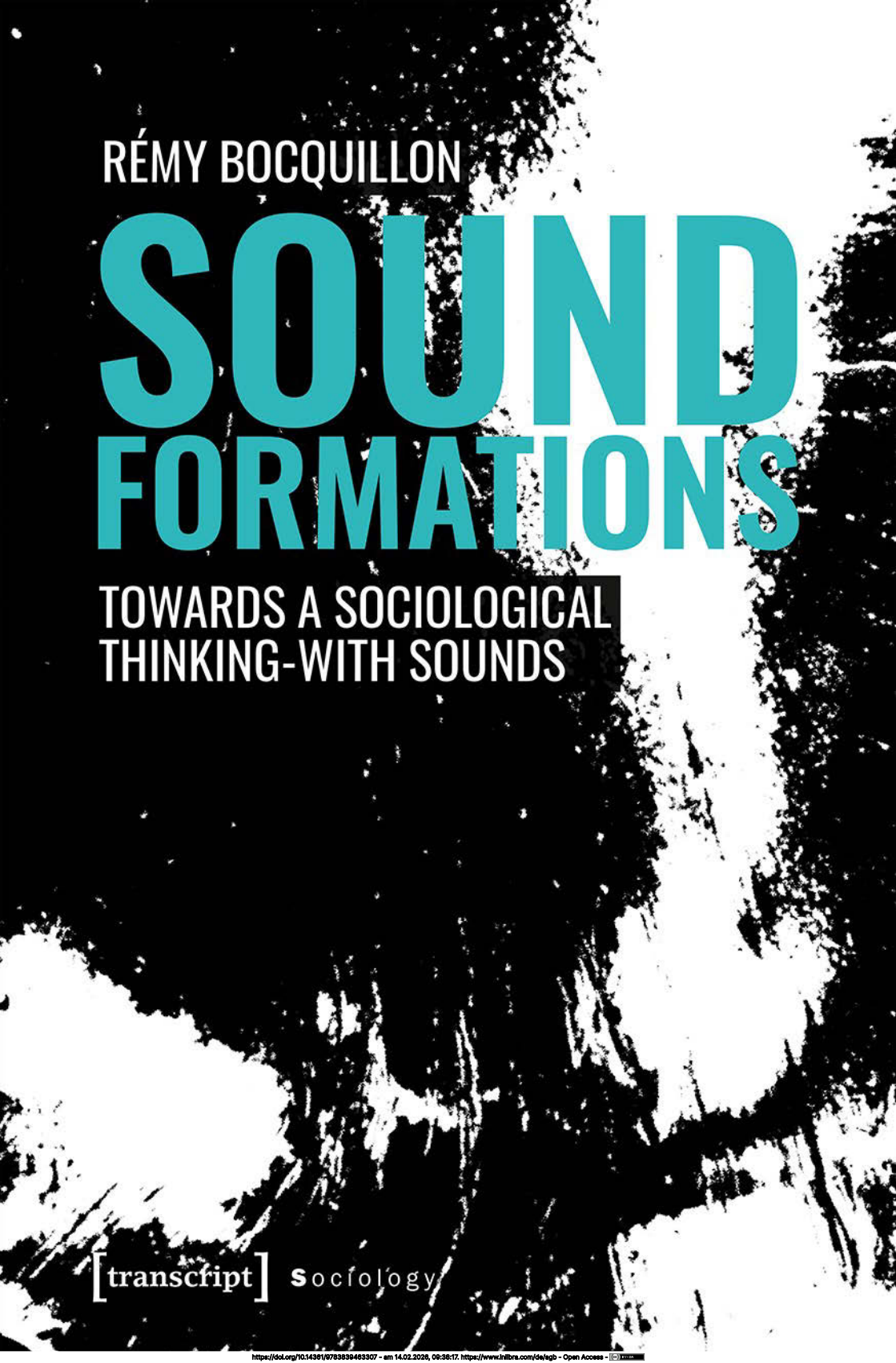

Rémy Bocquillon
Sound Formations

Sociology

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Rémy Bocquillon

Sound Formations

Towards a Sociological Thinking-with Sounds

[transcript]

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pour Serge

Introduction

»Rappelons-le : au-delà des entités actuelles, il n'y a rien, le ›reste est silence‹.« (Debaise, 2006, p. 162).

»There is no such things as silence.« (Cage, 2011, p. 191).

1. Where to begin?

May 2017, Edmonton, Canada. A long awaited lunch break, after a morning of conferences. I am hungry, and to be honest, a bit impatient to escape the hard artificial light typical of university buildings, to discover the city, take advantage of a beautiful sunny day, and get something to eat.

Still, I decide to postpone my meal outside and come back to the room where Ipek Oskay chaired one of the morning sessions a few hours ago. It was a session dedicated to different research topics around sounding, including soundscapes and soundwalking, Ipek's own sonic project *Sesol.org*, as well as a presentation of the intriguing device MIDI Sprout, a device for »making music with plants«[1]. The curiosity generated by the device led Ipek to invite the audience to come back at lunchtime, continue the discussion and discover the MIDI Sprout in more details, how it worked and how to play music with plants. An unofficial workshop of sorts, one could say.

1 The device, now rebranded as *Plantwave*, was then presented by one of the maker, Joe Patitucci.

I hear the plants before I see them. A recognizable music, reminding of the demonstration experienced earlier. Notes (were they piano notes, synthesized sounds?) playing, building (almost) random melodies and rhythms, clusters of sounds rendering a special atmosphere. A breath of fresh air (yes, a window is open, but it's not only the wind), relieving any mental fatigue that might have squashed itself in between the quantity of information and diverse knowledges that tend to be incorporated during an academic congress.

After some time playing with the plants inside, Ipek announces that she wants to take the device outside and test it on the lawn bordering the campus buildings. I ask if I may join her. I can't tell much about Edmonton's weather in May, but on this particular day, it was ideal. The sun was shining, it was warm, but luckily not too hot (I still had to retreat and seek shadows after a while). We played with the MIDI Sprout, put the sensors on the ground, experimented with how far apart they could be to still share a common link (a common root, a connection through water?), to close the loop and make sounds. We touched the ground, varying the pressure of our fingers on the soil, awaiting any reaction. Scanning the sky, waiting and wondering if the passing of clouds would bring any change (they did, slightly so, but they did). Experiencing another change when relocating under the shadows of a tree. An unexpected moment of play and joy, within the institution of knowledge production which still took nothing away from the impression of learning, of creating something of importance.

Needless to say that I keep a very intense memory of that lunch break, which morphed into a good portion of the afternoon, and of that trip altogether. One could surely argue that my depiction is ran by a nostalgic feeling. One could retort however that this is not the point. This trip and everything it encompasses — between the talks, the walks, the bars, the punk concert caught by chance — all that started a process that changed how I feel towards my own work. Or better said, all of them constitute a collection of impacts that changed how I thought of my work and how I think with others. It was not enlightenment, not a »aha« moment. It was a feeling, subtle but already persistent, diffuse but still distinct. A feeling initiated by the diversity of perspectives at

the conference, the multiplicity of ways of working, the kindness and awareness of those viewpoints, all in all, an openness. It took me by surprise. And I took this feeling home. It did not leave me. It grew, still unsure what to become. From the talks followed readings and the feeling became clearer, it found a basis for expression, for formulation. It found words. It does not only matter what you say, but how you say it. It does not only matter what your work is about but also how it is done. It does not only matter what you think but how it is thought.

2. Aesthetic play, sound and sociology

One aspect that particularly struck me then, and took quite some time to take form in what constitutes the following work, was how such a process of play, of aesthetic engagement with sound, even if quite »simple« in appearance, did bear something very important for the construction of sociological knowledge and could itself be presented as a mode of »doing sociology«, of »doing research«. »Sounding« as a possibility to produce knowledge, presented not only through the MIDI sprout demonstration, but through the other talks as well, where soundwalking and field recordings were constituting the core of the research, as a combination of ethnographic observation and aesthetic engagement. Not necessarily as tools or skills for the collection of scientific data (Bijsterveld, 2019), but as the maker of theory itself (Schulze, 2019). In short, a sonic sociology.

It raises epistemological and methodological questions. Not necessarily in the typical sense of which methods are best suited to a particular object of inquiry, but as a more general query: how come do we do sociology the way we do it? And to be expected, the question is itself opening up to a multitude of others: who is this »we«? What is it that »we« »do«? And a very much recurrent candidate within sociological theory: what is sociology, even? Taking that very experience of sounding seriously, as a possibility for theory making and knowledge production, what would it mean for the process of writing of a PhD thesis, what does it mean for the process of researching? In other words,

taking such a posture would not only show an engagement with what is being done, but as importantly, how it is being done. The production of knowledge not reduced to the silent world of ideas, to »intellectualised modes« (Montebello, 2015b) but a knowledge material, sounding, corporeal, beyond what is considered »scientific«, made through the aesthetic play. Sound then, in its immediacy and movement, in its multidirectional propagation, conceived as a flux of matter-energy-information (Cox, 2018) becomes a vector of intensities leading to the production of knowledge.

3. The importance of thinking-with

The following work is therefore not about sound, but rather about the possibility to think a »sonic sociology«, how it might look like, and how it might *sound* like. It aims for the possibility to work *with* sound in sociology, rather than write sociologically *about* it. It is not about the use of plants in music, but about how plants and music might be the co-creators of a sonic sociology. About how the materiality of sound itself is central to the production of sociological knowledge. Non-human actors as co-writers, ants and plants. A *thinking-with sounds*.

However, to propose such a work is already to involve as multiplicity of entities as bodies, theories, knowledges. At once, it is a *thinking-with*, which, through the use of the hyphen, emphasises the co-production of thinking processes. If the »how« is as important as the »what«, the »who« to think »with« is as well. First of all, as a nod, it refers to the work of new materialist and speculative philosophies and sociologies, building a posture towards the work itself rather than only being theory texts to cite from. To name a few, the works of Donna Haraway and Bruno Latour bear particular importance, but also who they themselves think-with, who those thought-with think-with and who thinks-with them: Isabelle Stengers, Vinciane Despret, Gilles Deleuze, Félix Guattari, Sha Xin Wei, Gilbert Simondon, Alfred North Whitehead, amongst others. Furthermore, it also includes all the other actors, non-human and more than human, friends, and of course, sounds. It therefore also implies

to *think with sounds*, which itself already gathers noteworthy entanglements with sound itself, as well as with the aforementioned philosophies, from the fluidity of sound in Christoph Cox's sonic flux, to Holger Schulze's process of *sonic thinking* and Salomé Voegelin's own thinking.

As Haraway puts it, »It matters which thoughts think thoughts. It matters which knowledges know knowledges« (Haraway, 2016, p. 35). It is a question of situation, of situatedness, as she explained elsewhere (Haraway, 1988). Proposing to *think-with sound* in producing knowledge in sociology is also a reflection on situation. On which knowledges are thought and produced, on the situation of scientific knowledge itself. On the one hand, because *sonic thinking* permits to challenge a certain hegemony in what it means to produce legitimate knowledge. It challenges the hierarchy of what is acceptable as scientific knowledge. On the other hand, it makes visible, or rather audible, as Schulze repeatedly notes (Schulze, 2018, 2020b), that scientific knowledge does not exist beyond but within power relations, and consequently, discrimination and alienation.

4. A posture towards

Accordingly, a sociological *thinking-with sound* is not only an epistemological or methodological discussion, but also necessarily an ethico-aesthetic engagement (Guattari, 1992), a posture that should reflect on the political and ecological implications at the core of the practice itself and the *matters of concern* it is entangled with. Experimenting with such practices in the scope of the knowledges »thought-with« implies to »stay with the trouble«, to quote Haraway again. It is not a political commentary or societal diagnosis however, but intends to reflect on how to propose a caring, meaningful and playful sociology in troubled times and thus already constitute a very critical perspective. As Isabelle Stengers explains, it implies to slow down as science. The illusion of timely responses and construction of readymade solutions only adds to the frenzied rhythm of capitalist necro-nomies, neglecting the ap-

parent »society« it analyses and reproducing the gap between »science« and »civil society« (Stengers, 2017; Stengers & James, 2013).

In this, *thinking-with sounds* is also a *speculative* venture. Not as a perspective retrieved from reality, but on the contrary, adding to reality, increasing the importance of experience, of the multiplicity of discourses and storytellings. In *Staying with the trouble*, Haraway proposes a declension over the letters *SF* as common denominator: »science fiction, speculative feminism, science fantasy, speculative fabulation, science fact, and also, string figures.« (Haraway, 2016, p. 10). The title of this work is another nod, to *SF* this time, as an extensible list of possibles: *SF* as »sociological fabulation«, as »sonic fiction«, as *sound formations*.

5. Overview of the work

The following work can be seen as an iteration leading to the construction of a *thinking-with sounds*, or rather, as an iterative process itself becoming *thinking-with sounds*. The first chapter deals with the *thinking with*, and will serve as a re-framing of the question of alienation of knowledge as well as a theoretical positioning. It is introduced in the mode of controversies, as developed by Michel Callon and Bruno Latour (Callon, 2013; van Loon, 2014). Arguing that it matters how sociology is being done does indeed asks the question of how knowledge is being produced. However, instead of a history of epistemology, it rather takes a particular starting point in philosophy, namely Immanuel Kant's work, which, through Alfred North Whitehead, will be understood as a *bifurcation of nature*, a separation between the nature in itself and the nature as apprehended by human beings. A bifurcation disseminated in the making and establishment of modern sciences as discrete fields of inquiry. It will be argued that this bifurcation as »split in thought« not only led to the strict separation between scientific knowledge and »the rest«, thus denying a plurality of modes of production, but also led to a form of alienation of knowledge, from its materiality echoing a hierarchisation in accepted and legitimate knowledges. The main perspective adopted in this chapter, and which will propagate through the work,

is that through a new materialist, speculative, radical empiricist inclination, an engagement with the multiplicity of modes of knowledge production is not only a possibility, but also constitutes a necessity, an attitude towards the making of sociology.

Sound, the second chapter, will propose and discuss the affirmation that the aforementioned alienation of knowledge from materiality is linked, or even constituted by the way knowledge has been produced in science: as a mostly visual endeavour. Through the impulses and thought probes of Marshall McLuhan and Walter Ong, it will be argued that the »acoustic space«, often reduced to archaic societies, not only would help to regain that said materiality, but that such a sonic material knowledge already exists and is being produced. Sounding as knowledge-generating. However, this perspective will also bring further challenges, namely the use of sound as merely *representational* medium, which not only applies »visual« limitations to the use of sound, but also reifies it to the extent where it becomes »sonification« reduced to human perception. The theoretical grounding started in the first chapter will therefore be continued in discussing how a nonanthorpocentric conception of prehension — as proposed by Alfred North Whitehead — could escape the representation and the need to make »sense of«, to explain.

The following chapter, *Thinking with sound*, introduces the possibility for a sociological sonic thinking. Taking on the challenges presented at the end of the second chapter, it reflects about the practices of sounding and how sound can be understood beyond the fixated object of inquiry. Through the work of Christoph Cox and Holger Schulze, it follows a shift from a thinking *about* sound, to a thinking *through* sound, *in* sound, a thinking *with* sound. It is an ontological question, to which Cox delivers a new materialist reading. However, beyond Cox's understanding of the sonic flux, the ontology of sound will rather be read through Gilbert Simondon's *ontogenesis* and the processes of individuation, central to his philosophy. Simondon's strength is to think the individual not through the defined and stable being, but through a notion of *becoming* that is itself very fluid and implies a multiplicity of actors involved. In other words, the third chapter proposes a reading of the sonic flux through

Simondon's philosophy of individuation and transduction. In addition, the sonic *thinking* at the heart of the sonic flux will be looked at in more detail, still through Simondon, and how as practice, it could become an integral part of sociological research.

The fourth chapter takes a step back to emphasise this time on the *thinking-with*. The hyphenated inclusion, as described earlier, is a particular gathering of thoughts and sounds, a nod to certain speculative philosophies, but in this part, it also gains another meaning: it will be argued that at the core of the attitude, the posture underlying *thinking-with sounds*, is an aesthetic engagement. This aesthetic thought, not as judgement of Beauty, but as *aesthesis*, the sensible, becomes a gateway to other modes of knowledge production that are not necessarily mediated by anthropocentric perspective, either as »perception« or intellectualised through representation. Once again, it is through Simondon that the notion of *aesthetic thought* will be pursued, as a possibility to bring back magic, as certain »enchantment« of the world, as an addition to reality, a thickening of the real, a different relation between entities, beyond dualisms nature/culture, technique/culture, through a *thinking-with sounds*. It is therefore more than a simple »aesthetisation« of research, but rather an attempt to echo Félix Guattari's ethico-aesthetic paradigm, as a multiplicity of possible creative and critical practices.

The fifth and last chapter is itself an overview, a re-collection of sounding experiments and thinking processes which co-constructed the following work. Not a presentation of results, or research design, but an archive of the thinking|doing practices that were part of the research over the span of the last few years. It includes a description of installations and workshops conducted both inside and outside the university, which themselves are not applications of clearly defined methods, but part of the process of writing the thesis altogether. Moreover, it also adds further theoretical reflections on particular aspects of *thinking-with sounds*, which also manifested themselves through the thinking|doing entanglements, as propositions either resonating with aspects presented in other chapters, or expanding from them onto new possibles. Finally, because such a work should also be sounding rather than remain a flat reduction of sound, the fifth chapter is also fol-

lowed by an audio counterpart, completing the *thinking-with sounds* anarchive: a sounding feedback, presented in the form of an »audio chapter«, where bits of narration illustrate recordings or sonic re-creations of the mentioned installations. They are not only passive renderings, but inviting for further actualisations and experimentations, through the inclusion of every program, sound and data used in the making of those installations. An extension of possibles hopefully, beyond academic particularism.

THINKING WITH | The alienation of knowledge: A theoretical frame

1. For a sociology of sociological controversies

> »Dans une controverse technologique, ce qui est intéressant c'est ce qui l'amène à être technique et ce qu'il faut éviter ce sont les controverses où il ne reste plus qu'un social résiduel et des technologies durcies.« (Callon, 2013).

One should avoid controversies where only a »residual« social and hardened technologies are left. Sociology would only suffer from it and become itself the continuation of those technologies rather than science (Callon, 2013). With this claim, Michel Callon closes his article *Pour une sociologie des controverses technologiques* (For a sociology of technological controversies). Originally published in 1981, this particular piece is probably one of the founding works of what is known as Actor-Network Theory/sociology of translation/sociology of associations that set Callon, alongside Bruno Latour, John Law, Madeleine Akrish and others, into a new venture (an adventure I might dare) which unarguably redefined sociology and proposed a novel perspective on how to look at science and knowledge. One of their main objectives was to show to which extent the construction of scientific facts and truths was never only a matter of pure science, never an undiscussed consensus, but embedded in constant negotiations between a myriad of interests, which are sometimes situated outside the laboratory itself (Knorr-Cetina, 1999; Latour & Woolgar, 1986). In other words, the production of scientific and, so explains Callon,

technological knowledge, is taking place in-between what they name »controversies«. Those controversies unveil the different interests and states of negotiations which »precede and delimit« the choices being made in research and further »constitute a privileged terrain to study the mechanisms through which certain solutions, which impose themselves locally first, end up to spread across society as a whole.« (Callon, 2013, trad. by the author)[1]. However, as Callon argues at the end of the quoted article — as a sociologist, one should avoid to »tackle«, or to »dive« into controversies that might appear too hermetic or to which solutions have been found long ago. The danger of launching such a debunking enterprise could only subject sociology to the technologies of what it attempts to analyse, or so it seems. Indeed, for Callon, controversies within fields or domains already strongly constituted, organised, become too restrained, only a »relative choice« between alternatives following a cost/profit calculation rather than a real issue. Those technologies become self-evident, appear as natural, and the resulting social presented as pre-constructed, structured by the technologies and machines at play. It gives a sense of irreversibility[2]. This is why Callon rather proposes to consider controversies which seem more open, where negotiations are multiple and the decisions not definitive, not reduced to an array of pre-defined choices (Callon, 2013).

Still, one could ask: isn't one leaving unconsidered and untouched a larger slice of what science is, or better said, of what is considered to be acceptable science? Aren't sociologists taking part in one of those controversies without really willing to take them seriously, out of arrogance perhaps, or fear, memory loss, laziness[3]? A set of questions directly followed by another one: If that is the case, what might those

1 Original quote : »Ensuite elles constituent un terrain privilégié pour étudier les mécanismes par lesquels certaines solutions, qui s'imposent d'abord localement, finissent par s'étendre à toute la société.« (Callon, 2013).

2 Here, Callon gives a few examples, ranging from nuclear energy to biotechnologies (Callon, 2013).

3 Those adjectives are of course not thrown at Callon or ANT in general, as they themselves are the few attempting to ask and answer those questions.

controversies within sociological theory look like? Are they located in paradigmatic differences? In methodological disparities? To a certain extent yes, but those are discussed relentlessly in sociology. Preceding those turf wars thus arises again another question worth asking, encompassing much more streams, traditions, including everyday practices and those of colleagues, inside and outside one's own chair, own field of expertise: how does sociology conceive its own work as knowledge production? To put it differently, in interrogating the construction of scientific facts, which is an interrogation about the construction of knowledge and truth, shouldn't one also question what is being done and how it is being done? Shouldn't one look at how, as sociologist, as scientist, they understand knowledge and apply it to their work? By accepting that knowledge production is not a straight line, but a network of interests and negotiations, can one look at themselves and put their own epistemological practices to the test? If knowledge about solar neutrinos or scallops (Callon, 1986) is traversed by controversies, sociological knowledge, and knowledge construction in itself might be as well.

The *techniques* used in sociology — without being exhaustive — constitute an array ranging from various sets of methods (quantitative, qualitative, mixed) to the processes of writing and publishing books and articles, from speeches to audiences mostly composed of scholar colleagues and/or students to research projects proposals, asking/begging for finances. And so on and so forth, the list is long. Those are the »norms« and are rarely discussed as such. Even the disputes between preferred methods, theoretical convictions, paradigms, might they be general or concerning points of detail, are accepted as that norm, as what it means to be a sociologist, a representative of a so-called multiparadigmatic science. Among those techniques, some are generally considered »scientific« at first glance. As such, even if one fraction or the other sees those particular techniques as »the bad kind«, they probably won't be denied their sociological value, they still are part of the same extended family, like that weird third grade cousin only seen at funerals or the strange conservative relative one doesn't want to talk politics with

at Christmas dinner[4]. They are still tolerated, they are part of the game. The quantitative–qualitative opposition, which is still very much active, remains based upon the mutual recognition of colleagues as sociologists. That does not take away the intensity of the debates, sometimes staged, but sometimes central to the definition of an academic field. In that manner, the processes of researching, presenting, representing and debating the research is the everyday routine, vital for the existence of sociology as *a science*[5]. But again, it's part of the job, no one seems to deny that. It is an intellectual work, which includes along the way practices of reasoning, interpreting and writing, considered scientific. At the same time, it is a scientific work including not very scientific practices (travelling, enjoying evening buffets at conferences, justifying expenses etc.), which are part of sociology as an academic field, without apparently being sociology itself.

Based on Callon's definition, one could therefore easily argue that those practices are indeed the result of controversies, perhaps long gone (they are not, as I will present later (Kissmann & Van Loon, 2019a)), perhaps indeed — as he argues — too dangerous to discuss (but dangerous to/for whom?), perhaps not even harshly debated (actually, they are), but that are representative of how what it is to »do sociology«, and more generally, what it is to »think sociologically« and to produce sociological knowledge, is conceived. The state of affairs in those matters,

4 The staging of the debate in German sociology between the Deutsche Gesellschaft für Soziologie and the Akademie für Soziologie, even if raising interesting questions, is one of those examples (see the debate: https://www.youtube.com/watch?v=6KXOLVYuVYc). However, it is in itself nothing new to sociology, as the main conflict revolves around which paradigms should be preferred. It can be summed up as another expression of the qualitative versus quantitative debate. Nevertheless, the issue is not only of methodological or epistemological nature, but becomes political as well, for instance when dealing with research funding. The question if it builds a controversy in the sense of Callon, or only presents »relative choice«, remains open.

5 A routine implying movement, over long distances, in a short amount of time. I'd be curious to see scholars‹ carbon balance sheets, at least before reconfiguring the ways of doing things because of the Covid-19 pandemic.

just as in any other kind of practices, is not an ex nihilo happening, but has historicities, traditions, ramifications, and of course, consequences. The issue that I intend to further discuss is that those controversies, which do have consequences for sociology as a science, also have a strong impact on how one conceives their own work, and how, as young researchers writing PhDs especially (but not exclusively) one engages more or less directly with those processes, if at all.

2. Defining the controversy

Practices of »doing sociology« have been — and still are — in the middle of controversies in the sense of Callon and I would like to argue that one in particular seems to remain vivid. For the sake of it, let's be bold with the definition of the argument: *knowledge has been alienated from materiality*[6]. It has been reduced to an intellectualised mode and became the prerogative of reason, thus denying consciously or not, the plurality of its modes of production (Montebello, 2015b). The formulation of the controversy might appear simplistic at this point, and although it constitutes the core of the argumentation, it is alone (in that form) far from enough, and several important precisions are more than needed. *Knowledge* mostly means knowledge production as in the practices of producing knowledge. Again, the question stems from what one is doing, as a scientist. And because this is a sociological work, knowledge production in sociology in particular. This is important to specify, because from this controversy and its field of possible unfoldings should emerge not a work of epistemology or metaphysics but a work of sociology including questions coming from various philosophical domains.

6 The formulation of the controversy, which carries the reflection of this work, bears a relevance that extends beyond sociology. Both April issues of 2019 and 2020 of the Zeitschrift für Medienwissenschaft (published by the German Society of Media Theory) include either in their editorial or in their articles the necessity to reflect on scientific practices of knowledge production (Fahle et al., 2020; Gramlich & Haas, 2019).

The controversy concerns the thinking as well as the doing in sociology and sociology is never very far from philosophy. Thinking is a doing and doing is a thinking as I will further discuss later on (Manning et al., 2018).

A few words about *knowledge* then. I find it interesting to look at the different etymologies of the word to see which characteristics are brought in. Maybe it is because I am a French citizen, based in Germany and writing in English, but the words and meanings tend to gain in comparison value, as they sometimes mix up how I look at things and try to grasp them. Still, this small exercise is not meant as an exhaustive analysis in comparative linguistics but rather constitutes a gathering of meanings and trajectories. It seems to be an obvious statement, but more often than not the etymologies and translations of the same word in different languages present disparities in their understanding but also in their usage, giving a same »concept« a very particular colouring. For instance, *knowledge* in French can be either *savoir*, from *sapere* (in Latin: to know, to taste, to try) or *connaissance*, from *cognoscere* (in Latin: to know, to learn, to recognise, to be acquainted with) but also bears the idea of a »being-born-with«, a co[n]-naissance. If both terms mean *to know*, the word *connaissance* comes closer to the fact of knowing somebody (je te connais), and somewhat brings a more material, physical, intimate even, dimension to knowledge. The physical encounter is producing knowledge. In German, two words can be found as well: *Wissen* and *Kenntnis*. The first one is relatively similar to *savoir*, the second one to *connaissance* and both can be understood as *knowledge*. However, when one looks at the definitions, in French as well as in German, *savoir* and *Wissen* can be understood as a gathering of *connaissances* or *Kenntnisse*. *Savoir*/*Wissen* is a more general term, a lexicon, a database, where particular *connaissances*/*Kenntnisse* can be found. That might explain why there is a *Wissenssoziologie* rather than a *Kenntnissoziologie*. However, and that might be interesting to sociologists only, both *sociologie du savoir* and *sociologie de la connaissance* can be found in French. If the two meanings are more or less interchangeable, the latter one is more often used as a direct translation of »Wissenssoziologie« (is there even a Kenntnissoziologie?). Finally, *knowledge* in English comes from *knowen* (to know,

to recognise) but is also related to *knowlechen* (to find out) and — as already seen — can be used for both *Kenntnis* and *Wissen*.

Either way, the French words of *savoir* and *connaissance* bring from their Latin etymologies the idea that knowledge is material: on the one hand, it means *to taste*, on the other hand, it can mean to physically *know* someone, a periphrasis for sexual intercourse. In each case however, knowledge is material, even the cognitive process is corporeal, linked to the lived experience, constitutive of it even. The same materiality is also present in the earlier uses of *knowledge* as in »the carnal knowledge«. The German word *Wissen* presents one other particularity. Its indo-germanic roots presumably lead back to the idea of »seeing«, which even if it denotes a material character, also might underline the link between knowledge, visuality and rationality, as I will later explain[7]. However, those examples show that the use of knowledge, as in the actual practice of producing knowledge (not the use of the concept), remains quite homogeneous in its materiality despite the slight differences in etymologies. The concept of knowledge on the other hand, that's another story, there is even a whole branch of sociology dedicated to it.

What is knowledge, one might then ask? I can easily say for now, with encyclopaedias as backup (whatever it means), that knowledge is the saving of more or less certain information (facts, theories etc.) and that it seems necessary for action and decision-making. A potentiality for future assessment[8]. Very quickly however, one can see how problematic this apparently simple definition can become. Knowing is *having* — I have knowledge on a topic. It is a gathering, a collection. The Greek word for gathering, *legein*, interestingly gives another dimension to knowledge by already implying the *logos* (van Loon, 2017), as speech,

7 »Wissen«, in old German wizzan, would come from indogermanic root weid, which means »to see, to spot, to recognize, to discern«. For the full etymology, see (Kluge & Seebold, 2011).

8 At this point, one could easily deepen that superficial definition of knowledge, differentiating between *episteme* and *techne*, or invoking decisive concepts about knowledge, from the cartesian *cogito ergo sum* to Husserl's phenomenological reduction amongst many others.

comprehensibility, but also as accountability. Knowledge is something that one can possess, give, share, retain for oneself. It implies a distinction between a subject that knows, and an object (things, words) that can be known, which is a very Kantian definition and the basis of the controversy started above (Debaise & Stengers, 2017).

Others might rather understand knowledge/information as the travel of energy (De Landa, 1997). Knowing as *logos* is therefore the gathering of energy but this energy can also be seen as power. Non-metaphorically. As Foucault would argue, knowledge is a gathering of power that can constraint or liberate, create or destroy bodies (Foucault, 1990, 2008). Not only because it can be retained, but also through its delivery. It is very material and some theoretical constructs certainly back up this materiality: both Karl Polanyi's implicit knowledge and Pierre Bourdieu's incorporated knowledge are forms of knowledge that are embodied, »made« material again. They are directly linked to the body, to the material, and not so much to the process of logical reasoning. At least not any more or not entirely. However, one could point out that to become incorporated or implicit, knowledge must be explicit first, »outside« the body, or so it seems. This process would then somehow indicate that if knowledge exists outside bodies, outside materiality, there is a separation between mind/soul and body, between the intellect and the senses, thus echoing Descartes' mechanistic perspective (Canguilhem, 1952). To which one could argue that this distinction relies on an anthropocentric perspective that posits as central and particular the human bodies and minds (van Loon, 2012). Knowledge can be passed from bodies to other bodies, it is an exchange, an encounter, that itself is a flux of energy, in a non-metaphorical way.

When Jean-Fraçois Lyotard asks in *L'Inhumain* (1988) if thought can exist without a body, it could be understood in this way. Indeed, for Lyotard, thought needs a body, not necessarily as an existential need, not necessarily as the *software* needing *hardware*, but because of the process of thinking itself, which is part of the corporeal experience. In other words, thinking as a process is itself already corporeal, and needs to be thought of (or implemented?) that way: as a process emerging from within what is being processed, rather than two separated realms. The

question of thought, as a reflexivity possible through corporeal experience rather than a purely logical operation, thus becomes a question of knowledge. Following this thread, a possible issue with so-called *Big Data* might lie in what Lyotard is warning against. The question »what happens when data is cut from experience?« becomes a question of the materiality of knowledge itself, as a constitutive part of that experience. Cross-reference and behavioural algorithms are therefore only mimicking the analogical process of thought. They might quantitatively give an image of what experience looks like, but as Lyotard puts it, it lacks body, a certain thickness (Lyotard, 1988). Nevertheless and to a certain extent, this question of the inhuman also asks which bodies and which experiences are taken into account, and thus, who generates, or gathers knowledge?

3. The roots and implications

Before going further, another precision: however sociological this work may intend to be, this does not mean that it should — or even can — remain situated within the pre-defined boundaries and epistemologies that are deemed exclusively sociological. Sociologies of science and technology have shown how science practices include very unscientific processes. This statement, applied to sociology, means that sociological discourse can never remain exclusively sociological, in the classical sense: dealing with the construction of sociological knowledge, with its recognition as scientific knowledge, stating that knowledge has been alienated from materiality, is, as Latour notes in *Nous n'avons jamais été modernes* (2010b), dealing with a hybrid construction, where the hybridity itself comes from the separation of domains, of human/non-human, subject/object, nature/culture. This hybridity is a vast network including sociologists, of course, but also philosophers, philosophers who do not want to define themselves as philosophers, anthropologists and ethnologists, religious traditions, politics, natural sciences, the »modern human«, nature, the »social«, the Earth itself, knowledge, space, sound, silence, and so on, and so forth. This controversy is therefore part of a

vast network and finds itself in the midst of heterogeneous historicities and actors, even at the heart of relations of power and domination. It does not have one origin-story. It is rather part of processes evolving throughout the years, throughout centuries even, through travelling interests, ideas, actors never completely staying in one place. History with a capital H, even of ideas, was never a straight line (De Landa, 1997). The history of concepts is not either (Deleuze & Guattari, 2005). At this point, it is also important to note that the formulation of the controversy also already appeared numerous times before, in a roughly similar form, or posited very differently but implying similar debates, either concerning the development of modern sciences (Stengers, 2011), or the relation between science and technology (Canguilhem, 1952). In any case, those debates can be brought together through their main claim: thought has been split in two distinct realms, which are more or less communicating but always remain separated. Moreover, those debates, the theories and concepts they rely on, are going back to crucial issues of Western philosophy. It is not a necessary reminder to state the youth of sociology as an academic field when bringing up those questions. Still, it can only support the affirmation made above: it is never only a sociological discourse and sociologists are themselves caught up in the controversy. On that basis, I am not willing to deliver either an exhaustive history of the birth of sociology from within sociology or a detailed account of the evoked debates, which would end up becoming a history of dualist Western philosophies since Plato. Nevertheless, a few stepping stones, »key moments«, should be laid, mapping the way in order to explain the controversy more precisely.

What is often described as the defining starting point of the controversy itself are Kant's *Critiques* and his definition of *Aufklärung*, both commonly seen in Western traditions as one of the most important revolution in philosophy and science. A revolution which is still palpable in the everyday making-of science, but which did however bring with it what Alfred North Whitehead understands as an absurdity, a split in understanding human experience and nature, a *bifurcation*. From Kant's account result two different understandings — two separate existences even — of nature, which are being opposed: »the nature apprehended in

awareness and the nature which is the cause of awareness« (Whitehead, 2015, p. 21), nature »in itself« and nature »for us«. This has very strong consequences on how to conceive one's thinking. According to Kant, human beings are limited in their capacities of knowing, and are unable to know *things in themselves*. To phrase it differently using two other dualist philosophers, namely Descartes and Locke, whose definitions of primary and secondary qualities also compartment knowledge production, the primary qualities are the things-in-themselves that cannot be perceived and the secondary qualities are particular manifestations of the primary ones, or sensations (their colours, sounds etc.) (Montebello, 2015b). It is another platonic separation between the world of things that one physically (but doubtfully) experiences and the world of (pure) ideas revamped through modernity. However, this separation, this duality in Plato's thought, which led to the bifurcation between real and possible experience, is not so much between the pure idea as model and its representation as copy, which one could experience. As Deleuze shows, the more profound platonic duality is to be thought through the difference: between the copy and the simulacrum (Deleuze, 1981). Between the icon resembling the model, and the phantasm differing from it. For Deleuze, it is very moral view of the world, vouching for the resemblance, the copy, the icon, and against the simulacrum, which is not only a copy of a copy, but difference itself »externalising« resemblance (Deleuze, 1981). Platonism thus rejects the simulacrum in its creative potentialities, as becoming through difference, rather preferring a certain understanding of experience towards the »real«, in the philosopher's pursuit of truth, already defining what can be understood as knowledge and which is apparently separated from nature »in itself«[9].

Coming back to Whitehead, the bifurcation is not actually the theoretical dualism itself, but the ensemble of processes, operations, prac-

9 For Deleuze, by putting back the simulacrum at the centre of experience, for instance in experimental artistic practices, new individuations are possible that are both real and possible. In reversing the platonic dualities, Deleuze is therefore proposing to »reunite« the domains of experience originating from Kant and weigh against the bifurcation (Longo, 2016).

tices that led to the categorisation and to the territorialisation of scientific thought and practice (Debaise, 2015a) and to a certain extent to the separation between science and society (Stengers, 2011). Consequently, by territorialising knowledge in human minds (and their perceptions), not only are »the objects« entirely separated from the human subject, but they are denied any kind of agency, remaining mere inert outcasts, that are acted upon, mere machines and slaves. It is inscribed as an inability to act — which is an inability to think. However, is it at the same time an inability to know (van Loon, 2012)? Reflecting on this bifurcation is already asking how objects can know and how knowledge can be produced. The subject–object dichotomy, the distribution of agency, the territorialisation of knowledge, have an impact on the very practices of production of that knowledge, it is a distribution of power, a hierarchisation between the human and nature, but also between who is defined as human and who is not. »Nature«, or the »objects«, only become data sources. They are denied the capability to act not only on the collected data, but on the way it is being collected, as if the methods were blind to their own object of inquiry.

However, looking at science the way STS did, it is evident that it is not really the case (Latour & Woolgar, 1986). As Latour explains it, two different orders are simultaneously at play, two different sets of practices which have been kept apart since the bifurcation. On the one hand, hybrid practices producing a network of nature and society, made of scientific research, political interests and »nature« itself. On the other hand, a separation between a nature that has »always been there« and a quite stable »society«, a separation between humans and non-humans (Latour, 2010b). Consequently, the more the world is being analysed and described by science, a natural world without man, and only (partially) understandable through Reason, the more that very natural world is being humanised, explained by the particular human Reason, but also »brought in« through hybrid practices (Montebello, 2015a). In other words, by locating nature as »the outside« one experiences, knowledge was also subjected to the bifurcation. Its production had nothing to do with nature itself, only with its apprehension, its understanding, as subjects. Our faculty of perception was itself seen as a human particu-

larity to experience the world, but only one-sided, with a world ready to be experienced by us. Still, by bringing the world in, hybrid practices annihilate the separation human/non-human, they even require from those objects to manifest themselves and be convincing, like Pasteur's microbes (Latour, 2001). At once, the acting potentiality of objects, negated faster than one could say »consciousness«, is being rehabilitated for the sake of knowledge. For Latour, this might show a blatant anthropocentrism, but more importantly, it exposes the paradoxical quality of the bifurcation. The issue he therefore sees in what he describes as the »Constitution of the moderns«, which is more or less a manual of the bifurcated nature, is not whether one side is right or wrong, but that the »moderns« let both co-exist in a very strange manner: »C'est parce qu'elle croit à la séparation totale des humains et des non-humains et qu'elle l'annule en même temps, que la Constitution a rendu les modernes invincibles.« (Latour, 2010b, p. 57). In turn, the modern critique's invincibility means that either position one takes, »the critique« will take the other one, as he shows in *Why has Critique run out of steam?* (2004). Depending on the argument opposed, the subject is either a determined machine or a powerful being of free-will and the object is either the source of determination or the receptacle of free-will:

> »This is why you can be at once and without even sensing any contradiction (1) an antifetishist for everything you don't believe in — for the most part religion, popular culture, art, politics, and so on; (2) an unrepentant positivist for all the sciences you believe in — sociology, economics, conspiracy theory, genetics, evolutionary psychology, semiotics, just pick your preferred field of study; and (3) a perfectly healthy sturdy realist for what you really cherish—and of course it might be criticism itself, but also painting, bird-watching, Shakespeare, baboons, proteins, and so on.« (Latour, 2004, p. 241).

Applied to knowledge, this critique's position is also often used in a particularism (relativism) vs. universalism debate, that can also be found in the opposition between some philosophical and sociological paradigms

(Latour, 2010b)[10]. But more importantly — and this is Latour's point in *Why has critique run out of steam?* — those oppositions become dangerous when they are used within political rhetoric/justification and conspiracy theories. The impact of »fake news« is crucial here as they tend to equal knowledge to belief, which is for most critical theorists, scientists, sociologists and philosophers, a horrendous affront. In a few sentences, in a statement originating from let's say FoxNews, Trump's White House, or the AfD, the disparities between different modes of knowledge have been flattened out. Science becomes another form of belief, just another mode of producing knowledge, reduced to its leap of faith. Scientific knowledge is not taken for granted as matter of fact any more. It is part of interests, it is in the midst of controversies. The bifurcation of nature and the split in thinking knowledge production of course did not produce a Trump, or »fake news« as such, but did lead to a shift in how science conceived itself, its work and how it has been perceived. By erecting scientific knowledge as the true way to know the world, thus denying other modes of knowledge production — moreover a way that is not easily accessible to the profane public and that »should« remain separated from society — modern science has itself co-produced the situation it is in nowadays (Stengers & James, 2013). The management of the COVID-19 crisis, and mostly the communication about the crisis, show this situation quite clearly. On the one hand, some governments are dubbing science committees as truth speakers and policy makers. In that case, Science with a capital S is presented as quite homogeneous. On the other hand, the debate within scientific communities on the previsions, the effectiveness of treatments, the scientific-economic race to the vaccine show a heterogeneous, sometimes even competitive landscape. What does it say about science then? Mostly — and that is what Stengers also implies — it means that science is

10 It is also at the core of what Gilbert Simondon calls a disjunction between a theory of knowledge and a theory of action, still prevailing in the making of philosophy nowadays and leading us to understand thinking and knowing independently from doing (Simondon et al., 2016).

accountable and that the scientists should not be insulted by this accountability, but work with it and be responsible (Stengers & James, 2013).

4. The consequences in sociological thinking

The consequences for sociology in particular are as important as for philosophy and science (as already seen with Latour (2010b) and Stengers (2011)), maybe even more than in its opposition to the »civil society«, as they are constitutive of sociology itself as a discipline. Indeed, the resulting split in thought described above deeply influenced the way sociology has been done since its establishment in academia, even since Auguste Comte's own positivist definition of sociology. However, within sociology, the controversy and the bifurcation of nature can be summed up under a debate »that never occurred« between the sociologists Émile Durkheim and Gabriel Tarde. To be clear, there was actually a debate between both sociologists, which took place at the École des Hautes Études Sociales in 1903. However, there is no extensive record of this meeting apart from some superficial mentions[11]. Anyway, in the building of his constitutive mythology — a prequel to the ANT-verse — Latour did find a sort of theoretical filiation in Tarde's own work, which he opposed to Durkheim's (Latour, 2005). That found filiation gave him the idea of re-staging the 1903 debate, by creating a discussion based on quotations from Durkheim's and Tarde's actual works. This is why it is in actu a »debate that never occurred«. Now, beyond a simple hero vs. villain staging, Latour's idea was, through this play, to propose a discussion coming back to the sociological roots of the debate — which he sees as constitutive for how sociology is performed nowadays — and the distinction between what he refers to as the *sociology of association* on the one hand and the *sociology of the social* on the other hand. The interesting character of this play is neither the history re-telling (again, this debate never actually occurred) nor the preference Latour has for

11 As indicated in the script of the play quoted in that part.

Tarde (Durkheim's success within sociology eclipsed Tarde's work for a long time) but the help it provides to understand how sociology has been shaped[12]. Moreover, besides the presentation of the core ideas of both Tarde and Durkheim, the text does so in the mode of a »doing sociology«, a kind of podium discussion which can be so often found in conferences (Latour et al., 2007).

In this debate, three main disagreements are being discussed and all of them could be seen as consequences of a bifurcation of nature. The first one (which contains both others) concerns the place and role of sociology as a science. As introduced above, a bifurcated nature led to a clear territorialisation of scientific thought. For Durkheim, this is exactly what sociology should achieve. It should establish itself as an autonomous science apart from civil society on the one hand, but first and foremost apart from other disciplines on the other hand (mostly neighbouring ones like psychology). This clear distinction is only possible through a precise definition of its object, which for Durkheim are the social facts. Only then — and with the help of scientific method — can sociology produce objective knowledge about society (Durkheim, 1967). This is for Tarde already problematic as for him »not everything that members of a society do is sociological« (Latour et al., 2007, p. 3). He already defines the hybrid character of »social facts« that Latour would later evoke in *Nous n'avons jamais été modernes* (2010b). Even if the establishment of sociology as an independent science is for him quite understandable, the too narrow definition of its object of inquiry is what should be avoided. This is a central difference between both authors, because of the consequences the disagreement infused in how sociology is being made. By reducing sociology to the study of social facts and locating them outside individual lives, Durkheim does not only strategically position sociology in the academic landscape, but also

12 As already stated, the impact Tarde actually had on sociology is of course far more limited than Durkheim's. The goal is therefore not to grant Tarde more importance than he had back in his days (without negating it of course), but to illustrate the theoretical disparities, and thus the already existing controversy, between different sociologies.

denies the materiality of those »social facts« or the importance — even for sociology — of facts that are not defined as »social«. In one strike, Durkheim thus completes the bifurcation of nature, by separating the individual from society as well as separating nature from society, both being for Tarde highly problematic standpoints. The first part of this bifurcated sociology denies the singularities of each situations, reducing them to occurrences cancelled out by the collective as exteriority. This is where the Tardian laws of imitation are particularly important (Tarde, 1898, 1993). Rather than explaining the social through the social, they allow to think from those singularities, from the smallest differences. They shift completely the focus of sociology from a science looking at social facts to a science looking at the smallest difference, the monad, the association. Because it is also where the difference between both theories lie: in how they understand the individual and the group. For Durkheim, the whole is more than the sum of its parts. For Tarde, the group can never be more than the individual. Furthermore, Durkheim sees the individual and the group as fixed beings. Tarde sees them as movements : »Il n'y a, dans l'ontologie de Tarde, ni individu ni groupe, mais des individualisations et des regroupements.« (Latour, 2011, p. 27).

Without willing to resolve oppositions in an attempt to convince the »other one« and thus reduce that alleged opponent to a false dogma, the observation seems nonetheless clear in how sociology is shaped nowadays: in the multiplicity of paradigms, the bifurcation of nature is still present and very much so. The Durkheim–Tarde opposition sketched above, made a bit artificial by Latour's own story-retelling, even if quite polemical, remains valuable, producing completely different ways to think the social and do sociology. On the one hand, what Latour calls the sociology of the social (also including critical sociology): a sociology embracing Durkheim's and later on Weber's dualisms and their separation between nature and society as well as between the individual and society. On the other hand, the side Latour possibly attempted to incarnate through his work, a sociology of associations, which rejects the described dualisms, and tries to practice a Whiteheadian, Tardian sociology (Latour, 2005). The main difference between both positions can be illustrated with — but not reduced to — their understanding of »mat-

ter«: the first position sees a clear distinction between »matter« and the »social«, a distinction that shaped human and social sciences in opposition to natural sciences. Against that position, what is commonly (and vaguely as it is a very diverse field) referred to as »new materialism« rejects that distinction, by also questioning the separation of natural and social sciences (Kissmann & Van Loon, 2019b). This has important consequences on how to understand reality and thus asks the question of the formation of one's knowledge.

For Kissman and van Loon (2019b), who take Berger and Luckmann's sociology as one representative of dualist paradigms, the issue lies in the interchangeability of *logos* and *episteme*: »The reality that is socially constructed is not the full reality, but the house of truth of being in which the human being dwells. It is the reality that makes sense and is meaningful in contrast to the reality-as-such, which remains inaccessible.« (Kissmann & Van Loon, 2019b, p. 11). This means that human beings remain bound to the experience of a socially constructed reality and thus to the production of a knowledge necessarily limited to that very construction. From this perspective, even claiming that another construction of knowledge is possible, that another engagement with materiality, with direct experience does matter, would be discarded as itself being part of a social construction and never as part of reality-as-such. Therefore, and from that perspective again, the fate of new materialism is already pronounced: a cognitive failure unable to acknowledge that one's experience is socially constructed. Taking matter or non-human actors into the equation would only mean a human interpretation, a human transposition of human demands onto their actions, their demands. One cannot escape that social construction of reality just like for Kant, one cannot experience things-as-such. The snake bites its tail, nature and society remain apart and one remains stuck in anthropocentrism. However, as Kissman and van Loon show, the core problem is of an ontological nature. Their example of rice cooking quoted below is quite eloquent. Matter is not something lying there, inert, that humans/sociologists only *make sense of*:

> »The rice is not demanding anything; it cannot prevent being overcooked or undercooked; it are those doing the cooking that decide how long the rice is to boil and thus how hard or soft it is going to be. However, even such defenders of the primacy of social cannot deny that the changing nature of the texture of rice is not the product of a social construction, but simply the effect of the duration of it being boiled. Learning how to cook well means that one learns from the rice; the rice tells us when and how its texture changes and when one is to stop boiling it. This is not some transfer of human language onto a physical process, but — in the words of Whitehead (1978) — a prehension. Hence it makes perfect sense — in a non-metaphorical way — to state that the rice demands. Being able to understand the demands of rice is referred to as cooking experience‹.« (Kissmann & Van Loon, 2019b, p. 16).

This example sums up beautifully how *prehension* as a process implies different modes of knowledge, of experience that are not automatically reduced to human perception-thought. It shows that matter indeed does matter and underline how knowledge and materiality do not constitute separated realms. In that case, reality becomes all that is, disrupting the dualism between a social construction of reality and reality-as-such. It shows that the separation between nature and society, the bifurcation of nature, which can be read as a separation between knowledge and materiality, an alienation of the former from the latter, is not a fatality. However, Kissmann and van Loon's account focuses on the German sociology of knowledge, which strongly uses Berger & Luckmann (1991) concepts. One reason for that »sparring partner« might well be that it is one of the paradigms within German sociology which is the most »vocal« about new materialisms and their »implementation« in sociological theory (through Latour's Actor-Network Theory for instance). Their chapter constitutes more or less a direct answer to critiques emanating from the sociology of knowledge. Nevertheless, it would be incorrect to consider that particular paradigm as representative for German sociology or even as representative for presumed opponents to new materialisms, which the editors understand,

through the plurality of perspectives they present in *Discussing New Materialism*. Still, and despite the clear disparities between both »sides« (sides reduced to a dichotomy which is in actu much more diverse) either on their ontologies or epistemologies, one can conclude from this discussion that the importance of materiality within sociology is apparently now of global understanding, even if the conclusions tend to differ (Keller, 2019; Schmidt, 2019). In other words, the presentation above was by no means a way to instigate or resolve a (still ongoing?) dispute some see as necessary, but rather to depict a quite superficial state-of-things. Even though different paradigms include materiality, they do not »work it« the same way. The main argument thus is not to show which one is right or wrong, but that there are differences in how they engage with them. Accordingly, reducing those multiple paradigms to one side or the other, even more when following Latour's own distinction mechanisms (wouldn't it be funny to quote Bourdieu here?), could appear as questionable. Am I not myself subscribing to that distinction, thus doing an »us vs. them« kind of thing?

5. The situation of knowledge

»The truth is out there.« (X-Files)

Is this an »us vs. them« scenario? I would argue that it is not the case. This is not an »us versus them«, a Tarde vs. Durkheim, a sociology of association vs. a sociology of the social. As explained at the beginning of this chapter, the main intent was to depict a sociological controversy concerned with how knowledge production has been shaped within sociology, but with roots going much further than an exclusive sociological discourse. This controversy is not meant as a ground for me to be the referee but rather to situate my own work — thus acknowledging its situatedness — and explain it. The formulation of the controversy »knowledge has been alienated from its materiality« supposes that another possible exists, not reduced to Reason, that there is a plurality of modes of knowledge production (Montebello, 2015b). But in turn, it

also supposes a situation of knowledge. Knowledge never exists *ex nihilo*. It is not an absolute that mortals can only imperfectly grasp, the true knowledge being *out there*, out of reach, in another universe, available only to some gods, philosophers and sociologists. Knowledge does not exist independently from us, hung over our heads, waiting to be looked up to by us, greedy academics writing PhD theses. And I know that this is already taking a side — de facto — but knowledge is situated. Or better said, knowledges (plural) are situated (Haraway, 1988). The production of knowledge — let's say for instance scientific knowledge — is always bound to the situation in which it is produced and transmitted. Not following a social construction, but interests. It partly depends on funding, reviewing, publishing. It is part of an agenda, being an institutional or a personal one. But it also depends on how the »objects« of research impose themselves to the researchers and manifest their »demands«. The claim for universal objectivity is always at best, a misunderstanding, at worst, a lie. One of the implications of this situation of knowledge is the fact that it is indeed in the middle of many — sometimes even competing — interests. Knowledge is *concerned* (ZfM Redaktion, 2019). Its production and transmission is therefore also a *matter of concern* (Latour, 2004). As shortly evoked above, it even becomes a question of power and domination. The making of the human subject within a bifurcated nature is mostly the making of a Western, white and heterosexual male subject.

Furthermore, the question of knowledge production also relies on the question of truth, of knowing something to be true, which is at the heart of Bruno Latour's research at least since *Laboratory Life* (Latour, 2012; Latour & Woolgar, 1986). As Latour explained in an interview for the French public radio France Culture echoing his *Enquête sur les modes d'existence*, truth certainly exists, but not universally, it is always subjected to the modes in which it is searched for (»Bruno Latour, Philosophe Des Modes d'existence,« 2019). Something that is »juridically« true is not necessarily scientifically true, or true in a religious

mode[13]. Truth does not mean the same thing depending on the modes in which it is produced. Moreover, the ways how knowledge is being produced to access that said truth, how it is being validated or refuted are also very different in each mode. Knowledge production in sociology is not the same than in art or in religion, or in politics. That, in turn, does not mean that each practices are the same and equal to each other, rather that they all are singular. Including modes of knowledge production that are not »intellectualised« means that one also needs to extend their understanding of knowledge beyond its reduction to a human activity.

Why is it that important? As I explained above, when the leader of the most powerful country in the world denies climate change, affirming that he does not believe in it, like he did in Davos in January 2020, reducing climate activists to »prophets of doom« or »fortune tellers«, one sees very clearly the limit of how scientific truth convinces people (Elliott & Wearden, 2020). How can something so undeniable and fatal as the current environmental crisis, which has been thoroughly documented, analysed, discussed and mostly agreed upon, can be that easily »refuted«, by simply attesting that they don't believe in it? And here I can only repeat myself: why is *that* so important? The incapacity of a rightfully baffled science to respond to this lack of faith in its methods to describe and explain the world, something that since the development of modern science has been more or less erected as an absolute, shows the situation of knowledge and the need to acknowledge it, pun intended. This opposition between »science« and »the public« — between scientific knowledge and »common sense« or »beliefs« — thus reaches in that case a dramatic point. And although it is something existing since the modern definition of science — as Stengers showed numerous times (Stengers, 2017; Stengers & James, 2013) — there is now a shift in power relations.

13 This is very clear when one looks at the debates concerning abortion. The truth claims from science, law and religion about the status of the embryo differ. They also can differ within the same modes.

> »Does [knowledge] correspond above all to a reality which pre-exists and is exterior to it, or does it actively participate in constructing a reality while at the same time creating a truth with regard to this reality? And secondly, which stories are told, by whom, from which perspectives etc.?« (Pihet et al., 2017, p. 69).

Those questions are not innocent. They show that the construction of knowledge and truth are undeniably *matters of concern*, and academics, should address that issue, reflect on it and work with it. Quoting them is not innocent either, it already gives a hint, not only about where this work is going, but from where it comes. In her last book, Donna Haraway (2016), who already coined the term of *situated knowledges* (1988), goes further by indicating that indeed it matters which thoughts think thoughts and that one bears a certain responsibility/response-ability to defend this plurality of modes and resist against the hegemony of one mode over the other. It is the same goal Latour is also following, but with different means[14]. In that manner, Haraway's words do bear a certain gravity and importance: it matters which thoughts think thoughts. Working within a »paradigm« is certainly making a choice. Doing sociology is also making a choice. By quoting this author over that one, by giving credit to these theories rather than those, by invoking scientific objectiveness or subjective immersion, choices are made. Those choices matter. Which in turn does not mean that every choice bears equal importance. Sociology is not like any other science just as science practices are not practices just like any other. No practice is just like any other. The situatedness of knowledge does not mean an absolute relativism. Embodying this perspective does not mean that »anything goes«, like Paul Feyerabend (1983) would argue. Nevertheless, it gives the bifurcation of nature a political nature: the values of knowledge itself have bifurcated. If they only show one thing, it is how one, and with whom (humans and/or non-humans) one thinks and produces knowledge have

14 One critique of Haraway towards Latour is his very own way of dealing with this issue. For Haraway, Latour's own writing and vocabulary is very (too much even?) war-oriented (Haraway, 2016).

consequences and as scientists, as citizens, also bear responsibility in that matter (»Isabelle Stengers, de La Science à La Sorcellerie,« 2020; Stengers, 2017).

6. Towards speculative fabulation?

To sum up, if I am willing — as proposed in the introduction — to question and investigate the experimental character of sociology, through a reflection about the inclusion of art practices and by attempting to put sound at the core of knowledge production, I am also making choices. Which does not mean that I negate or refuse the »paradigms that don't fit« and which does not mean that I already know where this is going. This uncertainty is what is central to this work: where does it lead me if I take knowledge materiality that seriously? How far can I go if I embrace new materialism fully within my work as a sociologist? A big »what if?« *en somme*. Because by stating that the bifurcation of nature is not an absolute but can be reconfigured, by taking the new materialisms seriously, the »how-to« drastically changes. In *Pandora's Hope*, Latour makes the following distinction between science and research, which sums up well this shift:

> »While Science had certainty, coldness, aloofness, objectivity, distance, and necessity, Research appears to have all the opposite characteristics: it is uncertain; open-ended; immersed in many lowly problems of money, instruments, and know-how; unable to differentiate as yet between hot and cold, subjective and objective, human and nonhuman. If Science thrived by behaving as if it were totally disconnected from the collective, Research is best seen as a *collective experimentation* about what humans and nonhumans together are able to swallow or to withstand.« (Latour, 1999, p. 20)

This is the main drive behind the present work. An attempt to embrace this idea of »research« which Latour defines, to reinforce and diversify the experimental character of sociological practice, to let knowledge production become an encounter, a moment of prehension, rather than

an anthropocentric thought-perception, unilateral gathering of information. It matters which thoughts think thoughts, as seen with Haraway. By questioning how one produces knowledge in sociology, and by applying to that question the idea that sound and art practices might bring new leads, what happens then?

> »Non seulement en suivant ces philosophies, le monde s'est repeuplé, mais en peuplant notre solitude et le monde mort des sciences, il s'est animé, enrichi, diversifié; il est devenu foisonnant, multiple, divers, non indifférent, communicable, participable, sympathisable. De nouvelles alliances sont possibles qui ne manifestent plus une parenté avec l'homme, mais une parenté de l'homme avec tous les autres êtres, distribuant au-delà de l'homme l'évidence d'une dignité inhumaine« (Montebello, 2015a, pp. 97, 98).

All is good and well, but »ces philosophies«, those philosophies, that will apparently »guide« this work, what are they? The broad category of new materialisms have already been encountered, which I will still retain. But to that, another precision might be added: the notion of speculation, which seems to be central to Whitehead's philosophy and its more recent developments through Isabelle Stengers and Didier Debaise, just to name a few[15]. Unlike what the label might indicate, speculative thinking in that sense is not an idealism disconnected from the real experience. It is quite the opposite, as Debaise and Stengers show: »Speculative thinking, as we seek to inherit it, is expressed for the first time, with the greatest accuracy, in Alfred North Whitehead's exhortation ›Philosophy can exclude nothing‹.«(Debaise & Stengers, 2017, p. 14). One of the main consequences of that thinking, of the ethical, moral obligation to exclude nothing, is that it takes into account, and makes central, the multiplicity of modes of existence, and consequently of modes of experience and production of knowledge. To put it differently, the philosopher, but one could extend this to the sociologist, cannot disqualify anything *a priori*. As the authors show, this is central to William James' *rad-*

15 The notion of speculation has gained visibility in the past few years, such that it became a »turn«, like the linguistic turn, or the spatial turn (Bryant et al., 2011).

ical empiricism as well. It can also be found at the core of Actor-Network Theory's principles, as described by Michel Callon (1986) or Bruno Latour (2005): one cannot define and posit *a priori* who is granted agency or not, define who is the subject, and who is the object. This is where the concept of speculation loses its vagueness and implies a commitment, the setting of constraints. One of them is to relate and »preserve what experience *makes important*« (Debaise & Stengers, 2017, p. 17). This is not meant in the sense of what is important to us, but important to the experience and the multiplicity of modes of existence it holds, humans and non-humans. Again, it matters what thoughts think thoughts, and upon that, those thoughts have consequences. »Making important« is a responsibility, an appeal to care. The importance of a situation, of an event, of experience, is that it *matters*, non-metaphorically.

Where to go, from there? That's the methods question, isn't it? To be granted research money, some standards are necessary, »a path to be followed«. A question asked indeed by Valérie Pihet in her conversation with Didier Debaise, Katrin Solhdju and Fabrizio Terranova about *Speculative Narration*. What is then the methodology of new materialism, or even speculative philosophy? Both Terranova and Solhdju bring decisive answers: »The problem today with methodology is that one thinks one can take it, shift it, and apply it elsewhere.« (Pihet et al., 2017, p. 76). This could appear as a way to discard the question by just stating, well, I don't do that here, I just make things up as I go. But what Solhdju then adds, using Whitehead's understanding of speculative philosophy and methods, takes away the doubt:

> »Crucially, Whitehead defined speculative philosophy as a method. But for him, a former mathematician, the notion of method was not at all linked to the idea of application. A method is not a ready-made tool-box that might be transferred from one context to the other in order to gain insight and knowledge about some new (pre-existing) field of research. On the contrary, a method, for Whitehead, is more than anything else an act of creativity, a creation. Such creation (in mathematics), however, is never arbitrary; rather, its creation is only

> possible with the respect to the precise construction of a well-defined situation of constraints.« (Pihet et al., 2017, pp. 76-77).

The methods then, are already there. The constraints the authors define are the ones already mentioned earlier and that ultimately link Whitehead's endeavour with William James' radical empiricism (James, 1976). To remind the core aspect of James' perspective: »To be radical, empiricism must not admit in its constructions any element that is not directly experienced, nor exclude from them any element that is directly experienced.« (James, 1976; quoted from Debaise & Stengers, 2017, p. 15). The philosopher cannot exclude anything but also cannot bring in what is not part of the experience, or rather, as Debaise and Stengers explain, cannot let an *a priori* judgement from outside the situation define it. This double constraint can be seen as what forms most of the speculative methodology. In the later parts of this work, one will see how they might appear along the way, not by limiting but rather expanding the possibles. This radical empiricist methodology brings two sets of consequences. On the one hand, an undeniable complexity in the processes of inquiry. Indeed, it amplifies the situation to a multiplicity of modes of existence that are not necessarily bound to human perspective and also refuses to consider a situation as extracted from anything else. Latour and Woolgar have already shown this empirically: the perfect and perfected laboratory situation is always already more (tainted?) and always part of the world (Latour & Woolgar, 1986). On the other hand, for Debaise and Stengers, it implies a »response-ability« or responsibility, an accountability, also in the sense brought by Haraway in *Staying with the Trouble* (2016). The ideas and concepts one uses, the situation one intends to make »important«, all those have consequences on what one is looking at. In the case of the above controversy and the building of a *thinking-with sound*, the main idea is to propose a different way to do sociology, to include sound practices as aesthetic practices in the process of doing sociology. This idea might have consequences on the practices of research, but also on the discourses that are implied, or on sociology itself as a science. Following Stengers, Whitehead and Latour, I am not allowed to deny it. In that situation, not every claim indeed sup-

ports my thesis, as I have shown with the Tarde–Durkheim debate or the critiques coming from the sociology of knowledge, and the speculative standpoint is not to be right or wrong: Debaise and Stengers, evoking Deleuze's figure of the »idiot« propose a slowing down, a looking around. In that sense, the practices of »knowledge production« slowly become encounters, first and foremost. It is about intensifying possibles. In a nutshell, what speculative thinking in the sense of Whitehead produces, as well as its ventures as »new materialisms« within sociology, is not so much a theoretical frame than it is already a methodology, an attitude.

7. The necessity of a choice

One question still subsists. Why going that way? Why making the apparently conscious choice to experiment with sound and artistic practices in a sociological work? Why willing to challenge the modalities of knowledge production? My choice did not come out of simple personal interest to combine what I might consider my passion with my work, although there is definitely some truth to it. It is not about doing something fun, even if one might ask: why not bring a bit of joy and playfulness into sociological research? Disclaimer — there is already a lot of both. This choice comes out of a necessity. A necessity for me to continue to work with said passion, and a necessity in order to propose a sociology that engages with a world I am already embedded in and to deal with the consequences of the bifurcation of nature.

> »Ever since the Enlightenment, Western philosophers have shown us a Nature that is grand and universal but also passive and mechanical. Nature was a backdrop and resource for the moral intentionality of Man, which could tame and master Nature. It was left to fabulists, including non-Western and non-civilizational storytellers, to remind us of the lively activities of all beings, human and not human.« (Tsing, 2017, p. vii).

What the anthropologist and philosopher Anna Tsing attempts to show in the introduction of her book, is that the way Western philosophies and sciences conceived knowledge since the Enlightenment — and partially still does — is based on progress. Progress is of course not inherently wrong but it is not an absolute quality either. It has histories, and therefore real and multiple developments. It is now an accepted fact amongst geologists and physicists that we entered the Anthropocene, attesting the disastrous impact of humanity on its habitat, an impact also partially coming from those histories of progress. Our mastering of Nature went so far that it changed the Earth for the worse, with no coming back. One slight precision though. Haraway notes it in *Staying with the Trouble* (2016): »our« is wrong. Indeed, not all humanity is equally responsible for that situation. In fact, relatively few are. That is why she prefers the term Capitalocene to Anthropocene. Histories of progress somehow collide with the history of capitalism (Boltanski & Chiapello, 2011).

Where Haraway and Tsing meet is in the attitude to have towards the world they live in. It is neither a resigned pessimism that it is over, no matter what, nor is it a wrong-placed nostalgia of simpler times. It is what Haraway calls the Chthulucene: becoming response-able, staying with the trouble, narrate other narrations, like Anna Tsing with the mushrooms, Vinciane Despret with the dead (Despret, 2015), or the collective *Dingdingdong* with those suffering from Huntington's disease (Debaise & Stengers, 2015). Tsing sees this attitude as a way to know the world without needing the (very patriarchal) histories of progress. The sociologist Benedikte Zitouni understands this definition as a new plane of problematisation, which intensifies the present, through the partial and local agencies, through the multiplicity of actors implicated, through the diversity of processes and practices at play (Zitouni, 2019). But it is also a very creative activity, a storytelling that is a »world-making«, which questions how and with whom those stories are told (Doucet et al., 2018). All of those formulations need new materialisms and radical empiricism, are already inscribed in them, as guidelines or inspirations, but none of them are reduced to a set of -isms. All are experimental works, within philosophy (Stengers, Debaise), anthropology

(Tsing), biology (Despret), sociology (Zitouni, Latour). And all of them also clearly state that they do not refute progress altogether. It is not an undoing. Rather, they speculate, ask about other possibles. It is a doing differently from within, with others (Haraway & Caeymaex, 2019).

> »L'expérimentation opportuniste est la clé stratégique du Chthulucène. Elle est rendue possible par l'introduction de la sympoiese. Il s'agit d'une expérimentation qui défie les tendances et qui nous importe *parce que* nous agissons dans le corps même du monstre dont nous sommes, parce que nous sommes associés et introrelatés dans une toile de vie, de mort et de survie qui ne cesse d'être tissée. Il s'agit d'une expérimentation ouverte, extensible, qui demande à ce que son histoire et ses effets soient sans cesse relayés, racontés et touillés dans le présent épais et gluant qui est le nôtre. Il s'agit d'une expérimentation contaminée et contaminante qui trace les lignes de partage à travers la réhabilitation même et les alliances qui s'y sont nouées. Elles se dessineront à chaque fois, pour chaque réhabilitation, pour chaque reconquête. Le Chthulucène est bel et bien continuation incessante.« (Zitouni, 2019, pp. 110-111).

So here it is, the necessity, the choice, the attitude. How to co-exist and survive »in the trouble«? By embracing the plurality of knowledge modalities and experiment with them sociologically. By allowing re-engagements with others (humans and non-humans), by immersing in re-compositions. It is an experimental re-enchantment of the world. Not because it was better before, or because it is a way to escape reality, but because it is where we're at, it is our reality. It should have become clear by now what the scope and intent of this work actually is: not only a thesis about sound, but through a *thinking-with sound*, also an engagement in research and a very personal reflection about sociology as a practice. I cannot seriously »do« sociology without asking those questions and reflecting on my own situation/situatedness.

> »I wrote this book as an exercise in philosophy in the mode of art, trusting that it can be done, that it matters not only what we say or do, but *how* we say or do it.« (Sha, 2013, p. 249).

SOUND | From silent knowledge to sounding representations

1. Knowledge has been made silent

In the previous chapter, it has been argued that the so-called *bifurcation of nature*, as defined by Alfred North Whitehead, (nature in itself/nature apprehended by us) led to what Didier Debaise defines as the territorialisation of scientific practices (Debaise, 2015a). As I have proposed, the bifurcation is also responsible for what I call an alienation of knowledge from its materiality, or from matters of concern. This alienation can be posited as follows: by understanding knowledge production as the process of how human beings gather information about the world that is apparently »outside and apart from them«, knowledge itself is being separated from nature and located, imprisoned in a separated conscious mind. A conscious and silent mind, which actually denies its own materiality. This will indeed come as no shock to state that knowledge production has been widely understood as a silent endeavour. The library is not only a place where one has to remain silent but what it gathers and contains also rarely troubles it. Silent knowledge is thus already leading to and becoming a product of alienation: the pursuit of truth through Reason by the platonic and kantian philosopher lies outside the possible experience, in an ideal void denying the material world. Moreover, this alienation is not only an expression of some philosophical debate between the dualities idea/thing, but has consequences on the practices of production of knowledge themselves. A knowledge kept silent is inevitably secret, only accessible to the literate. The pro-

duction and possession of knowledge thus separates, it *distinguishes* in the sense of Bourdieu (1979), it is embedded in relations of power, rendered in the separation between »science« and »civil society«, as already presented in the first chapter. Furthermore, a silent knowledge is also a knowledge silencing, reducing other discourses, other modes of its production, to silence. Another distinction, this time made on the basis of how it is being generated and by whom, in turn alienating the ones not allowed to speak. Discussing the controversy posited earlier, the question to ask is therefore if a sounding knowledge — rather than silent — is also challenging alienation? Was knowledge always silent? Does it always remain silent? In what follows, I will therefore propose and discuss that knowledge indeed *has been made silent* and ask if its »alienation from materiality« derives from neglecting its ability to »sound«.

Now, one could very well object that those considerations do not say much about how the bifurcation of nature and its resulting »silencing« indeed was implemented inside scientific practices, or inside thought altogether. Immanuel Kant was presented as the arch enemy, the original nemesis that started it all and most of the authors quoted in the last chapter indeed place the origin of the bifurcation of nature in his *Aufklärung*. However, this demonization might give Kant too much importance. Ideas and theories are surely powerful, but they do not sneak over humanity »just like that«, they ought to be written, read, repeated, transmitted — a very visual and textual practice, as I will later discuss. Tarde's laws of imitation (Tarde, 1993) show precisely how the practice of »convincing« is process-oriented. Kant's *Aufklärung* is never only Kant's *Aufklärung* but is embedded in larger networks. Furthermore, there is never only one »origin-story«, there are rather several sources or focals. Stengers and Montebello add for example Descartes, Newton and Hume to their pantheon of »bifurcators«. But they also invoke other figures that can be thought as bridges, like Galileo and how he relied on *common sense* (over the judgement of the scientific community) to prove his theories and in a desperate attempt to keep his life (Stengers, 2017).

Still, those storytellings do not help much further to understand what is really meant by »the alienation of knowledge from its materiality« and how it is being acted out. Therefore, a slight change of focus

is required, a detour of sorts. A shift from the thinkers to what is being thought and how it is being thought. Or better said: how thought is being presented, how practices of knowledge-making are being performed. By stating that knowledge production has been bound to Reason since the Moderns — which I did following new materialists — and by adding that is was only one mode amongst others, one could rightfully ask what would those other ones look like? Is knowledge entirely a venture of the silent mind? In opposition to the body (the dualisms come back creeping in…)? How important are sensory experiences to knowledge-making? And finally, did the silencing of knowledge alienate it from materiality and can sound re-invest it at all? This chapter is therefore not conceived as an attempt to dive deep in the metaphysics of thought, or in delivering an exhaustive history of knowledge. It rather intents to ask to which extent the materiality of knowledge is tied to the way it is being produced. A reformulation of the original controversy, through the lens of the visual versus the acoustic.

2. The hegemony of the visual space

> »We, who live in the world of reflected light, in visual space, may also be said to be in a state of hypnosis. Ever since the collapse of the oral tradition in early Greece, before the age of Parmenides, Western civilization has been mesmerized by a picture of the universe as a limited container in which all things are arranged according to the vanishing point, in linear geometric order. The intensity of this conception is such that it actually leads to the abnormal suppression of hearing and touch in some individuals. (We like to call them ›bookworms.‹) Most of the information we rely upon comes through our eyes; our technology is arranged to heighten that effect. Such is the power of Euclidean or visual space that we can't live with a circle unless we square it.« (McLuhan & Powers, 1992, p. 36).

Marshall McLuhan's conceptual dichotomy of the acoustic vs. the visual space dates back to the 1950s, first appearing in a publication co-au-

thored with Edmund Carpenter[1], and further developed later on in the *Global Village*, from which the quotation above has been taken (Carpenter & McLuhan, 1970; Ouzounian, 2008). Through this model, McLuhan proposes a reading of perception, communication and information that are not part of a homogeneous human disposition, but rather are co-created by the »culture« in which they unfold and by the technologies that are developed within that culture (Cox & Warner, 2017). However, more than a decisive and groundbreaking account on media and information technologies, McLuhan also offers an important reflection about how knowledge is being conceived and produced. In that manner, the last part of the said quote makes it quite clear: most of the gathered and produced knowledge is treated and rendered through the visual. Knowledge is visual and silent. In his formulation of the visual/acoustic split, McLuhan's perspective, although very phenomenological in its understanding of perception and lived experience[2], thus shows an unexpected closeness to the idea of a bifurcated nature encountered in the previous chapter, mostly in relation to its consequences on knowledge production. This proximity needs nonetheless to be put in perspective. McLuhan does not address the idea of a bifurcation of nature *per se*, nor can his theory be brought together with Whitehead's philosophy, apart from some references in *The Medium is the Massage* (McLuhan & Fiore, 2001) and in *The Global Village* (McLuhan & Powers, 1992). It would thus be quite a stretch to see him as being another precursor of new materialism. Still, his concepts and ideas seem to bear a certain resonance with the proposition made a few paragraphs earlier, based on the previous chapter. The alienation of knowledge would then have something to do with the visual character of its production and presentation.

1 Re-printed in an anthology in the 1970s, still with Carpenter.

2 In McLuhan's writings, there are no explicit references indicating his relation to phenomenology, (except very shortly in *The Global Village*), although he himself grants that his work *Understanding Media* is indeed a phenomenology of the media, according to a talk given in 1978, found online: https://www.youtube.com/watch?v=b9fKhsZuKO4.

I argued indeed that the bifurcation of nature led to understanding the practice of knowledge as bound to Reason and as if Reason was constituting an autonomous realm, separated from the material. Only that particular mode of knowledge, upon which modern science is constructed, can (presumably) truly depict the reality we are living in. Other modes of knowledge production — like the practice of magic for instance but also a certain form of (mostly seen as archaic) common sense — were more and more discarded, hunted down even, burned at the stake. Irrationality became dangerous and illegitimate. Scientific knowledge and common sense were fatally split apart (Stengers, 2017). McLuhan is proving a similar point, somehow rejoining Montebello's argumentation, that this particular »intellectualised« mode of knowledge production is related — if not reduced — to a Reason made independent from materiality. However, for him, this bond is not necessarily linked to the evolution of Western philosophy in itself or for itself, it is rather a more or less direct consequence of the technological developments in ways of gathering and presenting knowledge. »All Western scientific models of communication are — like the Shannon-Weaver model — linear, sequential, and logical as a reflection of the late medieval emphasis on the Greek notion of efficient causality. Modern scientific theories abstract the figure from the ground.« (McLuhan & Powers, 1992, p. 3). For McLuhan, those elements, which constitute the core of modern science, result from a very particular evolution in communication, going all the way back to Ancient Greece:

> »The Greeks gave a new birth to the alphabet as a mode of representation having neither a visual nor semantic meaning. Egyptian ideographs, for instance, were directly related to particular sensuous sounds and actions, with unique graphic signs. On the other hand, the matrix of the Greek alphabet could be used to translate alien languages back and forth without changing the form and number (twenty-four) of the original alphabetic characters. It became the first means of translation of knowledge from one culture to the another. The reader in the process became separated from the original speaker and the particular sensuous event.« (McLuhan & Powers, 1992, p. 45).

This event is crucial at many levels, but McLuhan draws one consequence that is particularly interesting here: it sets the basis for how the so-called *visual space* was gradually credited more importance than the *acoustic space*. As he then continues, the tendency starts with the Greek alphabet, but continues through the evolution of pictorial representation in the Middle Ages, or the invention and diffusion of print with Gutenberg. The eye drives the experience and, so it seems, the process of thinking as well. »The reader […] became separated from the original speaker and the particular sensuous event« (McLuhan & Powers, 1992, p. 45). Printed text, following the linguistic technology of the alphabet, takes away materiality from knowledge. It takes away the sensuous from the experience, only leaving an abstraction that waits to be deciphered by Reason, as if Reason itself was extracted from material reality. Consequently, for McLuhan comes what he calls an overload of visual stimuli, that forms Western logic: a logic which lost contact with the sensuous event. Like the eye perceiving an object, everything is explained through the line, the sequence, the causality, the either/or:

> »[The visual space] is a space perceived by the eyes when separated or abstracted from all other senses. As a construct of the mind, it is continuous, which is to say that it is infinite, divisible, extensible, and featureless – what the early Greek geometers referred to as *physis*. It is also connected (abstract figures with fixed boundaries, linked logically and sequentially but having no visible grounds), homogeneous (uniform everywhere), and static (qualitatively unchangeable). It is like the"mind's eye« or visual imagination which dominates the thinking of literate Western people, some of whom demand ocular proof for existence itself.« (McLuhan & Powers, 1992, p. 45).

But McLuhan's duality does not stop at the distinction between the visual and the acoustic space, they also meet in the human brain where the same distinction is operated: a right-brain thinking, dedicated to the acoustic space and a left-brain thinking, or »angelism«, corresponding to the visual space, analytical, logical, sequential. What this »psychologisation« shows is the link between experience and knowledge and their relation to materiality. It is not the ethereal mind, it is the fleshy

hard-jelly brain. And within it, knowledge is not reduced to its »left-side« treatment, the logical and the sequential. It rather expands, and is part of a much broader understanding of what experience is, which could lead to think that there is a »right-brain knowledge«. In addition, and this is decisive, it shows that even logical thinking, Reason, that »angelism«, being in the brain as well, is as much part of materiality as sensible experience is, even if it is characterised as »the mind's eye«[3]. Unfortunately, by relying only (or mostly) on the visual, this multiplicity of experiencing, of producing knowledge has been »forgotten«, one side dominating the other. For McLuhan, this is the core of the problem: the issue does not lie in the inherent properties of the visual and therefore of the alphabet or print or other »visual technologies« in themselves. Instead, the problem is rather in the hegemonic character the visual space has taken. As a result, a lack of balance between senses, between thought and feeling occurs. This hegemony is for McLuhan even pathological, and referring to Cicero's *sensus communis*, he notes: »In any cultural arrangement, trouble always occurs when only one sense is subjected to a barrage of energy and receives more stimulus than all the others. For modern Western man that would be the visual state.« (McLuhan & Powers, 1992, p. 37). The diagnosis becomes irrevocable: »By neglecting ear culture, which is too diffuse for the categorical hierarchies of the left side of the brain, he [the Modern man] has locked himself into a position where only linear conceptualization is acceptable.« (McLuhan & Powers, 1992, p. 38). I mentioned that the separation between scientific knowledge and common sense is for Stengers one of the greatest problems philosophy and science has to deal with. In the first chapter as well, one could see how for Latour, hegemonies in modes of existence/experience, in the making of truths, become an issue. Or how for Montebello, only intellectualised modes of knowledge production are being deemed acceptable, thus neglecting others. The overload/overkill of the visual space described by McLuhan produces exactly that: a deeper territorialisation and a hierarchisation of knowledge practices, a bifurcated nature. Now, it is hardly an exact

3 This reminds Lyotard's perspective on thought and experience.

transcription of the bifurcation (as already said, it is hard to know to which extent McLuhan has been influenced by Whitehead's work), it can nonetheless be understood as one of its consequences.

3. The issue with text

More than a global critique of the visual, however, it seems that mostly one particular aspect of it — a particular tool — is deemed responsible for the lack of balance within experience: text. As already seen, its establishment as the »driving« visual force is concentrated in the invention of the alphabet in Ancient Greece, but more like a prologue. It is its systematisation, its broad diffusion, its combination with other inventions like mass print, that will achieve the apparent alienating aspect of text, producing a reader separated from the »sensuous event«. However, this would still be a severe reduction. The hegemony comes through practice. In order to understand the particular role that *text* has to play in relation to knowledge and experience, a closer look at Walter Ong's *Orality and Literacy* (2002) might prove useful. Not only does Ong's work resonate well with McLuhan's, the author also delivers a thorough historical study of the link between both »realms« as well as a sometimes-needed moderation. Moreover, even if Ong tends to describe the evolution of orality and literacy in a certain ethnocentric manner and even though he even subscribes to binary oppositions similar to McLuhan's, his analysis certainly remains relevant today[4].

First of all, Ong notes that the *status* of knowledge is not a priori reducible to the mode in which it appears. Oral cultures did/do produce a certain form of knowledge that is/was/still is important, of value. But this mode of knowledge production is not the same as the mode related to literacy, which he calls »study«, and which like McLuhan, he links to analytical, sequential, logical thought. A categorical difference without

4 See for instance the preface and postface written by John Hartley, which can be found in the French translation of Ong's book (Ong et al., 2014).

a power relation? Not quite, as Ong himself grants, all modes of producing knowledge are not equal, the qualitative differentiation is also a certain form of hierarchisation, a difference in status that appears, but it does so over time, over repeated practice. For him as well, the visual becomes hegemonic, like in linguistics, where a »relentless domination of textuality in the scholarly mind« is palpable (Ong, 2002, p. 10). From there, it is almost too easy to backup Ong's assessment by adding a lot of other (almost all?) scientific fields to linguistics, in which knowledge is solely presented in textual formats.

Secondly, Ong even goes further and by echoing McLuhan again, explains how *writing* as a technology, and thus literacy in general, changed ways of thinking and consequently of producing knowledge:

> »Our complacency in thinking of words as signs is due to the tendency, perhaps incipient in oral cultures but clearly marked in chirographic cultures and far more marked in typographic and electronic cultures, to reduce all sensation and indeed all human experience to visual analogues.« (Ong, 2002, p. 74)[5].

It is indeed a very important aspect, when one is looking at literacy through Ong: thinking of writing as a technology. In effect, it comes quite close to McLuhan's »probe« *the medium is the message*: McLuhan himself understood media as an extension of the human sensible capabilities (McLuhan, 2015). This implies that not only does it matter which *thoughts think thoughts*, as I argued with Haraway in the previous chapter, but that it also matters how those thoughts think. In other words, the technologies one uses in the production of knowledge have an impact, they act (in Latour's sense), they co-produce, co-create that very

5 This quote somehow echoes how Ludwig Wittgenstein considers propositions and thoughts: as pictures of reality, of facts. Even sounds are reduced to depictions: »A gramophone record, the musical idea, the written notes, and the sound-waves, all stand to one another in the same internal relation of depicting that holds between language and the world.« (Wittgenstein & Ogden, 1999, pp. 23, 24). It is hard to say however, if Ong engaged with Wittgenstein's work at all (there is no apparent references in *Orality and Literacy*).

knowledge. The everlasting opposition between a thinking subject and a passive object shows in that case its limitation. It is not the greatness of the human mind alone, gifted by Reason, that produces universal truths, through a perfectly transparent tool one can rule out of the equation, but a mind formed by the technologies of textuality in an entanglement of matter-energy-information.

> »Without writing, the literate mind would not and could not think as it does, not only when engaged in writing but normally even when it is composing its thoughts in oral form. More than any other single invention, writing has transformed human consciousness.« (Ong, 2002, p. 77).

By analysing the impact of writing on human consciousness, Ong actually demonstrates the materiality of knowledge and links it to back to its technologies of production. In that case, one might add, what does the text do? Does it really alienates knowledge from materiality, as I have posited earlier, or does it do quite the opposite? As often in the staged formulation of such questions, the answer is without much surprise: both. Text alienates because it abstracts from its subject matter and states without possibilities of refutation or change: »A text stating what the whole world knows is false will state falsehood forever, so long as the text exists. Texts are inherently contumacious.« (Ong, 2002, p. 78). Which also constitutes its paradox: its fixity, its apparent coldness, its abstraction from experience gives text the potential of unlimited actualisations and of a sort of re-activation of knowledge's materiality (Ong, 2002 also p.78). Coming back to new materialism, in particular through Haraway, this might also explain why text in the form of »speculative fabulation« — for instance in the mode of science fiction — remains a way of engaging with the multiplicity of modes of experience. Textuality does not alienate knowledge in itself. Rather, it depends on how text is used to produce that knowledge. This is the possible agency of text that is here determining, switching positions between subject and object, or better said, modulating the intensities between practices of subjectivation and objectivation, as van Loon shows in his article *The Agency of Ethical Objects* (2012). Indeed, the text and that is what Ong

tells us, fixates, it produces actualities. This fixation on paper actualises (objectifies) thought and knowledge[6]. However, those agencies are not fixed forever. Reading/re-reading a book, engaging with it, re-writing it maybe, thinking with it, shows that the fixated text also subjectifies the one reading it, as well as what's being read, it creates new virtualities.

Nevertheless, and this echoes what I have presented earlier, the issue lies in the hegemonic character one mode can take over the others[7]. Intellectualised modes of producing knowledge, apparently *de facto* textual, still bear the »truth stamp« of their forms of production. »The text states«. It is not only knowledge that is being produced. It is a question of truth and power. The power of the word. A scientist must publish her work to gain credit, to establish herself, to be a scientist. The good and true parole is only worthy when printed. Only published knowledge (also *de facto* textual) is deemed enough value to be seen as scientific, a value that of course also strongly depends on the prestige of the publication itself. Again, this is problematic because of the resulting categorisation and territorialisation of knowledge production that is being normalised and may lead to a circular, if not fully tautological, rendering of knowledge[8]. More importantly, through normalisation, those modes of producing knowledge also inherently tend to erase their situatedness (mostly white western older men, let's be honest) and at the same time neglect other forms of knowledge: at »best«, becoming an object of study, like in Levi-Strauss‹ structuralist analysis, at worst, common sense only good for the plebs (»Isabelle Stengers, de La Science à La Sorcellerie,« 2020). This is how text alienates. The hierarchy and power relations within knowledge production are reproduced. The question

6 This perspective somewhat resonates with the tropes of the relationship between the author/creator and her work. As soon as the work is done, fixated, it escapes the agency of the creator to become something else, with its own subjectifying–objectifying properties, itself able to change.

7 Orality being one particular mode including forms of language, within the »acoustic space«, but not the only one, as I will see discuss.

8 A common paradox for younger researchers: to gain credit, one has to publish in prestigious publications, but those publications only accepts contributions from scientists with credit.

that follows, therefore, is not if a comeback to an original orality is possible. This would be absurd, just as absurd as the question of rewinding the bifurcation of nature. No, the question is rather to which extent the inclusion of other modes of knowledge production in scientific practices might challenge the still ongoing hegemony (of practices, but also of practitioners) and deliver something different. Again, it is not only a question of replacement of old alienating habits (they still have to change, this is undeniable), but it is also a question of experimentation. In order to change. To which extent can those very specific textual practices, commonly understood as scientific, in combination with others, really engage with materiality and the plurality of experience? To which extent can one engage with and open themselves towards the plurality of modes of knowledge production to which the »acoustic space« belongs? Can that acoustic space be included in those practices, not only in the gathering of information, but also in its production, even in sociology[9]?

4. Re-investing the acoustic space?

In McLuhan's dichotomy, the acoustic space is the space of the sensible. Space of simultaneity, it is multidimensional, multi-centred, unbound and immediate, discontinuous and non-homogeneous. It is inclusive. It is where »*the center is everywhere and the margins nowhere*« (Findlay-White & Logan, 2016). It is not only the space of sound, but sound does play a particular role in it, due to its immediacy and multidimensionality. It has often been reduced to the space of the archaic, the pre-literate, the pre-modern (McLuhan, 2017). It is also the world of nature, even

9 In his book on conviviality, Ivan Illich proposes to look at tools quite differently: working with them rather than having them working for us. Other politics of the tool, even in knowledge-making? »Tools are intrinsic to social relationships. An individual relates himself in action to his society through the use of tools that he actively masters, or by which he is passively acted upon.« (Illich, 1973, p. 21).

maybe of an »unbifurcated nature«, not yet divided in a »nature for itself« and a »nature to be apprehended«. It was the sensible world that has not been subjected by Reason. It was the world of primary oral cultures (Ong, 2002). But it is now a world unattainable. As I argued, an undoing of the bifurcation is neither what is wished for, nor even really possible. Instead, I rather aim to follow Haraway's attitude and *stay with the trouble*. But then, why still intend to bring in the acoustic space? Why still propose to experiment on those modes of producing knowledge? Isn't it a subscription to the dichotomy, an either/or possibility, once again? Well, not quite and in what follows, I will attempt to show why in four steps: 1) the acoustic space was never gone, its importance for experience has »simply« been forgotten, which shows that 2) we live in a world of sound. 3) Actually, one never even stopped listening, their »sonic skills« were always already in use, even in modern science. 4) Through particular practices like »sonification«, one can see the acoustic/visual opposition is far from enough to understand the multiplicity of practices, within which sound indeed bears a particular importance, as I will later further underline.

We forgot how to listen

To understand this idea of an acoustic space that was actually »never gone«, which would then partly go against too stiff dualisms, McLuhan and Ong already propose some answers. First of all, McLuhan, as I argued, did tend to psychologise his definition of spaces of experience and locate them within the human brain. Left-brain thinking confined to logic and the visual, right-brain thinking, to the sensible. However, he does not see those differences as two entirely separated realms that function independently from one another. Instead, McLuhan seems to acknowledge the possibility for communication between both sides, a possibility for conjunct action. This is what he calls the *resonating interval*. It is what links, or rather what »defines the relation between figure and ground and structures the configuration of ground« (McLuhan & Powers, 1992, p. 3), where the ground is the medium, from which the figure as content might arise. In other words, the *resonating interval* is

an »interface« connecting two worlds, a space between spaces, already implying that *the medium is the message*.

In the case of right-brain and left-brain thinking, it is a liminality where thought and feeling are entangled as well as the acceptance of the plurality of modes of knowledge production, the acceptance of »both worlds«. This is not just the apparent resolution of a dualism — and the consequent preference of one side over the other — it is an opening. The resonating interval does not simply reconcile two modes of thinking, but through this process of coordination, makes apparent the singularities, the multiplicity of modes of knowing and experiencing. McLuhan gives several examples of what a *resonating interval* can be: a border, which, when acknowledged implies the other side, but also the 1968 Apollo mission, where through the camera, one was on the moon and on earth at the same time (McLuhan & Powers, 1992). For McLuhan, the resonating interval is not only an acknowledgement of »the other side«, but becomes a necessity to fully grasp the effects of technology, which he sees as extensions of experiences and actions. To a certain extent, one could argue that it brings the matters of concern back to technology and how it is being used. In all cases, the resonating interval is never silent. So seems to be the acoustic space, which, in modern, overly visual practices, has apparently been neglected. Indeed, both McLuhan (already in the 1950s) and Ong (in his 1982 *Orality and Literacy*) argue that new technologies might have a very important role to play in the revalorisation of the acoustic space. The establishment of radio, later on television are for McLuhan already enough proof that the acoustic is »back« into everyday practices. He even prophesies about the importance of the computer, in what nowadays sounds like classical science fiction:

> »By the twenty-first century, most printed matter will have been transferred to something like an ideographic microfiche as only part of a number of data sources available in acoustic and visual modes. This new interplay between word and image can be understood if we realize that our skulls really contain two brains straining to be psychically united.« (McLuhan, 2017, p. 72).

Retrospectively, McLuhan's prophecy is not far from being true. Even printed matter, which still extensively exists, was code at some point (a very visual-driven logical »ideographic microfiche« (McLuhan, 2017, p. 72) of sorts). Data sources, from sounds to images, are, in daily practices, being encoded, decoded. The question then arises if the code, which translates, is a new Greek and cryptic alphabet, taking away the sensuous event, or a facilitator, a creator of the resonating interval. For Ong, both literacy and orality are being electronically enhanced. On the one hand, the translated word becomes even more spatial and sequential, although gaining in immediacy. On the other hand, new technologies produce a kind of »secondary orality«:

> »This new orality has striking resemblances to the old in its participatory mystique, its fostering of a communal sense, its concentration on the present moment, and even its use of formulas (Ong 1971, pp. 284-303; 1977, pp. 16-49, 305-41). But it is essentially a more deliberate and self-conscious orality, based permanently on the use of writing and print, which are essential for the manufacture and operation of the equipment and for its use as well.« (Ong, 2002, p. 133).

Here again, one can already find in those words the importance of the code, of the binary language of computers, that translates »data sources«, but also necessarily rely on technologies of writing[10]. Rather than a »coming back« to old oralities, those dated but still somehow relevant accounts show the greater entanglement of practices of knowledge production, which for instance within modern science, will sooner or later go through an electronic-based translation process. What the authors show is finally that there is no separation between sensible realms, there is no *a priori* categorisation of experience, no natural hierarchy. Rather, there are specific practices that categorise and hierarchize those experiences and modes of knowing. The apparent neglect of the acoustic over the visual, which I only sketched through McLuhan and Ong, is thus an ensemble of processes, with particular historicities and particular relations of power. One could even argue,

10 Of literacy altogether. Codes have languages, syntax.

following Haraway's feminist epistemology, that the neglect of the acoustic space, i.e. the predominance of the eye is the dominance of a certain eye, a certain I, a certain position, infused in technology and science. A particular male and white gaze, posited as objectivity, that reinforces the hierarchisation of knowledges and thus, the alienation of those denied their production (Haraway, 1988).

A world of sound

To expand on this idea of an ever-present acoustic space, the work of Raymond Murray Schafer, in which one finds bits of McLuhanian theoretical inspirations, delivers some insight. In his fundamental book *The Soundscape: Our Sonic Environment and the Tuning of the World* (1993), Schafer shows how the acoustic environment and its related practices drastically evolved throughout History. Sound is, so to say, more present than ever and the amount of academic work dedicated to it shows an undeniable interest (it was true for Schafer in the late 1970s, it is still today). However, for Schafer, if one lives in an acoustic world, this does not mean that they know how to do so. It is for him one of the many dramatic consequences of Modernity: the increase of noise as a disturbance that is a result of an inability to listen »with care« — what he calls the *Clearaudience*, in contrast to clairvoyance. In turn, the amount of »noise pollution« also further deteriorates that ability to hear and listen (Schafer, 1993). Schafer even goes further by stating that even if the study of sound might have made huge progress, which could denote a regained importance of the acoustic space, it only happened through the visual. Basing himself on Helmholtz' account, who argues that science often requires visual methods to make sense of an event, Schafer writes:

> »This strikes the pattern to be followed, and while the science of acoustics has advanced greatly since the nineteenth century, the listening abilities of average mortals have not shown corresponding improvement. In fact, they may have deteriorated in inverse proportion to the pictorialization of sound. Today, many specialists engaged in

> sonic studies — acousticians, psychologists, audiologists etc. — have *no* proficiency with sound in any dimension other than the visual. They merely read sound from sight. From my acquaintance with such specialists I am inclined to say that the first rule for getting into the sonics business has been to learn how to exchange an ear for an eye.« (Schafer, 1993, p. 128).

The same issue then remains, even in academic fields specialised in the study of sound — the hegemony of the visual. Schafer's point makes sense in the light of what was proposed above: the visual, linked to logical processes, seems necessary to give a scientific account of how sound works. Only that kind of visual (re)presentation seems to be what »counts« as acceptable knowledge production. Consequently, not only the visual representations themselves, for example the graphical representation of a sound's frequency response, but also the vocabulary, the processes of categorisation, tend to diminish the importance of the acoustic, and reduce it to visual tropes. A visual representation of sound remains a diminished account, it abstracts and renders on flat surfaces a multidimensional, sometimes multi-centred event. It objectifies the sonic event. In that fashion, one could of course even catch Schafer at his own critique. His account, like every book about sound, is a visual rendering and fatally, a reduction, an abstraction. In Schafer's case, however, it is not simply a writing *about* sound: the categorisation he operates one chapter after the quoted piece[11] also falls into what he himself seems to criticise: the territorialisation of knowledges about sound (acoustics, psychoacoustics, aesthetics etc.), which limits and reduces what sound might be(come). This reduction, if not necessarily a symptom of the visual *per se*, might be one of the bifurcation of nature, once again. It is a limitation inherent to every writing dealing with sound, including Schafer, but also including this PhD thesis, because they rely on visual media, either in their production, i.e. in the process of writing itself, or in their reception: the book, printed or not, remains a visual representation of thoughts.

11 Chapter 9 – Classification, the quote being from Chapter 8 – Notation.

That being said, this small and quite gratuitous attack was not meant to disqualify Schafer's work, it was not even meant to diminish the importance it has in academia. Instead, it shows how strong the bifurcation really is, how deeply practices, within science or not, within sound studies or not, are impacted by it. This can only make Haraway's call to »stay with the trouble«, even stronger. Nonetheless, Schafer, maybe acknowledging the limitations of his field of inquiry, hopes for a change, based on McLuhan's previsions about the »coming back« of the acoustic space: »If McLuhan is right, we may expect to move away from our dependence on visual representation of sound just as we are leaving print culture.« (Schafer, 1993, p. 128). Without giving at this point an exhaustive account, one can still reflect on those predictions. It is true that the evolution of computers led to the diffusion and omnipresence of auditory technologies — almost everyone carries a record player/tape recorder in their pocket. However, this omnipresence does not mean that the visual, or even print in a broad sense, gave any ground. Most listening applications have very visually-driven and textual user interfaces, even if they do implement touch and sound. In specialised fields, like in recording studios, digital tools often work on sound as if it was a visual medium. The user modifies a waveform that is apparent on a screen and expects that the changes on that screen have an effect on the actual sound. While these small examples show how persistent the visual is, the mentioned new technologies might still have the potential to change the practices of knowledge production. Nevertheless, even though the Greek musicologist Makis Solomos might be right when he states that we live in a »civilisation of sound« (Solomos, 2013), it does not mean that its balance with the visual in fact deeply evolved and that *sensus communis* has been reached. Some might even say, like Christoph Cox in his last book, that our current times even reinforced the impact of the visual: »This fascination with imaging, the desire and ability to present all information visually, and the epistemological priority of the visual are intensified in digital culture, in which the image has become currency and seeing (›eyeballs‹, in Internet advertising parlance) is pervasively monetized.« (Cox, 2018, p. 184).

Sonic Skills – we never stopped listening

Remaining within this »turf« — the visual/acoustic dichotomy — still eclipses much of what is actually going on, either in sound studies, or in the practices of science altogether[12]. It reduces sensory modalities to separate domains that are constantly fighting for hegemony or acknowledgement. Or better said, their »defenders« are. The modalities are not fighting, the materiality of experience is not exclusive. But here again, remaining in this »acoustic vs. visual« would only dramatize the practices I intend to understand and would insert them in a grandiloquent dialectical narrative. That is an overly simplified take on a much more complex and diverse landscape constituted by research and everyday practices. The acoustic/visual opposition shows its limitation in unpacking the primary controversy presented earlier. »We« actually never stopped listening. On the contrary, listening and sounding practices have been continuously implemented in research. The acoustic space is still active, and very much so. This is exactly what Karin Bijsterveld intends to show in her research, which »aims to understand the ambiguous and at times contested position of listening for knowledge in the sciences […] by tracking the shifting status of sonic skills in science, medicine, and engineering across the long twentieth century« (Bijsterveld, 2019, pp. 3, 4). Not only do listening and sounding practices play a role in science, even in engineering, but they seem to do so for quite some time, despite the deafening noise leaving people unable to »clearly hear«, according to Schafer. Still, as Bijsterveld explains, it does not mean that the issue of hegemony disappears as quickly as takes time to … sound. Looking closer at those practices, and how they are presented, one can still remark a certain hierarchisation in how knowledge is being received and understood as such. Commenting on a talk show where scientists shared their results gained through listening practices, she writes:

12 As well as in the definition of media, as Kittler shows in *Gramophone, Film, Typewriter* (1999).

> »Apparently, she [the interviewer] had trouble believing the geologists‹ ears. Their findings had not yet been *proven*, because the phenomenon had not been *seen*. By suggesting that hearing something is not sufficient to prove its existence, whereas seeing it would actually establish the fact, the interviewer posited a direct link between seeing and true science or ultimate knowledge.« (Bijsterveld, 2019, p. 2).

What is important here in Bijsterveld's introductory example is not the debate between both sides, which, as she later argues, is tackled very pragmatically by scientists. It is rather the apparent normality in which knowledge production is understood as visually-driven. This normality, however, as the geologist prove in their methods, or as Bijsterveld shows throughout her book, never truly exist. In challenging what is being considered as »normal« knowledge production, Bijsterveld is therefore not intending to re-establish sound practices or criticise visual ones, but to clarify how even within science, there is a disparity between the claims (acoustic vs. visual) and the actual practices. Auditory practices were not *hunted down*, but presenting knowledge through graphs and texts became a habit. She quotes Latour's article on writing to show that »inscriptions« — what can be broadly understood as the visual, written or drawn — were for instance the easiest way to distribute results, and that visually presented arguments appeared to be more convincing (which Latour sums up in the »you don't believe me, I'll show you« motto). As Latour further writes in this article: »We are so used to this world of print and images, that we can hardly think of what it is to know something without indexes, bibliographies, dictionaries, papers with references, tables, columns, photographs, peaks, spots, bands.« (Latour, 1986, p. 13). This easily convincing format might be linked to the strong objectifying potential of text that I described earlier with Ong's help. But departing from this standpoint and the apparent normal overload of one sensory modality over the other, Bijsterveld argues and empirically shows throughout her book that within science, sonic skills are as important as visual ones, in the production as well as in the distribution of knowledge. She states it from the beginning and the statement

remains true in her work, through and through: »[…] scientists do listen for knowledge« (Bijsterveld, 2019, p. 2). The sonar, the stethoscope, but also the set of skills doctors or nurses learn to react to alarms (within the body or not), and how they implement those skills in their work are based on very precise and complex listening practices that produce knowledge. And acknowledged as such. As knowledge production practices.

Sonification – the sonic representation of knowledge

All those practices can be understood as forms of »sonification«, of a sonic rendering or magnifying of an event, of information. For example, the stethoscope or the percussion technique (Bijsterveld, 2019), followed by a diagnosis, both help to determine the health state of a patient. They signify bodily functions or malfunctions. The sonar maps and signifies underwater landscapes and objects. Those techniques are tuned to the event they intend to understand, they produce knowledge — and they are not only practices of listening but of sounding as well — they are built to gain »insight« where the eye cannot go (Supper & Bijsterveld, 2015). In the last few decades however, another sets of techniques, which are now commonly referred to as »sonification« have emerged. First of all, their particularity emerges from what they are »sonifying«, namely *data* in the modern »big« sense of the word. More or less large amounts of gathered data about a topic, an object of inquiry that is not primarily sonic, are being translated into sound, like for instance EEG or particle physics measurements (Bjørnsten, 2015). Secondly, their purpose is not necessarily the gained insight or the knowledge content in itself, but the *value of representation*. This »value of representation« is itself not very new, as Latour already explained with Pasteur, for whom a successful demonstration needed to »show« the activity of microbes (Latour, 2001). Similarly, with data sonification and sonic skills in general, the *demonstration* plays a major role (Harris & Van Drie, 2015). This demonstration — showing of(f) data — not only serves the presentation of findings for science's sake, but is also used to convince peers and/or investors, to teach new recruits, to make available the findings for an

audience with seeing disabilities, to spark the interest of younger generations or a non-academic audience, and also to become accountable towards »civil society« (Bijsterveld, 2019; Supper, 2016).

Moreover, those practices rely on and confirm the importance of aesthetics — as sensory experience — in the construction of scientific knowledge. These sensory experiences are never only visual, or acoustic, or both, they also imply touch and movement (Supper, 2016). They all suggest a multiplicity of modes of knowledge construction and as Bjørnsten describes, the practices of listening become »knowledge-generating« (Bjørnsten, 2015). A multiplicity that has two indisputable consequences in the making of knowledge. In the first place, it strongly affirms its materiality, through the sensible, the bodily experience, the mediating technologies becoming objects with strong agency (Bruyninckx & Supper, 2016; Pinch, 2016). Besides, and in order to account for this materiality, it also needs a strong interdisciplinarity, both within the scientific community, as well as outside of it, the tools and techniques used lying beyond the classical methodologies (Bijsterveld, 2019).

Nevertheless, the practices of sonification present one major limitation in their knowledge production: they remain focused on the *representation* of data. This might become problematic when the ways of showing — a kind of indexicality which seems very visual — also denotes the apparent necessity of sense-making that the practices of sonification bring with them (Bjørnsten, 2015). One could also argue in addition that the *representation* of data, which is a reduction and abstraction, is another objectivation of what remains an »object of inquiry«. The example of the *MIDI Sprout*, which I already presented in the introduction and will resurface later on, can help to clarify this question. It is a sonification device that »makes plants sound«. It is made of electrodes that sense biofeedback (small electrical current differences between two poles of a living organism) and translate it into Musical Instrument Digital Interface or MIDI data, a communication protocol used to carry musical information between devices. The MIDI data corresponds to musical notes and control information that are originally coming from the plant in the form of biofeedback. This data can be

sent in real-time to musical instruments (hardware or software) with MIDI support, giving the impression that the plant plays music. The device represents biofeedback. Where sonification might be an issue, is in the user's practice, listening to the notes being played and attaching meaning to them. The interpretation of those sounds, the projection of feelings or musical taste onto the plant is only its personification[13]. Indeed, the sounds themselves do not come from the plant, but from the software/hardware dealing with the MIDI information. The same data can become either an ethereal organ sound or abrasive percussions, depending on the user's intent/inspiration and the pieces of gear used to »decode« the data. However, the practices of sonification also produce an undeniable awareness towards what is being depicted. In the case of the *MIDI Sprout*, changes in the intensity of the MIDI data can be traced back to the experience of the plant itself. Biofeedback values depend on closeness, temperature, humidity, light, and so on. Those have therefore an impact of the delivered data. In other words, the device magnifies the liveliness of a plant, through sound. By doing that, it restores the materiality of the experience, and the importance of the sensible. It intensifies the ways of interacting with the plant. In that manner, the *MIDI Sprout* only partially objectifies the plant. Or better said, it seems that it tends to even subjectify (not personify) it to a certain extent. Through re-inforcing its liveliness, it charges it with a certain agency. Thus, to go with Bijsteverld, it does not remain solely in the »sonification paradigm« (against the visual) but multiply the modes of experience altogether. Or rather, as Vallee (2020) shows with Sterne and Akiyama's (2012) article, it allows to propose a different understanding of sonification altogether that goes beyond the classical dichotomies that have been presented earlier. However, for Vallee, Sterne and Akiyama's promise is to be taken with caution: »They ultimately return to sound as something that is intended to be listened to: even in the face of a dismissal of the listener, they constitute the listener as the *sine qua non* of a sounding event.« (Vallee, 2020, p. 15).

13 For similar examples, see Bjørnsten (2015); quoting Connor (2013)

5. Perception and the reification of sound

It should be clear that scientific practices never were truly void of sound (and/or silence) and that, within those practices, more often than not, the sensory experience was playing a major role. Consequently, those practices were never performed in a visual–acoustic dichotomy, but embraced the entirety of sensory capabilities. However, in the case of sonification practices, it has been proposed that they are too often bound to the human listener. A set of questions thus remains: to what extent those sonic skills indeed included the materiality of knowledge and thus the multiplicity of modes of knowledge production? Can sonic skills be understood beyond human perception? In Bijsterveld's *Sonic Skills* as well as in the other articles analysing sonification practices, the use of sound »in the laboratory« was not so much different than the use of any other tool. Bijsterveld was very clear on that matter — scientists were very pragmatic in choosing their methods. Sound became the tool, which also was the aim of *Sonic Skills*: »The project was primarily interested in sound and listening as a way of acquiring knowledge about human bodies, animals, machines, or other research objects, and thus in sound and listening as a *means* rather than an *object* of research.«(Bijsterveld, 2019, p. 4). If sound was not so much the object of study, it certainly became the object allowing to study. It became the mediation tool that needed to be perceived and made sense of, itself »making sense« of what was not sound. In reaffirming the materiality of knowledge production through the importance of the sensory experience mediated through sound, sound itself underwent a reification.

This process of reification of sound happens as an effect of the qualification of sounding as needing a listener to even exist, as seen with Vallee (2020). But it also goes beyond the practices of listening themselves. Bijsterveld notes that sonic skills are not only listening skills, but also the »ability to design, record, store, mimic, and retrieve sound« (Bijsterveld, 2019, p. 81). The issue thus rather lies within the practices of sensing/perceiving that are attached to those skills and seen as the outcome for sense-making. This echoes the theoretical discussion that

happened in the 1960s when Pierre Schaeffer was conceiving his *musique conrète* and created the notion of the *objet sonore*. As Makis Solomos explains, Schaeffer's *Traité des objets musicaux* was first and foremost a treatise on listening (Solomos, 2013). What Schaeffer did was to shift the focus on how to listen and granted it a very human intentionality directed towards the »sounding object«. In other words, the human faculty of perception was for him the central element, not only of his music, but his research. Schaeffer is interesting here, because his phenomenological standpoint towards hearing/listening shows the key role that *perception* — as intentional and particularly human — plays. Remembering the use of van Loon's (2012) agency of ethical objects, in that manner, the practice of listening indeed objectifies not only the represented data, but sound as well. It actualises it. Of course, this is quite clear when sounds are »the object of study«. It becomes a bit more difficult when sounds are the *means* for study. But in that case as well, it seems that the faculty of *perception*, in the phenomenological sense, is what is central not only for understanding but also for knowledge-making. The sensory remains a product of cognition and »perception is thus elevated to the unique status of being the portal between the world of ›things as such‹ that we cannot know and the world of sense-making and reflection, that is, the world of consciousness.« (van Loon, 2012, p. 198). Here again, one can only repeat Vallee's critique quoted above: sound becomes intended to be listened to… by humans.

Coming back to the question asked at the beginning of this part, can one understand a making of knowledge through sound beyond human perception? By adopting a »new materialist approach« and by reflecting on how practices of sounding are understood, indeed, such a venture would appear possible. The question of »sounding« will be tackled next chapter in greater detail, but for now a shift can be proposed, from the phenomenological notion of perception — too much imprisoned in Cartesian thought — to the concept of *prehension*, which has already presented in the previous chapter. For Vallee, the link between sound and prehension can be found in Steve Goodman's *Sonic Warfare* (2012). In that book, Goodman refers more than once to Whitehead's philosophy, but it is the passage quoted by Vallee that best sums up the

possible link between sounding and prehension: »a nonanthropocentric concept of feeling. This notion of prehension exceeds the phenomenological demarcation of the human body as the center of experience and at the same time adds a new inflection to an understanding of the feelings, sensuous and nonsensuous, concrete and abstract, of such entities.« (Goodman, 2012, p. 95). The multi-directional, multi-centred and intensive character of sound, through its propagation, its reflections, absorptions and reverberations in space makes it quite clear how prehension is at the core of perception altogether. This would then allow to consider sounding, not as a process needing a human ear to even exist, as Vallee argues, but as »part of the configuration in a network or infrastructure« (Vallee, 2020, p. 16). What is important at this point, is the consideration that the sensory experience cannot be reduced to human subjectivity and that sound does not »need« to be listened to. Experience is not proprietary.

Prehension would then allow to escape the anthropocentrism of phenomenological perception. Prehension is a capture, the making of singularities out of plurality. It is the process that individualises, or rather individuates entities, not by separating them from »objects«, but by letting those »objects« be part of the (not yet finally constituted) »subject«, which thus can change through them. It is an appropriation of others that at once forms the »subject«, but also a sense of association, prehension never being only one-sided. This idea of appropriation comes close to Gabriel Tarde's own perspective, as Didier Debaise underlines in *Un empirisme spéculatif* (2006). Entities — or monads for Tarde — appropriate one another. What differs is not the inherent qualities of those entities, hence their being, but the degree and the mode of appropriation performed, a movement on the subjectivation-objectivation continuum.

6. What is sounding?

One can see now that the premises of this chapter are slowly moving. If the question of the materiality of knowledge remains vivid, its treat-

ment through the visual and acoustic became quickly limited, mostly because it has been too often posited in terms of human perception/human activity. Arguing that knowledge has been alienated from materiality because of visual practices only repeats the primacy of human perception. However, through new materialism, one can also see a way out of the dualism which appeared through a certain understanding of perception. The problem is not the visual, or any sensory experience in itself. The importance of visually-driven practices became a norm mostly through the force of habit — which did not mean that sounding/listening did not happen.

The problem either lies in how those experiences were qualified and made sense of, or how they kept coming back to human perception and how they were built as hegemonic and exclusive. To re-enter the realm of *musique concrète*, it is not unlike what Schaeffer did by locating the practices of sounding and listening within human subjectivity and perception: sound and knowledge are being extracted from materiality and only read through the conscious mind, as if it was separated from that very materiality. In sonification practices, they became representations. Prehension however might come closer to what François Bonnet qualifies as being »underneath listening«, not reduced to a »making sense of« (Bonnet, 2019). To a certain extent, it also comes closer to the practices of composing and »listening differently« pursued by John Cage, refusing to intellectualise sounds, practices themselves echoing the Deleuzian understanding of listening and composing music: the slicing and sampling of the sonic flux (Cage & Charles, 2009; Cox, 2018; Solomos, 2013). However, such an understanding of sound not only changes how music composition works, but also how music is being performed, and even goes beyond musical practices. The materiality of sound has an impact on how »order« is being (re)shaped. Goodman (2012) demonstrated it quite clearly with sonic bombs. A sudden burst of sound (a siren, a detonation, a lightning bolt, or even that sonic bomb) bears an extreme violence, even when it lies beyond what the human ear perceives. Its impact is irrefutable. Its actuality, inescapable. It interrupts the situation, leaving for only possibility a recalibration, with the knowledge of what happened. This can be translated into a prepa-

ration, an apprehension, a fear of the next impact. After the bomb is before the bomb. In those cases, the apparent silence in-between is as defining and violent (Bocquillon & van Loon, 2016). In any case, sound changes what was, it becomes a matter of concern.

Moreover, the issue does not entirely lie within the definition of sound, but within the practices themselves and the technologies used in those practices. The title of this part asks what sounding is, but by proxy, it asks what techniques, what technologies allow this sounding. For instance, I noted earlier that practices of data sonification are mostly *representing* data, which was linked to issues of objectivation and reification of sound or said sonified data. However, as Sha proposes in *Poiesis and Enchantment in Topological Matter* (2013), a shift is possible, if not necessary, in how technologies are conceived, in order to experiment with a *thinking-with sounds*. Sha sums up his proposition regarding »technologies for making images and sounds and texts and things« (Sha, 2013, p. 20) as follows:

> »What I propose in this chapter is simply to shift how we regard these technologies, to see how they can be used not to represent facts and knowledge but instead to create events. In short, I propose to shift the perspective from *representation* to *performance*. By *technologies of representation* I mean those technologies for creating media that are later perceived by a spectator in an edited form that does not vary according to what the spectator or environment is doing during the playback of the recorded media, whereas by *technologies of performance* I mean technologies that vary media by design according to contingent conditions and activity.« (Sha, 2013, p. 20).

Sha's perspective is interesting on several levels. First of all, focusing on performance rather than representation allows for practices of sounding and listening that are *prehensive*, and which expand the definition of agency. The subject/object dualism becomes a movement between practices of subjectivation and objectivation. Then, by allowing this change in agency, for instance through »responsive environments«, the practices of sounding also produce a shift in how knowledge production and experience are being shaped, opening onto a multiplicity of modes, re-

volving around the materiality of those practices. As he mentions, it is a departure from the composer (as the mastermind creating and directing) to the performer (a prehending body). Including technologies of performance in sociological research would therefore allow redefining what the researcher is actually doing in regard to other actors in a given situation.

Those questions and reflections necessarily imply to re-think practices, or rather, again in echo to Haraway's trouble-making, to »think-with« differently in order to propose new ethical sociological practices that include humans, non-humans, more-than-humans. The linking dash thus at once acknowledging a certain situatedness and accountability as well as implying a step aside, not only a thinking about something, but through it, with it. To escape intellectualised modes of knowledge production, the problem needs a deeper reshaping of what is being done. For instance, it means that the question of sound needs to be asked differently. In sonification, sound objectifies data. An already objectified sound, one might add. If one intents to account for the multiplicity of modes of existence and experience, one would also need to extend how agency is being »distributed«. Can practices of sounding, through *technologies of performance* help doing so, by subjectifying, by intensifying the importance of what is being encountered? Asking this question is repeating the initial proposal of this work, namely that sound, through its immediacy and vibrational quality, may help to intensify the materiality of knowledge and diversify its modes of production and that in turn — within sociology — to develop a *thinking-with sound*. This *thinking-with sound* becomes an ethical practice: a thinking-with accounting for a horizontal doing together, which then would avoid to reify sound — or whatever/whoever is there — too quickly.

THINKING WITH SOUND | Building a sociological sonic thinking

1. Refining questions

At the end of the last chapter, I asked if and how practices of sounding might change our modes of knowledge production, not focusing solely on their intellectualised modes but — as Didier Debaise would put it — by »intensifying experience«. I argued that to answer, or at least tackle that question, a shift in the understanding of those practices, and of sounding altogether was necessary. Indeed, the rather classical dichotomy between the acoustic and the visual — which I attempted to understand through McLuhan's thought probes as acoustic and visual *spaces* — might not have been entirely convincing, but it gave nonetheless an important starting point. Its merit was, through a thinking in dualities, to show a certain hegemony in practices of knowledge production, which tend to rely mostly on the visual. However, as seen in Bijsterveld's *Sonic Skills*, this hegemony might not so much rely on the visual in spite of the acoustic as realms of experience, than in a hierarchisation and categorisation of human senses through practice, or rather, in a hierarchisation of the practices themselves. Even McLuhan notes it, the fact that the visual space is governed by reason is no given *a priori*, it did not »appear« with Modern Science. It was built, in the long run, through practices of »inscriptions«, to use Latour's vocabulary again. The text alienates and objectifies, not as such, not in itself, but through the practices attached to it or that led to its production. They are practices of *scientific* knowledge production, still they are not

entirely reducible to the visual. They rather expand, and are also expressed for instance through *sonic skills*. In those cases, sound as an object, or as a tool, is not much different from any other sign that shows, that represents knowledge[1]. A variation on inscriptions. In a nutshell, the hegemonic character of how knowledge is being produced apparently remains unchanged.

It means that the use of sound in itself, as methods, as tools, does not seem to be enough to truly challenge and work with the multiplicity of modes of knowledge production. This does not suggest, however, that the endeavour itself is a failure. It rather implies that other questions might need to be asked. On the one hand, the »use of sound« as scientific methods was — as shown in chapter 2 — a form of reification that reduces sound to either »what is to be heard by the human ear« and consequently made sense of by human reasoning or simply posited as another object of inquiry. In the present chapter, a different perspective will therefore be proposed, coming closer to the understanding of new materialisms introduced earlier. This perspective will allow not only to think about sound beyond a too strong anthropocentrism, but to think *with sound*, *through sound*. As seen with Sha (2013), the focus might lie more on performance rather than representation. More than *sonic skills*, it is a *sonic thinking* that is needed. On the other hand, and directly coming from a reception of *sonic thinking*, the controversy of an alienation of knowledge from materiality — which has been presented in the first chapter — needs to be refined as well. I »inscribed« this alienation in the bifurcation of nature and its resulting dualisms, and consequently, in the modern practices of science-making. But the hegemonic character of what I called, following Montebello, »intellectualised modes of knowledge production«, goes beyond questions of ontology or pure epistemology. It is a certain kind of knowledge that has been alienated, colonised, silenced, deemed unfit, unscientific, unmodern. And it is another, white, male, westernised, that has been the

1 Which would echo how Wittgenstein considers propositions, thoughts, and sounds in his *Tractatus*, as noted in the previous chapter.

scientific intellectualised one. Therefore, asking the question of knowledge alienation — through the lens of *sonic thinking* — also needs to address this hegemony in knowledge production as well as in »sounding practices«[2].

2. Sonic Thinking as a *thinking-with*

The emergence of »sonic thinking« within academia is a quite new phenomenon. It is more or less a result of the success and expansion of *sound studies*, whose own spread follows the also relatively new domain of *sound art*. However, the advocates of *sonic thinking* make a »point d'honneur« to keep it at the margin of more classical *sound studies*, refusing to remain a study exclusively *about* sound, which would only further objectify sound. For clarity's sake, I deliberately will not propose an overarching and over-limiting definition of sound art (and its separation or not from music) or sound studies (and its existence or not as an independent field of inquiry). Those are mostly questions of textual definitions rather than impacting the *thinking* itself. Nametags presented as *either/or*. Moreover, most readers, handbooks and journals on the matter already discuss and criticise those matters of definition, delimitation and existence quite extensively[3]. However, among a broad ensemble of definitions and reflections, which, to some extent, include sound, *sonic thinking* as practice seems to imply a particular relation to sound. In the introduction to his edited book dedicated to *sonic thinking*, Bernd Herzogenrath defines it as follows:

2 This step seems even more necessary, being myself a white male French academic working in Germany. On the importance on reflecting on one's own position in writing about sound, see (Schulze, 2020b).

3 For a comprehensive history of sound art published recently, see (Groth & Schulze, 2020). See also (Bull, 2019; Bull & Back, 2015; Sterne, 2012) for a general overview of the field of sound studies — only a short selection among a quantity of monographies and journal articles dedicated to sound studies.

> »The project ›sonic thinking‹ aims to serve two interconnected purposes: on the one hand it wants to develop an alternative philosophy of music that takes music seriously as a ›form of thinking‹ (and that might revise our notion of what ›thinking‹ means). On the other hand, it aims to bring this approach into a fertile symbiosis with the concepts and practices of ›artistic research‹: art, philosophy, and science as heterogeneous, yet co-equal forms of thinking and researching.« (Herzogenrath, 2017b, p. 3).

I will come back to the importance of artistic research (or research-creation) — in particular for sociology — in the next chapter, but for now, what is important to take from Herzogenrath is the very basis of what sonic thinking is about: to build practices that are not reduced to one particular field of »thinking and researching«. Following this definition, sonic thinking would apparently allow through »interdisciplinary practices« to think a multiplicity of modes of knowledge production. As I will depict later on, the specificity of artistic practices allow for a different kind of knowledge production that »intensifies experience« and thus multiplies the possibles. However, the question I wish to ask beforehand is: what particularity does the *sonic* in sonic thinking bears, that seamlessly bridges science and art? Or to put it differently: which conceptions of sound — and consequently which philosophical entanglements — are needed to go past the limitations imposed by the reification or objectivation of sound that has been described in the previous chapter?

The concept of a »sonic thinking« or a »sonic thought« therefore demands, first and foremost, to shift the relation between the *thinker*, the *thought*, the process of thinking and the object of thought. Consequently, in »knowledge production«, it means to apply a similar shift between the *knower*, the *knowing* and the »known«, between the practice of knowing and the object of knowledge. Philosophy — as argues Christoph Cox following the »non-philosopher« François Laruelle — has mostly been a philosophy *of* something. In this relation, philosophy objectifies what it studies and (almost fatally) also dominates that constituted object, »claiming the ability to reveal what its object cannot re-

veal about itself: the essence, nature, or fundamental reality of that object.[…] Convinced that its object is fundamentally ignorant about itself, philosophy is little concerned with what that object has to say on its own behalf.« (Cox, 2017, p. 99). Moreover, such a practice of philosophy not only dominates its object, but through this very objectivation, extracts it from the »rest«, in an illusion of independence, of an object that can be taken apart from its »milieu« and studied, analysed in an artificial void. As a result, the illusion of an inert and disconnected object repeats the classical dualisms separating *phenomena* and *noumena*, in the case of Kant, or *Vorhandenheit* and *Zuhandenheit* in that of Heidegger, limiting that object to its human-given purpose and negating its possibility of agency (Harman, 2010). The same argument could be addressed to sociology as a global academic field, within which the sociologies *of* something also blossom. »Bindestrichsoziologien«, or hyphen-sociologies, sociologies »of [fill blank]«, reduce their practices to an object that indeed, as Cox would argue, does not have much to say on its own behalf, being defined — and thus limited — *a priori* by the theoreticians/practitioners. Their object: an extracted, alienated and displaced *thing*, a void and silent abstraction that loses any grip on reality. An issue that denotes a certain hylomorphic perspective of the object, which fails to address the individuation processes, the genesis of that particular object (Simondon, 2005). The chosen object as preferred field of inquiry, through the choice itself, is already formed. Fortunately for the object, its fate is quite different *in actu*. Even the most strictly defined Bindestrichsoziologien already bear a contradiction in themselves: they never achieve to study just one object, as this object can never be separated from others. A contradiction Bruno Latour unveiled multiple times, not only in sociology but in any kind of practice (Latour, 2005, 2013; Latour & Woolgar, 1986). Those sociologies and philosophies of [fill blank], producing a knowledge *of, about* something, mostly do so in the mode that I called »intellectualised« following Montebello. They ultimately tend to forget that knowledge in its materiality is also necessarily *in*, *through* and *with*.

One could grant that this consideration might seem a bit contra-intuitive at first. Knowledge production is always directed towards an

object that is being known. However, one could also argue that this relation between the knower and the known has been fixated in the practice beforehand thus not allowing the object to be other than known. Any possible agency seems stripped away. Switching from an objectifying *about* to an inclusive, encompassing *in*, *through* and *with* would therefore avoid reducing the process of knowing to an »objectivation only«. Instead, it would allow to create a movement between subjectivation and objectivation (as processes) that does not refuse agency to the »object of inquiry« by fixating and extracting it. In that manner, the idea of a sonic thinking already rejoins Haraway's concept of a *thinking-with*, presented in the first chapter but also comes close to the understanding of experience and empirical methods, as proposed by John Dewey (Dewey, 1958). For Dewey, experience is as much *of* nature as *in* nature, within which knowledge production as practice is »only« a particular manifestation. In sociology again, both Latour's motto »follow the actor« as well as Callon's principles of agnosticism, general symmetry and free association also weigh against an *a priori* definition of the object and are already to a certain extent a *thinking-with* (Callon, 1986; Latour, 2005; van Loon, 2014). Again, thinking in terms of prehension, the relation linking the knower and the known becomes central, non-exclusive and multidirectional.

However, what Cox proposes for his *sonic philosophy* is not an epistemology but rather an ontology of sound. Through a reflection about the being of sound, Cox attempts to understand how sound and practices of sounding inflect/effect/affect philosophy. In a probable allusion to McLuhan's acoustic space[4], Cox argues:

> »Indeed, sound is omnipresent and inescapable. Lacking earlids, we are forever and inescapably bathed in sound, immersed in it in a way

4 »The ear favors no particular ›point of view‹. We are enveloped by sound. It forms a seamless web around us. […] We hear sound from everywhere, without ever having to focus. Sounds come from ›above‹, from ›below‹, from in ›front‹ of us, from ›behind‹ us, from our ›right‹, from our ›left‹. We can't shut out sound automatically. We simply are not equipped with earlids.« (McLuhan & Fiore, 2001, p. 111).

> that we are not immersed in a world of visible objects. An attention to sound, then, will provoke us to modify our everyday ontology and our common sense conception of matter. Sound lends credence to a very different sort of ontology and materialism, a conception of being and matter that can account for objecthood better than an ontology of objects can account for sounds.« (Cox, 2017, p. 101).

Let's pause here for a moment. It might have already become clear that until now, I never really made any strong distinction between *thinking* and *knowledge production*, as if both terms could be used interchangeably. This has not been a lazy oversight. It is rather a blurriness I thought necessary in order not to fixate too quickly and too soon what is being worked with. At this point however, a further precision is required. Knowledge production is not reduced to the process of thinking. The process of thinking is rather seen as part of modalities through which knowledge can be produced. For instance, in what Montebello describes as the »intellectualised« mode of knowledge production, in which modern science functions, *thinking* is certainly central but not exclusive, it is a process amid a multiplicity of others that lead more or less conjunctly to the production of knowledge — e.g. sonic skills and sonic tools. In that manner, I don't intend to see sonic thinking (or any kind of thinking) as knowledge production altogether and therefore discard and discredit other practices leading to it, but rather try to understand sonic thinking as a particular modality helping to gain knowledge in a way that »intensifies« the materiality of said knowledge. That being said, thinking is also already a doing, a generative practice and doing is thinking (Manning & Massumi, 2014). Knowledge production becomes an entanglement of a multiplicity of practices within which thinking might occur. What now has to be clarified is if sonic thinking is a particular form of thinking in itself, or if it is thinking as a practice that is embedded in a sonic mode of knowledge production, which gives it its particularity? In other words, how and at which point does sound come into the process?

3. Sonic Flux: a new materialist ontology of sound

In the early parts of his book *Sonic Flux: Sound, Art, Metaphysics*, Christoph Cox presents his conception of a sonic flux, which lays the ontological ground for his *sonic thinking*, encountered above (Cox, 2017). If the idea of a fluctuating matter has been already developed in recent philosophy, with a more or less important reference to sound (Bennett, 2010; Goodman, 2012), the concept of a *sonic flux* attempts to build an explicit new materialist ontology, even though it does so mostly within sound studies. In any case, for Cox, it has indeed become necessary to re-think sound to the core and re-inforce its materiality, departing therefore from a cultural standpoint that — as he argues — focuses on human interventions, seeing every phenomenon as cultural construction and representation, which therefore can only reproduce and strengthen the bifurcation of nature and deepen the split between nature and culture.

> »A rigorous critique of representation would altogether eliminate the dual planes of culture/nature, human/nonhuman, sign/world, text/matter — not in the manner of Hegel, toward an idealism that would construe all existence as mental or spiritual, but in the manner of Nietzsche and Deleuze, toward a rigorous materialism that construes human symbolic life as a particular instance of transformative processes evident throughout the natural world — from the chemical reactions of inorganic matter to the rarefied domain of textual interpretation — processes Nietzsche called by various names, among them ›becoming‹, ›interpretation‹, and ›will to power‹.« (Cox, 2018, p. 18).

Following Nietzsche and Deleuze, as well as Manuel DeLanda later on, Cox therefore »endorses« — as he himself puts it — a materialism that understands matter-energy-information as »all there is«, a perspective which can also be linked to the idea of a »sonic realism« as developped by Casey O'Callahan: »Realism about sounds — *sonic realism* — is the view that the world contains sounds whose existence is not entirely dependent upon the auditory experience of subjects. Realism about

sounds as I shall develop it maintains, furthermore, that the world of sounds is the same world that contains ordinary material objects, events, and their attributes.« (O'Callaghan, 2007, pp. 9, 10). In this understanding, cultural productions and human interventions are not seen as separated from nature, or from matter, but seen as some sort of particular expressions of them. Cox sums up this idea in the introduction of his book by stating that: »[…] all entities and events in the universe are the products of immanent and contingent material and energetic processes.« (Cox, 2018, p. 6). However, those entities and events are not seen as fixed but rather — following DeLanda's own understanding of history (De Landa, 1997) — embedded in flows and fluxes, a sort of ever-moving magma. Whereas DeLanda sees all there is without *a priori* distinction as flows, from the movement of bodies and genes to the fluctuations of language and money, Cox adds that *sonic flux* might bear a particular importance. As he argues, again through Nietzsche and Deleuze: »Music — and, particularly, sonic difference of discord — makes audible the dynamic flux of becoming that precedes and exceeds empirical individuals and the *principium individuationis*.« (Cox, 2018, p. 29). Music, and Cox expands the argument to sound art as well, therefore does not *represent* the world, it rather takes and samples from a continuous sonic flux, from a constantly changing natural flow, it — and this will become very important later on — *individuates* from that flux[5].

> »Just as Nietzsche conceives artists or musicians as immersing themselves in a field of forces and drawing something from it, so Deleuze suggests that we think of sound as continuous, anonymous flux to which human beings contribute but which precedes and exceeds them — an ever-changing and variegated sonic domain of incalculable size and infinite temporal dimension to which new material is added every moment.« (Cox, 2018, p. 30)[6].

5 It could be said in that sense, that *sonic thinking* is a thinking-with Deleuze's simulacrum, the sonic flux being constantly changing, the difference itself.

6 The reference to Deleuze can be found just above the cited passage. Here Cox quotes Deleuze: »[…] ›One can …conceive of a continuous acoustic flow …that

Focusing on the sonic flux — which resembles a fluctuating flat ontology — therefore precisely allows to escape the issues encountered last chapter, among them Vallee's concerns about the objectivation of sound, its reduction to a »secondary quality« as well as its subordination to »what we hear« (Vallee, 2020). This is important because as sound escapes its only function of representation, it also »frees« the practice of listening from any obligation of a human and reason-centred »making sense of«. This is for instance what Makis Solomos calls »l'écoute authentique«, after the Italian composer Luigi Nono, or what Pauline Oliveros understands as »deep listening« (Oliveros, 2005) : »[…] l'écoute authentique dont parle Nono est celle qui se centre sur le son en défiant la tradition qui a fait de ce dernier un simple moyen de représentation. Ainsi libéré, le son est également affranchi de son autorité : il est lié au silence. Et l'écoute n'a rien d'une obédience : elle est une ouverture aux possibles.« (Solomos, 2013, p. 222). At this point, Cox still mostly links his sonic flux to aesthetic productions in music or sound art as relatively independent fields. Nevertheless, through the sonic flux, one could ask to which extent sonic thinking can also invest research practices in sociology. This sampling of the real described by Deleuze, which is also a reconfiguration, an impact on the fluxes, already takes part in knowledge production. Not necessarily as in »for us«, but not separated from »our« experiences either.

If one keeps on following Cox's argumentation for a little while, another important aspect of the sonic flux also appears. Sound might escape objectivation »only« but does it escape causality? It is for instance how the composer and music theorist Pierre Schaeffer understands his »objets sonores«, as objects distinct from their sources (Schaeffer, 2002). However, if for Cox, Schaeffer's theory is strongly inspired by phenomenology (which it is), its conception of the sonorous object cannot be entirely limited to it. As Solomos shows, Schaeffer's object-oriented ontology anticipates any »phenomenological turn«, which remains a source of contradiction throughout his work. On the one hand,

traverses the world and even encompasses silence,‹ he writes. ›A musician is someone who samples [*prélève*] something from this flow.‹« Deleuze (1998).

the *objet sonore* is not merely a phenomenon perceived by the ear, and distinct from the thing-in-itself, it exists as a whole outside the listener's perception and consciousness, without any »Kantian bifurcation« to say it quickly. On the other hand, however, Schaeffer also sees the sonorous object as the phenomenological object of one's listening. A contradiction which, according to Solomos, Schaeffer apparently never could quite resolve (Solomos, 2013). In either case, the problem remains: it is an object, which for Cox, neglects temporality and multiplicity. In other words, a relatively homogeneous and static being. It denies its faculty to change over time, to become, to be *individuated*. There again, Cox takes from Deleuze's distinction between bodies and events or effects to answer the question of causality:

> »In the first place, there exist bodies that have various qualities, that act and are acted upon, and that inhabit various states of affairs in the world. Yet, in addition to bodies, there exist incorporeal events or effects that are caused by bodies but differ in nature from them. Deleuze asks us to think of the ontology of the verb (events) as distinct from that of the noun (bodies) and adjective (qualities).« (Cox, 2018, p. 33).

Thinking sound as an event therefore allows to go past its limitation, its reduction to the effect of a given cause that fixates the relation in an unbreakable bond to the source that produced it, but without arbitrarily separating them into discrete objects either. As Cox notes, shifting from Schaeffer's object ontology to a Deleuzian »ontology of the verb«, grants sound with a particular faculty of individuation, a process of becoming that is not reducible to something exterior to it but nevertheless remains linked to an exteriority: »[…] sounds are not punctual or static objects but temporal, durational flows.« (Cox, 2018, p. 34). Of course, this is true not only of sounds — which are for Cox incorporeal events — but of bodies, things, or any other corporeally more »stable« or »dense« individuals. All undergo processes of individuation, that move, become, and all define themselves in relation to their milieu. Those processes are very different from one another, but can still be expressed in terms of matter, energy and information. In that sense, corporeality is there-

fore »only« a particular physical structure that also became, or rather is becoming, extracted and distinct from its milieu, but still in it and composing it. According to this understanding of individuation, one could say that both events and bodies are embedded in temporalities that distinguish between exteriorities and interiorities, not according to the same »modes«, however. As Deleuze puts it in *The Logic of Sense*, directly referencing the philosopher Gilbert Simondon, from whom the theoretical framework of individuation originates: »Events are like crystals, they become and grow only out of the edges, or on the edges.« (Deleuze, 1990, p. 9; quoted from Sauvagnargues, 2013, p. 69). The process of individuation, either corporeal or incorporeal, can be seen in a movement always happening at the very border of its »structure«, a process that is deeply material and energetic in both cases, linked to a »milieu«, but never reduced to either matter and form or to a unique substance. Beyond substantialism and hylemorphism, it is the relation, the process of individuation that becomes defining (Simondon, 2005). As already mentioned, this conceptual framework has to be traced back to the work of Gilbert Simondon, who had a great impact on Deleuze[7]. However, it is also beyond Deleuze's own use of Simondon, that the original notion of individuation can become central to the *sonic flux* and to *sonic thinking*.

4. Sonic Flux and ontogenesis

As argued just above, reflecting on *individuation* through Deleuze's use of the concept, as Cox did, undoubtedly leads to the philosophy of Gilbert Simondon. Best known for his work on technology (Combes, 2013), with his book *Du mode d'existence des objets techniques* (Simondon & Simondon, 2012), which questions the separation between *culture* and *technique*, Simondon is also a great ontological thinker, as demonstrated in his now well-respected main doctoral thesis and

7 For more information about the influence of Simondon on Deleuze's work, see (Bowden, 2013).

philosophical grounding *L'individuation à la lumière des notions de forme et d'information* (Simondon, 2005). This work — originally written in 1958 and partially published in 1964 — only saw a relatively recent regain in attention, both in France with the republication of the original thesis in 2005 and in English-speaking academia with the translation and broader reception of some of his work, as the books *Gilbert Simondon: Being and Technology* (De Boever et al., 2013) and *Gilbert Simondon: Information, Technology and Media* (Mills, 2016) demonstrate. In what follows, and without aiming for an exhaustive explanation, I will sketch the main lines of his work in order to understand how it may be useful for *sonic thinking*[8].

Simondon's main philosophical goal is to propose a theory of being that is not reducible to either an Aristotelian *hylemorphism*, where an individual is only the result of an encounter between pre-existing form and matter, or a certain monist substansialism or *atomism* that posits a pre-existing substance forming the individual. In both cases, the issue lies in the primacy of a *principle* of individuation over the operation of individuation that constitutes the individual (Simondon, 2005). To put it differently, in both philosophical traditions, there is a confusion between »being as such« and the individuated being (Combes, 2013). In what he calls an *ontogenesis* — rather than an ontology — Simondon therefore wishes to confront this confusion by focusing on the operation of individuation rather than any kind of *a priori* principle. The individual is the *result* of this operation. In this operation however, the individual is not a fixed entity, a definitive formed being, but rather »relative to reality« (Simondon, 2005), always in becoming, always in relation to a »milieu«. Becoming is a dimension of *being as such* that will lead, through its operations of individuation, to the emergence of the individuated being. Being as such therefore precedes the individuated being, but even then is only seen as a becoming, a magma full of potentials yet to be actualised, a field of virtualities, almost pure subjectivity,

8 For more complete discussion of Simondon's work, see the two quoted books above and of course the introduction by Muriel Combes (2013), which will be used here as well.

not a principle. This is what he calls the *preindividual*, »a system that is neither stable nor instable« (Combes, 2013, p. 3) within which the individual may emerge through »dephasing«. As Muriel Combes notes in her comprehensive and in-depth introduction to Simondon's work:

> »The emergence of an individual within preindividual being should be conceived in terms of the resolution of a tension between potentials belonging to previously separated orders of magnitude. A plant for instance, establishes communication between a cosmic order (that to which the energy of light belongs) and an inframolecular order (that of mineral salts, oxygen etc.). But the individuation of a plant does not only give birth to the plant in question. In dephasing, being always simultaneously gives birth to an individual mediating two orders of magnitude *and* to a milieu at the same level of being (thus the milieu of the plant will be the earth on which it is located and the immediate environment with which it interacts).« (Combes, 2013, p. 4).

In Simondon's understanding, being therefore always implies a multiplicity. The individual cannot be thought without its milieu, which appears through the operation of dephasing, or in other words, the resolution of a tension between potentials. However, those potentialities do not entirely vanish, some remain within the individual which keeps on *becoming*. Simondon here strongly uses thermodynamics to explain the stability and metastability of a system and therefore of being. To put it simply, a system is stable when there is no potential energy left, which means, where no further individuation can happen. If an individuated being retains quantities of the preindividual, of that potential energy, it is not stable but only *metastable*, other tensions might occur that lead to further individuation. Furthermore, Simondon understands that operation of individuation as *transductive*, which can be defined as »a physical, biological, mental, social operation through which an activity propagates gradually within a domain, by founding this propagation on a structuration of the domain that is realized from one place to the next« (Simondon, 2005, p. 32; English translation quoted from: Barthélémy, 2013, p. 230). Transduction is central to Simondon's philosophy and this

has consequences in epistemology and ontology all at once. The operations of individuation are not only »subjected« to individuals as beings, but englobe thought and knowledge as well. Simondon positions himself against Kant's theory of knowledge and as Combes notes »before the rupture between the object to be known and the subject of knowledge.« (Combes, 2013, p. 7). One could almost argue that through individuation, Simondon constructs a conceptual framework as well as a methodology that resists the bifurcation of nature described earlier. It also slightly reminds of Latour's reflection on subjectivation and objectivation as processes, which has been encountered through van Loon (2012): not as predetermined realities, but as fluctuations, as becomings. Not in the separation between a nature in itself, and a nature apprehended by us, but in the individuation of knowledge as well as of the individual. Muriel Combes underlines it quite clearly: thinking and being as processes are therefore not much different from each other, both come from operations of individuation, both are transductive at their core.

Coming back to sound, the notion of transduction is also very important both in the practice of *sonic thinking* — which will be presented later — as for the understanding of sound as an event, within the *sonic flux*. An example has been shortly encountered (if not *the* example) of transduction through Deleuze's quote on crystals (see #3 of this chapter). The way a crystal is growing, out the edges, *»de proche en proche«*, is transductive. By reverting the argument that equated the event to the crystal, one can easily see how the Deleuzian event undergoes transduction as well. In other words, the sonic event, as a sample of the *sonic flux*, comes into being through a particular process of individuation, of transduction. A similar idea was proposed by Padovani in relation to Pierre Schaeffer's work, but with a certain distance from the phenomenological *sonic object*[9]:

9 Padovani's article, published in the journal *Interference* is one of the very few contributions that attempts to propose a Simondonian study of sonic practices.

> »The very recognition and delimitation of individual *sonic objects* can be related to a *transduction* process that occurs not so much during the mechanism of recording/production, but, above all, in the perceptual and psychophysiological processes that enable us to detach these sounds from a continuum and identify, analyse, manipulate them individually using technical means.« (Padovani, 2018, p. 35).

And to conclude:

> »Sound production and perception are by nature dynamic processes that rely on the propagation of an energy to produce dynamic structures (*information*) that acquire and retain their individuality as long as they preserve a clear boundary (*different phase*) and independency (*phase difference*) in relation to the surrounding sound environment. From a Simondonian perspective, we could think in terms of *individual sounds* (or sounds ›in process of *individuation*‹) rather than *sonic objects*.« (Padovani, 2018, p. 42).

The link between Padovani's continuum from which individual sounds detach themselves and Cox's *sonic flux* (apart from a semantic closeness) can seem a bit tenuous at first, or falsely related. Cox's concept is a Deleuzian one, and is directly influenced by DeLanda's own work on fluxes. Padovani himself does not say much about how to understand the continuum, balancing Simondon's theory with Schaeffer, who mostly proposed a phenomenological concept of the *objet sonore*. However, the concept of a sonic continuum might still prove useful, if read for instance through the work of the composer Pascale Criton, in which it regains a certain materiality. Influenced by both Deleuze and the Russian composer Ivan Wyschnegradsky[10], Criton understands the continuum as a pathway, allowing to switch from noise to timbre. The sonic

10 According to Solomos (2013), Wyschnegradsky was the first to introduce the notion of *continuum* in musical composition. It gained in popularity in contemporary and experimental music during the 20th century, with composers like Karlheinz Stockhausen, Iannis Xenakis and Pierre Boulez (»Pascale Criton, Le Continuum Du Son,« 2018). In that manner, and regarding the global argument of Padovani's article, I see both conceptions as close encounters.

continuum is a plane in which sound switches »states« (»Pascale Criton, Le Continuum Du Son,« 2018). However, it is not a spiritualist turn[11], but a very material conception of sound. Just like other physical beings, other individuals, sound is here being expressed as a fluid, an unstable becoming, in other words, as a being undergoing individuation : »A l'idée que la ›logique du vivant est en devenir — et non pas stable et simplifiable‹ (comme elle l'était pour la pensée mécaniciste) correspondrait donc une musique ›qui se porte sur le multiple, l'interactivité, la complexité du mouvement et la formation dynamique des évènements'"(Delume & Solomos, 2002, p. 41; quoting Criton, 1998, p. 130).

This might have been a slight stretch, but through Criton, Padovani's continuum can be understood in a way that makes sense of individuation and transduction and that indeed comes very close to Cox's sonic flux. Musical practices are transductive practices, they individuate sound, they extract sound from the sonic flux, this »sonic continuum«. This, of course, is true of compositional work, like the ones of Criton mentioned above or any others for that matter, Padovani notes. Interestingly though, not only for composition does it bear importance. A version of the concept has been experimented with indirectly (apart from references to Deleuze and some versions of new materialism) through »radical« improvisation, the way the drummer Sean Baxter understands it: as an »acte critique du *devenir*, en incarnant la promesse d'une rupture progressiste, et en amplifiant les possibilités sociopolitiques offertes par le tumulte des flux.« (Baxter, 2020, p. 15). In Baxter's understanding, improvisation thus becomes the sampling of the sonic flux on the go, formulated through the materiality of objects and bodies sounding. Non-metaphorically. The sonic flux, in short, either in compositional or improvisational perspectives therefore makes sense, not from a theoretical standpoint that wishes to make jigsaw

11 From John Coltrane to Karlheinz Stockhausen or to some extent LaMonte Young, the *sonic continuum* also gained a spiritualist value, which has been strongly criticised. As Solomos (2013) shows, it supposes the faith in a »vibratory unity« with the universe, the access to a higher plane of understanding and consciousness.

pieces fit at all costs, but from the practice itself. The sonic flux thus becomes the basis, the preindividual magma from which sounds can extract themselves or be extracted through the transductive sounding and listening practices, ordered, modulated, recomposed, and become individuated sounds. They are not only »acted upon«, but themselves change the milieu and other beings they are related to. An example could be found in the process of subtractive synthesis. Through an array of filters applied to a white noise signal — which itself contains all frequencies — some frequencies are taken out, rendering step by step a »particular sound«. The filtering individuates the signal into a particular timbre, a particular note, a particular event that is still relating to its own milieu and influencing it, through the characteristics of that filter. However, this example is only for the sake of illustration. It does not mean that white noise is the pre-individual itself, it can also be thought as an individual event (for instance through sequencing i.e. the temporal ordering of sound events), when thought in the scope of an electroacoustic composition. Nor does it mean that only subtractive synthesis (in contrast to other forms of synthesis, like additive and FM) is a transductive operation of individuation. In any case, the Simondonian concept of being, applied to sound in combination to Cox's *sonic flux* proposes a new materialist consideration of sounding practices, neither limited to nor excluding human contribution.

5. From Sonic Flux back to Sonic Thinking

In the sonic flux, sound is an event, or an effect[12]. It is an actual occasion. It is immanent, differential, expressed in terms of matter-

12 For Cox, an effect is a particular event distinct from its cause but bearing a certain possibility for repetition and thus »not reducible to their empirical instantiations« (Cox, 2018, p. 34). He takes the work of Augoyard and Torgue (2006) as an example, in which the sound effects describe a soundscape as a »flux of haecceities, recurrent but transitory auditory modalities and intensities.« (Cox, 2018, p. 34). An example of those effects would be the Doppler effect.

energy-information. It undergoes operations of individuation through the practices of sounding and listening, which are transductive (Padovani, 2018). Such a materialist conception of sound is important because it allows to strongly rework the effects of the bifurcation of nature, among them the separation nature/culture, subject/object. Not only theoretically, but in practice as well. As noted above however, Cox's work is mostly directed towards aesthetic productions, in particular »sound art«. It is in those productions, from the musical score to the sound recording and the sound installation, that the *sonic flux* is being expressed, not as a representation, but as a sample, a configuration, a particular individuation:

> »Such a materialist and realist account of the sonic arts will enable us to conceive sound as both irreducible to culture and also shaped by it. It enjoins us to suspend the idealist and humanist language of representation and signification that has characterized cultural theory over the past half century, and to reconceive aesthetic production and reception via a materialist model of flow, force, and capture.« (Cox, 2018, p. 41).

This conception of sound reminds of the first principle of Latour's *Irreductions*: »Nothing is, by itself, either reducible or irreducible to anything else.« (Latour, 1988, p. 158). Following Latour, it therefore means, that sound, to exist as a »real thing«, must resist what he calls »trials«, which are expressed in terms of forces. Simondon's operations of individuation become processes of resisting, of gaining strength, of forging alliances with others. To »exist«, sound must propagate in a non-empty milieu, it requires enough power to set the molecules of that milieu into movement, which already involves a quantity of actors. As Latour puts it: »No actant is so weak that it cannot enlist another. Then two join together and become one for the third actant, which they can therefore move more easily. An eddy is formed, and it grows by becoming many others.« (Latour, 1988, p. 159). This is the movement »de proche en proche« at the heart of individuation. In other words, sound, to exist, to become, needs others, a »milieu« in which to emerge, which is itself a multiplicity of actors, or as Whitehead would put it, of actual entities.

In that sense, individuation as becoming is already *prehension*. As transductive, it is »concrescence«, a thickening »togetherness«, alliances in movement (Debaise, 2006; Whitehead, 1978).

> »The art of sound is precisely the art of unleashing, cutting and shaping these flows, which are temporal or nothing at all, always manifesting the passage, the relentless becoming-other that is time.« (Cox, 2018, p. 169).

Even in Padovani's article, in Criton's compositional work, or in Baxter's radical improvisation, musical expression is at the centre; it is what individuates sound[13]. However, as Schulze (2018) points out, this *sonic materialism* goes far beyond a new definition of sound art as an aesthetic practice, but encompasses every possible practice of sounding and listening, that are not necessarily defined or culturally coded as »musical productions«. This does not mean however, that — for instance — Criton's or Baxter's works are not *sonic thinking*. In the case of Criton's music, the reflections about the smallest variations, about the Deleuzian notion of the sensible, but also the territorialisation of sound (Solomos, 2013), are a particular instance of *sonic thinking*. For Baxter, *sonic thinking* is necessarily at the core of improvisation, which leads him to think his production with Anthony Panteras and Dave Brown as an »ultra-materialist and anti-humanist music« (Baxter, 2020, p. 15). Nevertheless, it is not only musical, it also reconfigures what is understood as »sonic research«: from *Sound Studies* about sound, to a *sonic thinking*, »*with, through* and *beyond sounds*« (Schulze, 2017, p. 218).

Deriving from the sonic flux, sonic thinking is first and foremost a process-centred thinking. For Christoph Lischka, it allows to follow Whitehead and reconfigure the »balance of fluency vs. permanence, of generation vs. substance« (Lischka, 2017, p. 173), to weigh against the bifurcation of nature, to escape the »subject-predicate-object struc-

13 Central, but not exclusive, even in Criton's understanding (Delume & Solomos, 2002)

ture« (Lischka, 2017, p. 172) that determines object-oriented thinking[14]. It refuses a certain anthropocentrism as well as a logocentrism and bears spatial, corporeal and »imaginative« components (Schulze, 2017). In terms of sociological research, including a *sonic thinking* thus might lead to tremendous consequences concerning the methods employed — not only of gathering and interpreting data, but on the methodology of *doing sociology* altogether. It changes the *Herangehensweise*, as well as the modes of knowledge production. Following Herzogenrath (2017b), Cox (2017) and Schulze (2017), adopting a »sonic thinking« can therefore never remain enclosed in typical sociological methods or philosophical thought alone. They are *de facto* always already at the intersection of scientific work and aesthetic practices. But they are also a critical thinking|doing, asking what it means to do science and produce knowledge, (Schulze, 2020b; Szepanski, 2020) as well as *speculative fabulation* reflecting on one's situatedness and also who to think-with (Haraway, 2016)[15]. The proposal for a *sonic thinking* is therefore not only of epistemological or ontological nature. In the preceding chapters, it has been shown that the alienation of knowledge from materiality could be expressed in how knowledge was being produced, which itself derives from the situatedness of knowledge production and that a silent knowledge could be seen as a particular expression of that alienation. What is being implied in this proposition? How is a *sonic thinking* being performed and how is it indeed challenging existing conceptions and hierarchisation of knowledge production?

14 Presented in that manner, Lischka's sonic thinking sounds quite like what Simondon intended to achieve with his ontogenesis as well as a departure from an alienating and objectifying text-making.

15 *Sound formations*, speculative fabulation, sonic fiction. I follow Haraway, Stengers and others and branch on the *SF* catalogue (see the introduction of this work).

6. Doing sonic thinking?

Rather than presenting an »all-encompassing« listing of what it might be, a dive-in the reality of *sonic thinking* seems more adequate. To do so, I can only repeat Schulze's invitation and technique: »*Sonic thinking* starts here: where knowledge is not mainly gained by academic reading, by discussing, falsifying or confirming, by rejecting or redefining propositions on some object called *sound*.« (Schulze, 2020b, p. 19). The knowledge Schulze's is referring to mainly emanates from Kodwo Eshun's *More Brilliant than the Sun: Adventures in Sonic Fiction* (1998), »a book written *out of music*« (Schulze, 2020b, p. 83) that helps (re-)defining *Afrofuturism* and challenges a certain hegemony not only in musicology and sound studies, but in cultural theory, science and art practices as well. What Eshun proposes through his book but also through the research-creation practices of the *Otolith Group* co-founded with Anjelika Sagar[16], is a mode of knowledge production that actively engages and reflects on the issues of alienation already mentioned. By means of sound practices, performances, installations, exhibitions as well as academic articles and books, they can weigh against this alienation, not only of knowledge, but through knowledge, against the alienation of bodies. Displaced and silenced bodies. An inescapable materiality, reinforced through the sonic. A multiplicity of modes of knowledge production escaping the hegemony of an intellectualised one, which too often tends to deny its own situatedness. Their work is rooted in aesthetic practices, but they are in their effect, in what they activate, in the knowledge they produce, already very sociological.

This project, this practice, this attitude is also what drives the work of Philadelphia-based *Black Quantum Futurism* and their carriers Camae Ayewa and Rasheedah Philipps[17]. They describe the project as follows:

16 More information of the *Otolith Group* at: http://otolithgroup.org/index.php?m=information.

17 There is a conceptual, theoretical and methodological closeness between the work of the *Otolith Group* in London and *Black Quantum Futurism* in Philadelphia, even though their claims and situations greatly differ. A passage point

> »Black Quantum Futurism (BQF) is a new approach to living and experiencing reality by way of the manipulation of space-time in order to see into possible futures, and/or collapse space-time into a desired future in order to bring about that future's reality. This vision and practice derives its facets, tenets, and qualities from quantum physics and Black/African cultural traditions of consciousness, time, and space. Under a BQF intersectional time orientation, the past and future are not cut off from the present – both dimensions have influence over the whole of our lives, who we are and who we become at any particular point in space-time. Through various writing, music, film, visual art, and creative research projects, BQF Collective also explores personal, cultural, familial, and communal cycles of experience, and solutions for transforming negative cycles into positive ones using artistic and wholistic methods of healing. Our work focuses on recovery, collection, and preservation of communal memories, histories, and stories.« (Ayewa & Phillips, n.d.).

What becomes clear from both artistic groups is their relation to space. Space not only as the outer space — which is nevertheless at the core of *Afrofuturism* — but first and foremost as the situatedness of their discourses and practices. This is what defines *sonic thinking*. It is a *spatial* and *located* thinking. Knowledge production is situated (Haraway, 1988). In the case of *Black Quantum Futurism*, it is deeply rooted in the city of Philadelphia, it is deeply emerging from the black communities living there. The *sonic thinking* that emanates from those spaces, the *sampling* of the sonic flux that bridges through times is located[18]. An afrofuturist, feminist queer practice challenging the hegemony of knowledge

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were both met was at the Institute of Contemporary Art (ICA) in London in 2019, where they discussed the topics of *Black Chronopolitica* and *temporal deprogramming* by re-investing and giving importance to erased narratives and alienated histories. See https://www.ica.art/learning/black-quantum-futurism-the-otolith-group-black-chronopolitica.

18 See for instance their project *Black Womxn Temporal* (http://blackwomxntemporal.schloss-post.com/) or *Project Time Capsule* (https://www.blackquantumfuturism.com/project-time-capsule).

production. Moreover, this re-territorialisation of experiences and histories, is made possible through the very nature of sound and how it propagates: »any sound event can only be materially manifest in a specific physical situation — be it a concert venue, an art gallery, a tablet computer with poor loudspeakers, or a pair of headphones.«(Schulze, 2017, p. 224). It is never only sound, of course, but sound accompanies the thinking, the doing, it produces and propels it. A *thinking out of sound*. The materiality of the sound event and the *milieu* in which it evolves are central. As Schulze notes, the technologies involved in both emission and reception, the design and architecture of the space in which it unfolds become defining. Thinking sonically and spatially thus »focuses on: *The Auditory Dispositive and the Aural Architecture as the historically, culturally, and materially determined, and thus highly situated and immersive, conditions of any sonic experience*.« (Schulze, 2017, p. 224). This sonic thinking also *activates space*, in the sense developed by James Morrow and Rob Shields[19], not only because it »repurposes« vacant spaces, but because it shows the importance of that space and its community, it shifts the attention to purposes that might have been forgotten, or have been hidden, silenced, alienated[20], through a plurality of modes of experience, through a multiplicity of modes of knowledge production. It activates space through *sonic* practices.

Remaining along the lines of Schulze's typography — such an activation of space, such a *sonic thinking* is also necessarily a *corporeal* thinking. The spatial immersion of a *sonic thinking* is — I might dare to say — *de facto* a corporeal one. The situation/localisation of sonic thinking is the situatedness of the body listening and sounding. The body becomes the prerequisite for a sonic epistemology.

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19 In their field guide *Activating Space*, Morrow and Shields propose strategies to find »new purposes for vacant spaces«: https://www.spaceandculture.com/wp-content/uploads/2020/04/Activating-Space-Field-Guide.pdf.

20 See for instance the *Black Space Agency* project by BQF: https://www.blackquantumfuturism.com/black-space-agency. Further from BQF, the work of Emma Warren with her book *Make Some Space: Tuning into Total Refreshment Center* (2019) and the jazz musician Angel Bat Dawid also propose variations on how to activate space through sound (Warren, 2020).

To express this prerequisite, the following paragraph is an illustration, a switch in narration, an attempt to show the corporeality implied in *sonic thinking*, as a kind of autobiographical snapshot. My own sampling of the sonic flux as a direct reference to Schulze's storytelling in *The Sonic Persona* (2018).

The body of the researcher, my body, right here, typing away on my laptop, not sitting straight enough, a bit bothered by the neighbour who starts to vacuum clean her place. Actually, I am not that bothered, I have to confess, I prefer the constant drone of the machine to the »four-to-the-floor« dancefloor techno she was blasting yesterday. It would be almost relaxing if it did not remind me that I have to do the same later. She drops something heavy on the floor, a book perhaps. The materiality of knowledge does sound, apparently. Interrupted by the sudden stomping sound, I drift out. My focus wanders elsewhere. I am now listening to the swallows that circle the house in a mad race. They are hunting, chasing small insects and mosquitoes, easier to catch now than during the afternoon; the humid air of an early summer evening weighs on their thin wings and slows them down. The birds sing. My body reacts, I react to the sounds I am immersed in.

This sudden change of register might feel a bit odd. Incongruous even. Despite the lack of elegance in its appearance out of nowhere, the »out-of-place« feeling it produces also exemplifies the difference between a small piece of narration and the academic tone normally expected. A quick (self-)reminder maybe, about how knowledge is being constructed. This form of storytelling is not centred around a phenomenological understanding of the *sensory experience* though. The human body and »sonic persona« are only part of the sonic flux (just like the swallows outside or the vacuum cleaner upstairs). It follows Schulze's conception, a non-anthropocentric approach to knowledge production through sound. The sensory experience of the body is itself generative and produces knowledge, an experience that can be expressed and intensified through particular forms of storytelling like sonic fiction.

Schulze focuses on Steve Goodman, Jean-Luc Nancy and Eugene Gendlin to express the corporeality of sonic thinking that places »the

humanoid and its body within a dense, materially and corporeally resonating field of possibilities, flexibilities and other relations of the human« (Schulze, 2017, p. 227). Based on this quotation, one could still argue that the focus lies in the human as a particular sensing being and that the approach surely remains anthropocentric. Even the narrative piece would indicate it. However, in that case, the *humanoid* is seen as singularity, but not as the exclusive sensing body. Or rather, as he states elsewhere: the sensory persona is not human (Schulze, 2020a). The practices of listening and sounding are not necessarily reducible to reason-mediated processes. Even then, in this very sentence, I reiterate the dualisms I wish to depart from, by separating reason from experience. It is through William James that one could finally make sense of what is above: »If you ask what any one bit of pure experience is made of, the answer is always the same. ›It is made of *that*, of just what appears, of space, of intensity, of flatness, brownness, heaviness, or what not.‹« (James, 1976, pp. 14, 15). Thoughts and things being made of »the same stuff«, sonic thinking gains in density. Coming back to Simondon's wording, one could then add that the »humanoid« is an individual being (becoming) on the verge of further individuation. The sonic flux as a flow of matter-energy can become information as *in-formation* (Combes, 2013). Sounding and listening practices are actualising potentialities that could cause further individuations. Taken in that material sense, sound and thoughts are generative within human corporeal epistemologies but not only, and without being excluded from them either. This is for instance what Mickey Vallee (2020) shows in *Sounding Bodies Sounding Worlds*: practices of sounding and listening, *sonic thinking*, *sonic epistemologies* that are not entirely reduced to an anthropocentrism, both in very scientific fields (like bioacoustics) and artistic contexts. A *thinking with sounds* that engages with the plurality of modes of knowledge production, themselves being *thinkings with sounds*.

7. For a sociological *thinking with sounds*

Sonic thinking is therefore embedded in a multiplicity of practices that go beyond classical definitions of epistemology. Its spatial and corporeal entanglements underline and even request this multiplicity of »epistemic practices«. In other words, *sonic thinking* is an acknowledgement and a pursuit of the multiple modes of knowledge production, modes that indeed re-inforce the very materiality of knowledge. What Schulze proposes is to expand what can be understood as »epistemic practices«. Echoing what I described in the first chapter, not only practices deemed scientific are generative and produce knowledge. Dancing, sewing (Haraway, 2016; Manning et al., 2018), walking, cooking rice (Kissmann & Van Loon, 2019b) are not less »epistemic« than practices of writing, thinking, and debating, for example. And of course, practices of sounding and listening are as well. Through his analysis of the work of Kodwo Eshun (to which I attempted to add BQF, amongst many others), the expansion Schulze proposes therefore sounds like an invitation, a possibility to experiment towards a sociological thinking with sounds. *Sonic thinking* becomes a real *proposition* — in the sense of Whitehead — a *lure* that »captures feelings« and »intensifies« experience, a speculative practice that engages with the plurality of possibles (Debaise, 2015b).

> »Positioned in sound, in its visceral and material impact, one moves away from a traditional and distant epistemology. An epistemology that imagines some anonymous, objective, omni-erudite and all-knowing researcher as its steering entity — always male and athletic and always in charge, ›white, thin, male, young, heterosexual, christian and financially secure‹ (Lorde 1984: 116). A strange and actually inexistant ›mythical norm‹ (Lorde 1984: 116). From this epistemic idealism one moves carefully, daringly and curiously into epistemic materialism and realism. A sensory and sonic materialism that materializes actual and existing sensibilities and subjectivities of experience — in all their glorious erratic richness.« (Schulze, 2020b, p. 102; quoting Lorde, 1984).

The challenge *sonic thinking* poses to sociology is therefore that of a departure from logocentric practices (Schulze, 2020b). This does not mean however that the *scientific* practices of writing, reasoning, of »doing sociology« should be erased, refused, or forgotten, but that their hegemonic character in the production of knowledge should be questioned. If I understand the practice of sociology as experimental, as »research« the way Latour presented it (1999), then I must reflect on those issues as well. If I intend to practice a sociology that follows James' radical empiricism, Dewey's pragmatism and Whitehead's speculative philosophy, then the expansion of what »epistemic practices« mean is more than necessary. Such an attitude seems central to regain the pursued experimental character but also, as argued in the first chapter, because of the political and ecological urgencies attached to those practices and the critical standpoint sociology can inhabit. As Nigel Thrift puts it in introducing his *non-representational theory*: »[…] the social sciences and humanities suffer from a certain kind of over-theoretization at present. There are too many theories, all of them seemingly speaking on behalf of those whose lives have been damaged by the official structures of power.« (Thrift, 2008, p. 3). The goal thus becomes, from the posture of a thinking-doing, to also question those structures of power. This opening of possibles, of »sonic possible worlds« through practice also implies to rethink how »new materialism« is being used and understood, in order to avoid the same alienating pitfalls that tend to discard a knowledge production that is not white or masculine enough. The quote by Schulze, referencing Audre Lorde makes it quite clear: the need to move »away from a traditional and distant epistemology«. Reflecting on *sonic materialism*, and engaging with the work of Quentin Messailloux and Christoph Cox, Salomé Voegelin also reminds the importance of the situation in the production of knowledge:

> »While a masculine new materialism insists on the absence of the human to get to the unthought, and thus ultimately proposes the end of philosophy in its own mathematical probability, a sonico-feminine new materialism brings us to the creative performance of matter and language not in words but on the body and on things: doing, digging,

> gardening as a revocalization and rephysicalization of theory through its intra-activity with things.« (Voegelin, 2019, p. 175).

Language not in words. *Logos* beyond the text. This has important consequences in understanding *logos*, which could become problematic and challenging for classical sociological practice, mostly because of how that *logos* in socio-logy has been dealt with. A *logos* which can be seen here not so much as the focus on writing cultures than as the transcending value of the text, of reason, and in the case of sociology, the »always-already-here« quality the social, which is for instance inherent to Durkheim's sociology. As van Loon (2017) shows, this understanding of *logos* and consequently of *nomos* (as arbitrarily opposed to *logos*) only results in a separation between *Sprechen* and *Handeln*, between discourse and practice, and consequently between *thinking* and *doing*. The alienating character of theory Thrift (2008) describes actually results from this split through a denial of its situatedness, apparently even more so as it has been mutating from *Sprechen* to *Schreiben*, as shown with Ong (2002) and McLuhan (2001) in the previous chapter. However, this reproduces the dualism *thinking* vs. *doing* in their *visual* vs. *acoustic* or *literacy* vs. *orality* expressions. Therefore, to escape this dualist *cul-de-sac* that tend to conceive the social as an »always-already-there« *sui generis* reality, van Loon proposes to reshape the understanding of *logos* through *legein* and *typtein*.

Typtein is the impact that makes a difference in a situation. Van Loon here takes the Heideggerian hammer example: the impact of a hammer makes an imprint, it creates a difference, a singularity. »*Typtein* ist das gewaltsame Herausfordern einer Wirklichkeit im Sinne von Differenzieren (z.B. als Selektieren, Unterscheiden oder Entscheiden). *Typtein* ist deshalb das Sich-ergeben von aktuellen Entitäten, die in ihrer Auswirkung individuell nachvollziehbar sind, zum Beispiel in Bezug auf das, was sich als Teil einer Sammlung präsentiert.« (van Loon, 2017, p. 73). *Typtein* is in that sense the individuated sound event, differentiated from its milieu, from the sonic flux. Something moved by the impact, something in motion. But that something is never taken away from its milieu. This is where *Legein* becomes important: »*Legein* ist die

Investition der Bedeutsamkeit oder Sinnhaftigkeit einer Wirkung, wodurch (vielleicht sogar kausale) Verknüpfungen zwischen voneinander in verschiedenen Aktualitäten getrennten Ereignissen nachvollziehbar gemacht werden. Mit *Legein* bekommt eine Kreation (als Gestaltung) oder auch Entfaltung auch eine Kreativität (eine schöpfende Kraft).« (van Loon, 2017, p. 74). *Legein* is a gathering, an assembly of the differentiated through *Typtein*. A form of ontogenesis that allows to think the *pre-individual*. If *Typtein* is the individuation of the sonic flux, *Legein* becomes the *sonic thinking*, the *sonic fiction* even, that gathers. The discourse as gathering is already performative and already a *Handlung*. There is no separation between *Sprechen* and *Handeln*. Consequently, *logos* becomes itself something else: »Logos ist Handeln-Sprechen und Sprachlichkeit ist immer eine immanent-performative Verwirklichung.« (van Loon, 2017, p. 80). The issue with the representation of sound, or the representation of data as sound therefore lies in the understanding of »sense-making« that not only separates words from things but objectifies what it makes sense of. Thinking *logos* through *Legein* as gathering, re-presentation does not objectify what it shows, not to the same extent, at least. It rather unveils the multiplicity of possibles, in which *Typtein* as singularity can be expressed as a particular situated modality, linked to other situated modalities, other expressions of *Typtein*. In this, it comes close to the radical empiricist attitude and the speculative posture endorsed by Stengers and Debaise that intends to intensify the possible. Even more so because the relation between *Legein* and *Typtein* is expressed in its materiality, or rather in the relation between matter, energy and information.

Hence, following van Loon, there is no »escape« needed, no compromises to be made in a possible sociological *thinking-with sounds*. Eshun's book *More Brilliant than the Sun* has been posited as the exemplification of sonic fiction, which, following Schulze, is not encapsulated in the — rightfully so — criticised logocentrism. Based on *legein* and *typtein* however, Eshun's book is generative as impact, as motivation, but as *gathering*, as *logos* as well. In other words, the generativity of sonic fiction and sonic thinking receives an even greater value through its *logos*, its ability to gather, to render singularities in their multiplicity, on the sole

condition that *logos* is understood as a creative thinking|doing, speaking|doing. In the quote above, the »visceral and material impact« is a particular expression of *typtein*, an expression of singularity, a particular individuation. As described earlier, *typtein* differentiates (van Loon, 2017). In a *sonic thinking*, it is also *legein* as a gathering of those particularities and differences. If anything, as van Loon notes, this recollection is the result of what may be called the social. In this, a sociological thinking with sounds thus can be positioned at the crossroads between Schulze's heuristic sonic thinking and van Loon's sociology as *Empiraterei*:

> »Dadurch, dass man empirisch denkt und sich auf konkrete erfahrbare Ereignisse beruft, ist man in der Lage, das soziologische Denken weiter anzutreiben. Die Empirie wird zwar ›genommen‹ (und von ihren konkreten Situationen entfernt), aber das passiert immer spielerisch und mit einer Vielfalt von möglichen Rückbindungen. Diese Vielfalt ist ein Antidot gegen vampirisches Soziologisieren. Dieses Antidot der Empiraterei bedeutet dann nichts anderes als eine spekulative Begegnung der temporalen Situativität des Sozialen.« (van Loon, 2017, pp. 89, 90).

THINKING-WITH | A speculative venture between aesthetic thought and research-creation

1. Sonic thinking and artistic practices

For a sociological sonic thinking. I ended the last chapter on this »plaidoyer«, assured that it would *make sense*, assured that it gained enough value and energy to set into movement, to impact. In order to achieve this call for action, however, I need to circle back to a certain aspect of sonic thinking I left *au chaud* for further discussion. It should have become clearer now that sonic thinking encapsulates the speculative posture described in the first chapter and could become a strong ally in an exploration of the multiplicity of modes of knowledge production. A posture to which I would add a Jamesian inclination towards experience. The question left unanswered, though, concerned the practices themselves. What does sonic thinking look like? What does it sound like? Bits of narration and references to art collectives could give a hint, but within sociology, is it that clear? Indeed, both Herzogenrath (2017b) and Cox (2018) understand sonic thinking as entangled within artistic practices but do not expand beyond them, or do not say much about their inclusion in research practices, for example within social sciences. A strong link between sonic thinking and art as mediated through the aesthetic (of sound itself, of sounding?), but does it remain within the »art world«? Maybe in contrast to Cox and Herzogenrath, Schulze — who does not reduce sonic thinking to

art — still acknowledges the particular and intense relation between sonic thinking and the sensible (the humanoid as sensing body). A relation, which for him bridges the work of Kodwo Eshun and Michel Serres (Schulze, 2018, 2020b). Sonic thinking — because of what it engages with and thinks through — seems to be necessarily bound to the aesthetic. And more often than not, it does so on what appears to be the mode of artistic practices, even if it is reaching far beyond those particular expressions (Herzogenrath, 2021).

Reflecting on the unfoldings of sonic thinking thus implies to take the aesthetic into account and ask to which extent they are generative practices. In addition and from this standpoint, thinking in terms of artistic practices, as »research-creation« as I will later explain in more detail, may indeed become helpful to tackle some of the issues presented earlier, mostly in terms of the definition of agency, the reification of sound, or the situation of knowledge practices. Such practices could be thought of as »non-representational«, as Nigel Thrift (2008) understands them. More than a focus on practice, non-representational theories convey an understanding of »life«, the »everyday«, and experience beyond phenomenology and a certain anthropocentrism, mostly through a new materialist and radical empiricist perspective. This is interesting, not only because it criticises dualism and hylomorphism, but also because it proposes a concrete alternative. In such theories, the performative is central in order to generate knowledge differently, to engage with other actors differently. It has been already discussed in earlier chapters: practices of sounding and listening are *prehensive*. One could argue that they are already aesthetic. For Thrift, performing arts are able to »capture« »traces« of actual entities, through the sensible. It is not only a philosophical argument, but a very concrete posture of engagement with those entities, within materiality. In other words, the inclusion of performing arts in social sciences, but also, as I will argue in what follows, of aesthetic practices in a broader meaning, which are at the heart of *sonic thinking*, thus allows to generate knowledge and thought according to other modes, not alienated from materiality, in short, to fully embrace the prehensive character of sounding. If any-

thing, *sonic thinking* understood as aesthetic practices reinforces what has been seen in the second chapter through Goodman and Vallee.

Such an attitude therefore directly engages with a sense of »wonder«, as Thrift puts it, a certain re-enchantment of the world. As I will discuss later with Simondon, this idea of wonder can be seen as a comeback of the magical, which itself brings a redefinition of agency, and of knowledge itself. It is an intensification of experience, an »expansion of life« that underlines *matters of concern*. The aesthetic within a *thinking-with sounds* is therefore not only of theoretical value, but in engaging against neoliberal practices of alienation, co-opting and monopolising aesthetics, and with them, a certain production of knowledge, it becomes critical. In the first chapter, as one intention motivating this work, I asked, through Haraway, how to stay with the trouble, in particular within sociology. I would argue at this point that a *thinking-with sounds*, which directly and profoundly engages with the aesthetic, embodies such a critical attitude from within the »Chthulucene« (Haraway, 2016). Engaging with *sonic thinking* as aesthetic practice therefore means to be able to reflect on those questions and how they indeed relate to sociology. To which extent can it be included in sociological research? Do those practices indeed express other modes of knowledge production? Are those modes thus limiting what is being understood as knowledge, hindering its production? Or on the contrary, do they achieve its intensification, and even allow to propose a viable critique of the said »trouble«? Are sociology and art, or broader said even, aesthesis, bound to a subject-object relation or can it be reconfigured into something else?

The following chapter is therefore an attempt to focus on that aesthetic and non-representational character that lies in sonic thinking. Aesthetics are here taken in the original sense of *aesthesis*, the sensible, the experience, rather than the Kantian judgement of the beautiful. In other words, this chapter will propose a reflection on how an *aesthetic thought*, as what constitutes a *thinking-with sounds*, might allow to link sociology and artistic practices and what importance it can bear for sociological research itself. As a consequence, a clear-cut definition of what sonic aesthetics, or practical aesthetics are — again, for instance in relation to Kant's aesthetical judgement — should not be expected

here. Aesthetics is one of the main pillars of philosophical theory-making since Ancient Greece and I do not intent to either propose an exhaustive history of the concept or define it anew[1]. I would rather follow another approach. I already sketched the closeness between van Loon's Empiraterei and sonic thinking at the end of the last chapter. I would like to continue and deepen this exploration in the present one, by insisting on the speculative and generative character of aesthetic thought, and of what could become a sociological thinking-with sounds. In this, I hope not to construct a clear set of methods to be applied on any object of inquiry but rather to clarify the *attitude* I could adopt in doing a sociology that is radical and ethical.

> »What if we view the world not as a vacuum raisined with corpuscles but as a *plenum* instead? What if we construe and construct our world as a single medium varying through boundlessly many modes of articulation, continually exfoliating in a value-creating magma of experience?« (Sha, 2013, p. 97).

2. Thinking in phases?

A somewhat unexpected but nonetheless fruitful way to think about aesthetics is with Gilbert Simondon, who has been already encountered earlier. Not only a thinker of technology and »ontogenesis«, his interests branched out much further and »his project was to constitute a general anthropology, studying perception, imagination, memory, invention, by situating human originality in each case within the set of living beings.« (Michaud, 2013, p. 121). As Binda (2015) notes, his conception of aesthetics can be linked back to the original Greek definition of *aesthesis*, which means sensation, sensibility. In that manner, she continues, his reflection departs from a particular philosophy *of* the Beautiful or *of* the *beaux-arts* to encapsulate the whole of experience and to

1 For a further and broader reflection on *aesthetics* and its practice, see for instance Herzogenrath's edited book *Practical Aesthetics* (2021), in particular the first three chapters by Christoph Menke, Katerina Krtilova and Tim Ingold.

question the »specific mode« of how human beings, through experience and through their sensibility, engage with the world. Art, or the sensible experience in a larger sense, are not the direct objects of his thought, but rather a mode through which one can experience the world. It is a slight movement from a thinking *about* to a thinking *through*, which might help in conceiving/practising a »thinking-with« sounds. Moreover, for Simondon, the sensible experience is never »alone« or isolated, but always linked to technical elements, which allow us to »articulate« that very experience, to use Binda's terminology (2015). From a technique/culture separation, another result of the bifurcation of nature, Simondon rather understands a technique|culture co-constitution, expressed as techno-aesthetics.

However, before further exploring what techno-aesthetics are, a detour through the aesthetic thought might seem indicated. Simondon's aesthetic thought, or better yet, his process-oriented *aesthetic thinking*, is quite particular because it relies on a complex logic that can easily be misunderstood (Barthélémy, 2013), namely that of phases and phase-shifting. The idea of phases and of *dephasing* has been shortly introduced in the last chapter: it is what Simondon understands as becoming. At that particular point however, I focused on the relation between the individuated being and its milieu (made possible through *dephasing*) in order to understand the sonic flux. I equated, rather simply, *dephasing* and *becoming* without giving much attention to the first term.

Simondon — as Combes rightfully notes — thinks of being as a system *in the process of becoming* and this is where *dephasing* becomes more important: in thermodynamics, a field Simondon often refers to, a *dephasing* system is one that changes states and in so doing thus contains different phases »at once«. Combes gives here the example of evaporating water, which, in its change of state contains two phases: liquid and gas (Combes, 2013). They are two potential »becomings« of water depending on its relation to a milieu, on the »stability« of the system. Those phases, however, only appear through the operation of individuation taking place. They are no *a priori* already determining how the individuation will go. This has two main consequences. Firstly, it means that the pre-individual full of potentialities has no phases yet, they only

emerge from the operation of individuation, and secondly, that phases can only be thought in relation to one another, thus always more-than-one. Moreover, and this is very important, phases are not thought in a strict temporal sequence. Being as becoming is not a dialectical operation, where the negation (antithesis) is provoking change and progress (Combes, 2013; Simondon & Simondon, 2012). The following quotation from Simondon and translated by De Boever for his edited book clarifies this:

> »Here, the idea of a discontinuity [*discontinu*] becomes that of a discontinuity [*discontinuité*] of phases, which is linked to the hypothesis of the compatibility of successive phases of being: a being, considered as individuated, can in fact exist according to several phases that are present at the same time, and it can change phases in itself; there is a plurality in being that is not the plurality of parts (the plurality of parts would be below the level of the unity of being), but a plurality that is above this unity, because it is that of being as phase, in the relation of one phase of being to another phase of being.« (Barthélémy, 2013, p. 221)[2].

Through this notion of phases, what Simondon here postulates is a multiplicity of modes of existence (phases are not necessarily limited to two) that not only concerns the already individuated being (a fully-fledged human being for instance, although it is actually still individuating) but also the relations between that being and its milieu emerging through the operations of individuation. In *Du mode d'existence des objets techniques*

2 Original quote : »Ici, l'idée du discontinu devient celle d'une discontinuité de phases, jointe à l'hypothèse de la compatibilité des phases successives de l'être : un être, considéré comme individué, peut en fait exister selon plusieurs phases présentes ensemble, et il peut changer de phases d'être en lui-même ; il y a une pluralité dans l'être qui n'est pas pluralité des parties (la pluralité des parties serait au-dessous du niveau de l'unité de l'être), mais une pluralité qui est au-dessus même de cette unité, parce qu'elle est celle de l'être comme phase, dans la relation d'une phase d'être à une autre phase d'être.« (Simondon, 2005, p. 307).

(2012), he proposes to analyse the genesis of technicity as »a process affecting the relation of human being to the world« (Michaud, 2013, p. 122), as one mode of relating amongst others. As noted above, for Simondon, being is a system in *becoming*: it is polyphased. By positing the hypothesis that the human being, the world and their relation also form a system that is becoming, it is logical to state that this system is made of multiple phases as well. The multiplicity of modes of existence is therefore also a multiplicity of modes of »being-in-the-world«, as expressions of phases of the system human-milieu where each term is co-constituting the others. As a reminder, Simondon's perspective in that particular work is to criticise the opposition between *culture* and *technique*, as well as culture/nature and technique/nature (Barthélémy, 2013). To understand the mode of existence of technical objects, he thus proposes to analyse the modes of thought, the modes of relations between the human being and its milieu, to which he sees the technical as a particular mode. The human-world system is not thought as a dualist and anthropocentric particularism, but a singular analysis of one system amongst others[3]. This is through the different phases of »being-in-the-world«, as multiple modes, that Simondon explains not only technicity, but aesthetic thought as well.

In the beginning, then, was the magical mode. A unique and »primitive« mode of being in the world where no distinction between object and subject takes place. In this primitive unity, neither was the world objectified nor were objects »separated and constituted« (Simondon & Simondon, 2012). In the sense of Whitehead, the magical mode represents an unbifurcated world : »L'univers magique est structuré selon la plus primitive et la plus prégnante des organisations : celle de la réticulation du monde en lieux privilégiés et en moments privilégiés.« (Simondon & Simondon, 2012, p. 229). The unbifurcated world as cross-link, a reticular world, a network, a rhizome where particular points have particular powers over the world, like the top of the mountain,

3 For Simondon, there is no human particularism: humans do not have the exclusivity of »being« just as they do not possess the exclusivity of experience (Chopot, 2015).

the heart of the forest, the centre of flatlands. For Simondon, they are not meant as a metaphors or idols, but imply a union between subject and object, between content and form. They are »focal points« or as Simondon notes, »key points«. Magical thought, then, is the pursuit, the research of those points. Exploration becomes magical : »Gravir une pente pour aller vers le sommet, c'est s'acheminer vers le lieu privilégié qui commande tout le massif montagneux, non pour le dominer ou le posséder, mais pour échanger avec lui une relation d'amitié.« (Simondon & Simondon, 2012, p. 230). This »friendship« between the explorer and the »key point« is not an objectivation of the top of the mountain, nor is it the subjectivation of the explorer in a domination of nature. Unlike the unbifurcated nature, which is unreachable, for Simondon, the magical mode of thought still exists in modern societies. For instance, he sees the holiday trip as a research for key points, city, land, shore or mountain. The holiday itself would then be a temporal key point.

This cross-linked universe, though, splits. Content and form are separated. This is the bifurcation happening. On the one hand, the key points are objectified as tools, instruments, constituted things. A loss of this original friendship between the explorer and the forest. The forest becomes usable, exploitable. On the other hand, others are subjectified as the divine and the sacred. If the mountain becomes the object, the climber becomes the hero, planting a flag, building a cross, setting a border. Saint Georges killing the dragon. This is the dephasing of the magical into technical (objectifying) and religious (subjectifying) modes of thought. A distance, a »mediation« has appeared between the human and the world. The reticular structures fade in relations between subjects and objects. Both phases, however, coexist, are always themselves related to each other. One phase alone is not all that is, it does not contain all reality, it is not more or less magical that the other. If the holiday retains some of the magical, modern tourism does not, already implying the objectivation of the exotic destination, and the subjectivation of the tourist/explorer/conqueror.

What is striking in Simondon's analysis both of the magical and the technical/religious phases, is the way he defines them. They are in a sort of temporal succession, (the dephasing emerges from the magical

mode, therefore, after it), but without excluding each other out (I already stated that some modes of thought and experience are still partly magical, or in relation to the magical mode). Moreover, there is no linear historiography — the dephasing is not reducible to Modernity for instance — and it does not express a dialectical evolution, or any form of progress *in fine*. Simondon is himself quite clear on this: the technical mode and the religious mode both only partly contain reality, consequently they are therefore both »poorer« than the magical. If there is technical progress, it is inherent to technicity and the function to fulfil, the operation performed, not in an expansion of reality, as if it were to crawl back into the magical. Furthermore, and Simondon might not present it that critically, but the dephasing is indeed a bifurcation. It is a categorisation, a distribution. It is already an alienation. The alienation of knowledge from materiality, the alienation of objects denied agency[4], the alienation of bodies reduced to slaves and tools[5].

3. La pensée (techno-)esthétique

Where does aesthetic thought emerge? As explained above, the technical and religious phases are understandable only in relation to one another and to the magical. However, both of those phases imply a greater »distance« between the human and the world, either through objectivation (the technical) or through subjectivation (the religious). I posit here clear terms, but of course, they are almost ideal-types, it is neither only technical or religious. It is neither pure subjectivity nor pure objectivity. Those are fluctuating quantities, nonetheless distant from each other. To come back to the magical, it is a sort of »pre-phase«, a cross-linked universe, a network of networks, a »reticular« structure as Simondon

4 See here again van Loon (2012) to discuss the agency of objects.

5 A comeback once more to Illich's understanding of tools. One could ask if conviviality might not be a reinforcement of the magical as well, questioning practices of subjectivation and objectivation (Illich, 1973).

calls it. Aesthetic thought, then, is for him a particular mediation between the technical and the religious that intends to »remind« the unity of the magical, to reconstitute the cross-linked/reticular universe, to re-draw continuities between modes of thought and experience. »It is a question, so to speak, of magic after the loss of magic.« (Michaud, 2013, p. 124). The aesthetic thought, which is praxis, a process, is a way to connect what had split through the bifurcation of nature, through the loss of magic. However, Simondon here does not separate the aesthetic from the rest or construct an aesthetic reality above the technical and the religious. Rather, the aesthetic adds to what is. It adds to reality rather than reducing it. Through the sensible, it intensifies the experience and thus, unveils the multiplicity of possibles (Simondon & Simondon, 2012). It is magic, then, as an addition to reality.

> »Someone hears a nightingale late at night, or sees a rock with strange forms, and all that remains is the happiness of this experience. A musician captures this song or those sounds to inscribe them in a work of ›*musique concrète*‹, a sculptor makes a statue *in situ*, a religious group builds a chapel in a place.« (Michaud, 2013, p. 129).

All those examples are particular samplings, they lead to individuations, they are particular expressions of experience and thought in phases. In the case of the *musique concrète* for instance, the sound taken from but still in relation to its milieu is a sampling of the *sonic flux*, as encountered in the last chapter. Aesthetic experience, thought, practice, is a sampling of the real as magma, as fluctuations, that intensifies the importance of experience. It is embedded in materiality, producing knowledge in a multiplicity of modes. It is local and located, *in situ* situated, »an aesthetics of sensitivity to places and moments« (Michaud, 2013, p. 125). But it is not mere representation and signification. It would only objectify. Aesthetic thought is already sonic thinking, generative. It is based on the *sonic flux*. One example would be the work of Maryanne Amacher, whose practice was precisely outside representation and signification (Schulze, 2018). As Cox notes: »Amacher's sound installations, then, suggest that film, television, and comics be read not as representations or signifying forms, but as blocs of sensations and configu-

rations of affects, energies that impinge upon the body of the viewer, reader, and auditor and render it an active element in a field of forces.« (Cox, 2017, p. 41). Amacher's work as a particular and intensive aesthetic thought[6]. An entanglement that shifts what experience is: it does not belong to a fixed, fixated and constant individual, but is always embedded in the relation with an also non-fixed milieu. An *always more than one*, as Manning (2013) explores in her eponymous book, that Simondon also defines as the transindividual.

> »La transindividualité fait apparaître et constitue de nouvelles *saillances*, de nouvelles évidences, de nouvelles marques : c'est une certaine ›esthétique‹ partagée. Ce n'est pas seulement un problème de perception, mais un problème plus vaste de significations, et donc un problème de l'individuation de l'être, *c'est-à-dire* de création de nœuds réels avec les autres et les milieux – la signification, chez Simondon, n'étant jamais une ›chose située dans la tête‹, comme une ›représentation‹, c'est une in-formation de l'être qui prend un sens pour plusieurs individus parce qu'elle est intervenue comme la résolution d'un problème pour eux.« (Chopot, 2015, p. 10).

In a letter written to Jacques Derrida in 1982, Simondon proposes to deepen his reflection on aesthetic thought in its relation to the technical. It is what he calls »*techno-esthétique*«[7]. It is not conceived as a finished product, but as a draft, or as Simondon even himself notes, as a *zététique* endeavour. The piece is a thought-in-progress, itself a form of *thinking-with* that does bear importance in the understanding of his

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6 Even if the example of a composer/sound artist was given, aesthetic thought is not the prerogative of the artist as part of a constituted domain. It rather means that every experience, every moment can be intensified through aesthetic thought. It does not necessarily require the artist or the artistic inspiration (Simondon & Simondon, 2012).

7 In the introduction of this text, presented in the anthology *Sur la technique* (2014), it is noted that the letter was written but not sent in that form. After finding the extended draft, it has been first published posthumously by Derrida in 1992. It is now available along further reflections on techno-aesthetics in the mentioned anthology.

aesthetic thought, as Binda explains in her article (Binda, 2015; Simondon, 2014). I have already stated earlier that for Simondon, the aesthetic thought is *in situ*, but it is also *in actu*, in the practice. It does not necessarily appear in the contemplation of the work of art, but in the production of this work, »un certain contact avec la matière en train de devenir ouvrée.« (Simondon, 2014, p. 384). It appears in the performance. For instance, one becomes aesthetically »affected« even in the act of soldering. There is a corporeal relation, mediated by the tool, a sensible experience, that can procure joy, satisfaction, and pleasure. An exchange of matter-energy-information that can be seen as an epistemic practice in which the tools, the »things« being worked on, are far from being only passive objects. »Le corps de l'opérateur donne et reçoit. Même une machine, comme le tour ou la fraiseuse, fait éprouver cette sensation particulière.« (Simondon, 2014, p. 383). This description almost sounds like a romantic depiction of a worker's body and practice, finding happiness in the realisation of her work. However, it is not meant as the idealisation of craftsmanship or industry, but rather the possibility of engagement, a mode of being reminding the magical. It is a tenuous relation, it can disappear. The alienated body, destroyed by the machine, or rather, by the mode in which to engage with it, is indeed also affected by the relation. But the happiness is long gone in this case, as well as the aesthetic. The distance increases with the pain. The alienation hunts the magical.

Techno-aesthetics is therefore an aesthetics of technical objects, but first and foremost of practices, of doing. Coming back to Sha's quote in the first chapter, not only does the *what* matter, the *how* does as well[8]. Rather than an aesthetic *of* the tool, it becomes an aesthetic *with* the tool, an experience co-constituted. Moreover, it is as practice an intensification of the sensible, of that very experience. This perspective, which Binda links to John Dewey's own conception of aesthetics, presents the technical operation, »en tant que capacité à faire sentir l'expansion de

8 »I wrote this book as an exercise in philosophy in the mode of art, trusting that it can be done, that it matters not only what we say or do, but how we say or do it.« (Sha, 2013, p. 249).

la vie, de la sensibilité, de l'aesthesis, à travers des individuations de plus en plus organisées et complexes.« (Binda, 2015, p. 6). The aesthetic experience is therefore not fundamentally linked to the function of a tool, or the function of the operation itself, in what it does and if it does it »the right way«, but in the process of its realisation. It is an enrichment, an intensification of experience, as described in the first chapter through Whitehead and Debaise. In this »expansion of life«, the aesthetic thought already brings back the magical, as an opening for possibles, an invitation to enchantment.

Furthermore, a multiplication of modes of knowledge production caused by the generativity of the aesthetic thought may also lead to further individuations. Sha's understanding of technologies of performance, presented in chapter 2, can be situated within this frame, it completes it, even. Technologies of performance are conceived precisely to produce knowledge according to new modes, not limited to representation. The goal for a *sociological thinking-with sounds* would therefore not only be the acknowledgement of aesthetics in existing methods and technics, although that would probably constitute a first important step. The goal would be to also develop tools that reinforce the aesthetic character of sociological practice. This of course brings again the question of knowledge production to the foreground and how knowledge can be produced through the aesthetic experience. But at this point, from the transindividual to the aesthetic thought as intensifying experience, Simondon already gives us a set of tools that allow to think beyond *a priori* categorisation of subject-object, beyond the primacy of human perception, and beyond the fixation of the individual. The aesthetic thought becomes prehensive, in the sense of Whitehead. As Manning notes:

> »For Whitehead, every occasion of experience is composed of feelings. These feelings fold through the affective tonality — the concern — of the event in its emergence. They arise not from the subject per se but from the field of relation itself. Every worlding — every prehension, every grasping-with the world — is a feeling, in Whiteheadian terms. An event is a composition of feelings selected from the panoply of

> potential, a complex affective tonality agitating toward actualization. No occasion of experience can be abstracted from its feeling: ›The feelings are inseparable from the end at which they aim; and this end is the feeler (Whitehead 1978, 339). The feeler is the subject of the experience, a subject that is in every way immanent to the event.« (Manning, 2013, p. 156).

4. Aesthetic thought and knowledge

A focus on (techno-)aesthetic thought addresses individuation processes gaining in complexity, through the sensible experience. Simondon understands it as the capacity to »*make feel* the expansion of life« or to »remind« the magical unity that had been lost. Thinking in terms of prehension, as Manning does in *Always More than One*, aesthetic practice therefore reinforces the importance of a situation in the sense of Whitehead: of an experience as *matter of concern*. Following Debaise, one could argue that it is the core function of speculative philosophy: »*intensifier jusqu'à son point ultime l'importance d'une expérience*.« (Debaise, 2015b, p. 106). It is necessary to note however that for Whitehead, the notion of *importance* is first and foremost a »question of *feelings*« and that those feelings are not exclusive to human experience[9]. In other words, it means that consciousness only expresses a particular dimension of feelings and therefore of importance (Debaise, 2015b). Debaise, quoting Whitehead, even speaks of a »vital activity«, which resonates with Simondon's own vital individuation processes to which the psychic only represents a dimension, a mode of experience that reminds of James' radical empiricism.

> »L'importance est donnée. Elle appartient à tout être dans la mesure où il incarne une perspective singulière sur l'univers, qu'il exprime dans chacune de ses parties les dimensions cosmiques dont il hérite.

9 Stengers compares them to affects, more »indeterminate«, without however trading terms, »feeling« — or »sentir« in French — being too important in Whitehead's lexicon (Stengers, 2002).

> Les manières de sentir, de se relier, de prendre, ainsi que l'importance que ces manières revêtent, sont constitutives de la nature elle-même. Il n'y a pas d'un côté des qualités primaires et de l'autre des qualités secondes, mais des articulations spécifiques qui se font pour chaque existence dans l'affirmation de ce qui importe ici et maintenant.« (Debaise, 2015b, p. 119).

How can this importance become intensified, then? It sounds metaphysical, but it is mostly a methodological question[10]. According to Whitehead, speculative philosophy intensifies the importance of experience through *propositions*, which he defines as »lure for feelings« (Whitehead, 1978). This lure however, is not any negative deception, but a *capture*, as Debaise explains (Debaise, 2015b), a form of »gathering«. Last chapter, I proposed to consider a thinking-with sounds through van Loon's *Empiraterei*, in a redefinition of *logos*. Reading it again through Whitehead's speculative philosophy, it itself becomes an intensification, a sociology able to work with *propositions* as *lure* for the multiplicity of feelings. In a similar manner, techno-aesthetics — and aesthetic thought altogether — not only becomes prehensive, but propositional as well. The *expansion* of life it produces, its reminding of a magical unity, is an intensification of importance, a capture of the multiplicity of feelings, a grasp of the multiplicity of *possible worlds* that could have been. This is what gives an event, a situation, its importance: the possibles that never happened but co-produced the actual occasions, the hesitations, the doubts, the stumbles and the dwellings. Coming back to what Debaise explains, it is through the narration of those »could have been« that the importance of what had been and of what is emerges.

To be rather blunt, this is what I intend to pursue with a thinking-with sounds, through aesthetic thought, sonic fiction, Empiraterei, through the sampling of the sonic flux: be moved by other narrations that intensify the importance of experience, experiment with practices not less *generative* than classical epistemic ones. Consequently, not only

10 A question of methods which has been already encountered in the first chapter.

the practices of knowledge production are subjected to change, but the goal of knowledge itself shifts gears. Vinciane Despret and Stéphane Galetic, reminding James' own attitude towards knowledge, argue that it is not so much about explaining the world than it is about enriching it, about multiplying its versions (Despret & Galetic, 2007). Aesthetic thought and techno-aesthetics, as speculative venture, as renderings of the »expansion of life«, in bringing back magic, in their propositional character, are knowledge production in that very particular manner: an enrichment, a thickening, deepening, an account of multiplicities that might emerge beyond classical academic practices. Beyond classification and categorisation, it becomes a way to »stay with the trouble« (Haraway, 2016). Speculative methods are no denial of or escape from what is happening. It is rather the contrary. By creating those »alternative worlds«, as Debaise puts it, it shows the importance of »what we have to deal with«. It resets a certain accountability, a »response-ability«, a way to »live within the ruins« (of capitalism) (Tsing, 2017). It slows down the tempo, invites to change one's pace (Stengers & James, 2013). At the beginning of this work, the premises were that knowledge had been alienated from its materiality, or from matters of concern. But knowledge is also what has been alienating. The knower knowing the known possesses it. Foucault (1979, 1990, 2005, 2008) made it very clear throughout his work. Knowledge is mapping, a cartography unveiling what was still hidden, a database that reduces, objectifies what it is compiling, who it is controlling at the borders and beyond[11]. Reflecting on those practices, which are constitutive of a sociologist's work, implies to re-think the »possessive« and alienating character of the knowledge being produced. Experience is not proprietary. Think-

11 For instance, the work of Nishat Awan (2016) reflects on those questions, challenging and reclaiming practices of mapping: https://www.topologicalatlas.net/.

ing with Simondon[12], Whitehead, Stengers and Debaise, but also with James and Dewey, knowledge becomes a co-creation, a co-prehension, a »*co-appartenance*« (Halewood, 2011). Knowing becomes performative, part of entanglements beyond a distribution between the knowing and the known (Barad, 2007).

5. Research-creation

Such a techno-aesthetic and speculative (ad-)venture already exists to some extent and is being experimented with. Perhaps not so clearly within classical established sociological practices, but at the margins, where the liminal spaces between philosophy, science and arts become junctions rather than separators. An openness that makes me wonder if, within sociology, the same could be done. It takes many forms, polyphonic variations on a name — versions of the same? The intents are plural though, as the situations in which they emerge. Some expressions are thought as artistic research, scientific research in the field of art production, research *about* art. At the other opposite of the spectrum, there are artistic representations of scientific material. Art *about* science. But there is also something else, that can be seen as a *thinking-with*, a coordination, a co-creation that is neither nor. This strange plurality now expands in certain parts of academia under the moniker *research-creation*. The term has a history, a geography[13]. Made a category

12 "[…] Il semble possible d'affirmer qu'aucune théorie de la connaissance ne peut être faite sans être en même temps une théorie de l'être, et même une théorie de l'action. Mais jusqu'à ce jour toutes les doctrines donnent le primat à l'un de ces aspects, et lui subordonnent les autres. " (Simondon et al., 2016, p. 214).

13 Both Manning and Loveless, who will constitute the main frame for this argumentation, are based in Canada, where research-creation as a »coined« academic practice is mostly present. In Europe, it finds some institutional resonance under the broader field of *artistic research*, although it remains defined/confined to »research in the arts«. See the *Vienna Declaration on Artistic Research*, presented by the European Society for Artistic Research

for financing project in Canada, it became an institutional denominator (Manning & Massumi, 2014): »Moves within the academy toward institutionalizing research-creation are inevitably implicated in a larger context where the dominant tendencies are toward capitalizing creative activity.« (Manning & Massumi, 2014, p. 85). But beyond this institutionalised practice, there is a sort of redefinition, of re-claiming of what research-creation can be and can become.

In *How to Make Art at the End of the World*, Natalie Loveless, basing her reflection on an essay by Chapman and Sawchuk (2015), accounts for a particular »category« of research-creation that is challenging how knowledge is being produced in academic institutions:

> »By bringing *research* and *creation* together in such a way that they unpredictably contaminate and remake each other, in such a way that they render each other uncanny, research-creation makes space in the university for research practices that are grounded in nonhegemonic literacies, thereby challenging the naturalized assumption, in arts, humanities, and social science scholarly cultures, that the book-length monograph or peer- reviewed academic essay is the only valid — or only »top- tier« — means of research communication output; it also challenges perspectives that would argue for artistic production as de facto research. Practically speaking, research-creation pushes at the limits of traditional academic outputs and traditional artistic outputs; it is productive of work that, more often than not, fails to fully register on either scholarly academic or art-world exhibition front.« (Loveless, 2019, pp. 56, 57).

Different from »research-from-creation«, »research-for-creation« or »creative presentation of research«, this particular mode of doing research, and of producing-presenting knowledge is defined as »creation-as-research« (Loveless, 2019). Its classification, however, must be put in perspective. Leaving it as is would somehow imply that research cannot be understood as a creative practice, or rather that it is not

(SAR): https://societyforartisticresearch.org/wp-content/uploads/2020/10/Vienna-Declaration-on-Artistic-Research-Final.pdf.

being considered as such. This either confirms the territorialisation of scientific practices as »intellectualised« production of knowledge (Montebello, 2015b), with a willingness to challenge its status or it subscribes to it, by reinforcing the said separation, denying the creative potential of research. According to Manning and Massumi (2014), this is one of the reasons why research-creation is being looked at with mild scepticism and cynicism by research-practitioners: an apparent conviction that research is not a creative practice. One can question this conviction. Indeed, throughout the last chapters, it should have been clear that it is not remotely the case. Each practice, in its singularity, can be creative, generative. Debunking the possible scepticism, Loveless actually acknowledges this generativity. *Creation-as-research* does not mean that research is not creative. Quite the contrary. It rather means that research-creation — in its formulation as *creation-as-research* — fully acknowledges the creativity and generativity of research practices, and does so by multiplying its modes of producing knowledge beyond classical epistemic ones. It means that research-creation takes the experiment so seriously, as in radical-empiricist serious, that it does not exclude anything being part of the experience, not even the aesthetic. An attitude towards research that not only acknowledges, but embraces the aesthetic as part being part of the process of thought and research.

> »This idea of research-creation as embodying techniques of emergence takes it seriously that a creative art or design practice launches concepts in-the-making. These concepts-in-the-making are mobile at the level of techniques they continue to invent. This movement is as speculative (future-event oriented) as it is pragmatic (technique-based practice).« (Manning & Massumi, 2014, p. 89).

In this quote, one can guess the contours of the said attitude towards research practices. One can also see how sonic thinking and techno-aesthetics start to converge to a form of *creation-as-research*. A hybrid of speculative and pragmatic practices that intensifies the importance of experience. As Manning and Massumi explain beyond the entanglement thinking-feeling, doing is always a thinking and thinking is always a do-

ing (Manning & Massumi, 2014). It is not representation, but as seen with Sha, performance, where »performative activity can be regarded as the articulation of matter in dynamical processes of sense making. This shaping of matter as physical, affective, symbolic material in a rich magma of process constitutes events.« (Sha, 2013, p. 87). Research-creation as it is understood here it therefore comes without pre-conceived outcome, the conceptual work always happening from within — »from-the-middle« — the techniques being shaped through practice[14]. It challenges the classical distribution of labour between theory and praxis. A production of knowledge that does not explain, but enriches, again, intensifies the experience in which it emerges. It becomes value-generating (Sha, 2013), valuation instead of evaluation (Manning, 2008).

In other words, the attitude of research-creation is clearly *ethical*. In a deleuzian move from the *noun* to the *verb*, Loveless leaves behind the denomination of the »artist-researcher« as academic identity mastering its object to focus on the associations made through practice, and thus reflects on their situatedness. Research-creation becomes *response-able*, as Haraway understands it, as responsive accountability: »It matters what thoughts think thoughts. It matters what knowledges know knowledges. It matters what relations relate relations. It matters what worlds world worlds. It matters what stories tell stories.« (Haraway, 2016, p. 35). It echoes Stengers' cosmopolitical proposal of slowing down, invoking Deleuze's figure of the *idiot* (Stengers, 2005; Stengers & James, 2013). A response-ability towards the displaced, the alienated, the undocumented, the disappearing from within the ruins of our world (Tsing, 2017). It also echoes the posture towards vital materiality that Jane Bennett describes in *Vibrant Matter* (2010). It rethinks matter and ethics beyond a too often too anthropocentric notion of »affect«, by reinforcing its Spinozian meaning. It engages with matter, which »is *not* the raw material for the creative activity of humans or God.« (Bennett, 2010, p. xiii). I am not intending to understand Bennett's work as constitutive of research-creation, or invoking it in order to justify the

14 This position echoes how Simondon thought of techno-aesthetics: not limiting the aesthetic experience to the function of a tool.

importance of such creation-as-research. Still, I am convinced that in pursuing this attitude, for instance in the way it has been presented by Manning and Massumi, to experiment with it, slowly, leaving urgency aside, within sociology without being exclusive, that it might lead to a shift of focus, to a process of thinking from the middle of the vital materiality Bennett is writing about. An invitation to think-with, which is undeniably an invitation to care. It is not necessarily reducible to artistic practices, but as shown earlier, thinking through techno-aesthetics might propose a different entry point.

Nevertheless, reading Bennett's last chapter leaves me wondering, assailed by doubts. »Is it not, after all, a self-conscious, language-wielding human who is articulating this philosophy of vibrant matter?« (Bennett, 2010, p. 120). Transposing this question in terms of thinking-with sounds, of sampling the sonic flux, or of research-creation would work just as well. It is the same question. The tautological ouroboros of the primacy of human subjectivity and the social construction of (social) life. A question very much known and awaited when discussing new materialisms and Actor-Network Theory within sociology. Already encountered at large in the first chapter, in the debate part of *Discussing New Materialism* (Kissmann & Van Loon, 2019a). A question I feel I have to ask myself, a question I feel I have to have an answer for in preparing the defence of this work, as if it were my task and responsibility to close the debate once and for all (a bit overdramatic, I can concede that). What are Bennett's answers, then? Give examples of how human beings are already non-human, living assemblages? Or simply »question the question«? »Why are we so keen to distinguish the human self from the field?« (Bennett, 2010, p. 121). As she herself admits, both work and do not at the same time. It is still an important question, though. Not as a warning, not even as an attack I would have to defend myself against. But rather as a reminder. A reminder of how careful, how thoughtful, and also how »feelful« I (we) have to be in my (our) attempts of engaging with the plurality of modes of knowledge production, each step of the way. If anything, and recalling Stenger's proposal, the question also invites to slow things down.

6. Towards an ethico-aesthetic paradigm?

The attitude of what I understand as research-creation — i.e. not the institutionalised capitalisation of art and research but the slowing down of thinking and of production of knowledge — the attitude of responseability, of speculative thinking, the implementation of techno-aesthetics as practice is therefore an *ethical*, *critical* and *political* posture. In gathering, relating, responding. In engaging with the other. In embracing fluid and vibrant matter. Reflecting on research-creation within geography, Derek McCormack affirms »[that] research-creation involves an ethical commitment to learning to become affected (in a Spinozist sense) by the relational movement of bodies, and a political one borne of the claim that we can never determine in advance the kinds of relational matrices of which bodies are capable of becoming involved.« (McCormack, 2008, p. 9). Invoking for instance Lefebvre's rhythmanalysis and Guattari's use of ritornellos in *Chaosmose*, McCormack shows how performance allow to *think-space* differently[15]. I will come back to the refrain later. However at this point, I would like to stretch the importance of Guattari's *ethico-aesthetic paradigm* for the attitude profiled throughout this chapter[16].

In *Chaosmose* (1992), Guattari pursues his work on the production of subjectivities and their emergence from what he calls *chaosmosis*: »For Guattari there is always an *a priori* moment of creativity, or simply desire, that prefigures any given entity or any subject-object relation. Indeed, life, in whatever form it takes (organic or inorganic), emerges from a ground of sorts — one that is unfixed and ontologically unstable — that at all times accompanies the very forms that emerge from it.« (O'Sullivan, 2010, p. 257). Knowing the »fluidity« of Guattari's thinking with and without Deleuze, and remembering Simondon, one can

15 To a certain extent, the importance of performance and research-creation within geography could also be transposed to social sciences in general, for instance with the help of Nigel Thrift's *Non-Representational Theory* (2008).

16 Hereby, I am not assuming that McCormack neglected the importance of Guattari's paradigm. Still, I think it might be useful to engage with it more explicitly.

see here how this »groundless ground« producing subjectivities can be compared to the pre-individual within which processes of individuation produce individuals and milieus. Similar to Simondon, Guattari here thinks beyond the classical dualities subject/object, subject/society and nature/culture that for him have been constituted in a capitalistic fixation of subjectivities. Against those »micro-fascisms« — which tend to become macro on a daily basis — Guattari proposes to shift to an *ethico-aesthetic paradigm*, to construct a »processual assemblage« that is »post-individual« (Guattari, 1992; O'Sullivan, 2010). In other words, rather than attempting to come back to a »pre-capitalistic« assemblage where no fixated subject/object constituted a trans-individual magma of undefined intensities and focals (an impossible comeback), Guattari presciently wishes for a way to »stay with the trouble« caused by the capitalist assemblage and transform it into a post-capitalistic (chthonic) one. A disruption from within through the aesthetic, which »folds-in« and »crystallises«, produces new modes of experience, and of subjectivity.

To put it differently, the capitalist »production of subjectivity«, possible through the division of labour and the formation of classes in the classical Marxist sense, was also further reinforced through the formation of cultural industries the way Adorno and Horkheimer understood them in their *Dialektik der Aufklärung* (1988). The production of desire through standardized aesthetics presented and sold as consumable products continued the redistribution of the roles producer-consumer and consequently redefined agency. As Bernard Stiegler puts it, the cultural industries colonised, or monopolised, aesthetics (Stiegler, 2012). The ethico-aesthetic paradigm is an attempt to relocate the aesthetic in the praxis[17]. It is not about coming back to the pre-industrial pre-capitalist aesthetic. It is about the responsibility of finding another way, within the actual situation we find ourselves in. This is for instance what Guattari attempts through schizo-analytics but it is far from being reduced to his work at La Borde. In fact, for Guattari, social sciences and humanities as a whole are concerned. Adopting the ethico-aesthetic

17 A relocation which for Stiegler would happen through technics (Stiegler, 2012).

paradigm implies a critical and political engagement towards aesthetic practices, but also towards the production of scientific knowledge.

I deliberately remained close to Guattari's vocabulary here, but a similar succession of assemblages that are not temporally exclusive has already been encountered: Simondon's phases, here revolving around capitalism. The pre-capitalist machines being expressions of the magical phase. The capitalist fixations becoming distributions of subjectivity-objectivity through the technical and religious phases. The ethico-aesthetic paradigm invoking the techno-aesthetic thought, not only as a reminder of magical unity, but as a producer of multiplicity, of *importance*. If for Simondon, the practice of soldering, hammering, crafting is aesthetic, this aesthetic has been alienated, taken out by the capitalist production process, or rebranded and sold, idealising the craftsmanship, but destroying body and mind. Knowledge alienated from its materiality. The ethico-aesthetic paradigm proposes to restore it, not in its previous, untainted form, but as something new. In a speculative understanding, it is not about rewinding the bifurcation of nature, but about asking how to work within it. The bridge between Guattari and Simondon (which also includes Deleuze) is not a new one to build however[18]. Still, in this particular work, it seems to become another intensive focal in the making of *thinking-with sounds*. If techno-aesthetics were allowing to think epistemic practices differently, enhanced through Whitehead and a particular understanding of research-creation, Guattari's ethico-aesthetic paradigm proposes a deep political engagement on top of that, that neither denatures a Simondonian-Whiteheadian thinking nor tames the political urgency of »staying with the trouble«. It matters which thoughts think thoughts. Coming back to the controversies presented in the first chapter, I have proposed that the issue of knowledge production is not only a pure methodological question, but also implies to reflect on one's situatedness. It becomes an eth-

18 The work of Anne Sauvagnargues, compiled in the anthology *Artmachines: Deleuze, Guattari, Simondon* (2016), already show the closeness between the authors. The work of Bernard Stiegler (2012) also articulates those connections at large.

ical and political question. Guattari's aesthetical ecosophy, coming from a thinking-doing that embraces his work at the La Borde clinic as well as his environmental engagement, thus becomes important thoughts to think with. The ethico-aesthetic paradigm as an ecological »program« linking humans, non-humans, more-than-humans:

> »Notre survie sur cette planète est menacée non seulement par les dégradations environnementales mais aussi par la dégénérescence du tissu des solidarités sociales et des modes de vie psychiques qu'il convient littéralement de ré-inventer. La refondation du politique devra passer par les dimensions esthétiques et analytiques qui sont impliquées dans les trois écologies de l'environnement, du socius et de la psyché.« (Guattari, 1992, pp. 37, 38).

> »Politics, then, as the force of the more-than where what is at stake is not simply the human but the ecologies of existence that coevolve in the realm of the more than human. Politics as an aesthetico-ethical engagement with the forces of becoming that are fleetingly perceptible in an event's dance of attention. Politics as that which ›contains in itself a power of amplification‹ (Simondon 1995, 16).« (Manning, 2013, p. 148).

Sociology *thinking-with sounds*. Sociology as *Empiraterei*. Sociology as ethico-aesthetic practice. At the beginning of this chapter, I asked if and how sociological research could be understood as aesthetic practices. What does it mean to practice a *sociological thinking-with sounds* within which *thinking-with* can be understood as an aesthetic thought? The paths followed through this chapter show, if anything, that it is not about producing a »stylish« new-wave and innocent sociology, but a sociology that matters, that is ethical and critical, response-able, as Haraway would argue. It tremendously complexifies, or rather, it intensifies what it means to do sociology, beyond the scope of just defining it as a possible field of application of research-creation methods. The discussion did not deliver much examples of how it could be expressed. Not yet. It will come. Moreover, beyond the broad ethico-aesthetic

»staying with the trouble« attitude described earlier, I did not propose an applicability — i.e. *a priori* methodology — either. This, however, I will avoid. Reflecting on Guattari's ethico-aesthetic experiments at La Borde, Sha writes: »There are no blueprints or recipes for any of this kind of playful, rigorous work, and in fact it would be a terrible betrayal to make a method out of this.« (Sha, 2013, p. 158). I am convinced that this does not only apply to schizo-analytics. Finally, I am not proposing a totalising theoretical frame that *explains* the world, or that affirms how sociology should be. Bridging Simondon, Whitehead, Guattari and Manning, linking techno-aesthetics, research-creation and ethico-aesthetics, weaving Empiraterei and sonic thinking is itself an experimental *sampling/sequencing*. Possibilities rather than »carapace« (Sha, 2013). A gathering (socio-*logy*?). A big what if *en somme*.

7. Does it sound?

The sociological *thinking-with sounds* I feel drawn to, in a combinatory exploration of what has been presented throughout the last few chapters, therefore goes beyond the scope of sociology in the mode of sound art, or sound art for sociological purposes, even though it might include practices that would be considered as such. Sound Formations as part of Haraway's *SF*: speculative fabulation, science fiction, speculative feminism, *sonic fiction*, *sound formations*. I shortly addressed the political and ecological urgency that is linked to the attitude of *staying with the trouble*, in resonance with her eponymous book (Haraway, 2016), but also with Tsing's *The Mushroom at the End of the World* (2017). An urgency to which sound, the sonic flux, sampling, sounding and listening, add something particular. The Chthulucene becoming a Phonocene (Despret, 2019)? A possibility for experimentation. An acknowledgement of plurality beyond the stating of immutable truths in the production of knowledge that is itself political, critical, ethical. This particularity without exclusivity is what Salomé Voegelin strongly works with in *Sonic Possible Worlds* (2014) as well as in her collection of essays *The Political Possibility of Sound* (2019) from which the following paragraph is taken.

Not only does Voegelin propose a reflection about the multiplicity of modes of knowledge production which, through practices of sounding and listening, reinforce its materiality, but she does so in a way that is aware of its situatedness and its ethical-political potential:

> »Sound's mobile and ephemeral constitution enables and motivates this echographic practice of inclusion: including the formless, the invisible and the barely audible, the unfamiliar and the affective in the generation of knowledge and the knowable. Knowledge is a fundamental engine of political change and transformation. Sonic knowledge, the knowledge of the invisible and what remains unheard, opens politics, political actions, decisions and institutions to the plural slices of the world. Listening as a care for the fragile within the condition of actuality produces knowledge as a responsibility towards the plurality of its possibility, questioning the singularity of its authorship and authority and thus its partisan investment and legitimacy. Knowledge is refracted in the invisible light of sound: more voices come to be heard as barer of information, insight and facts. However, its plural rays do not find easy consensus, and they also do not simply contradict or deny existing ideas but enter into an agonistic game of doubt and speculation, which enriches and augments the possibility of knowledge through alternatives from the plurality of what could be known.« (Voegelin, 2019, pp. 37, 38).

To conclude this chapter, I would like to present one of those possibilities, of how I feel a thinking-with sounds could be proposed and (re-)presented, how it could look and sound like to experiment with the multiplicity of modes of knowledge production. It is one possibility among many, not isolated, but in combination with others. This short introduction can be thought as a sort of teaser, a version of it being part of the following chapter. This version however will not be the application of a fixed methodology, as I explained above (it is not a question of how things should be), but rather an open interpretation, an inspiration of what had been reflected upon, translated into this particular work. This possibility is called the *audio paper* and was introduced by

Sanne Krogh Groth and Kristine Samson (2019, 2016, 2021). They define the *audio paper* in their manifesto as follows[19]:

> »Audio papers resemble the regular essay or the academic text in that they deal with a certain topic of interest, but presented in the form of an audio production. The audio paper is an extension of the written paper through its specific use of media, a sonic awareness of aesthetics and materiality, and creative approach towards communication. The audio paper is a performative format working together with an affective and elaborate understanding of language. It is an experiment embracing intellectual arguments and creative work, papers and performances, written scholarship and sonic aesthetics.« (Groth & Samson, 2016).

One of the interesting aspects of *audio papers* is that they are not mere sonic representation of written arguments. They are not just the sonic rendering of a script. Those arguments are present, they are narrated by a voice even, but the voice is not alone. The voices are not alone. Added to them, other sound sources articulate and activate other elements, a multiplicity of layers and bodies that are not necessarily human. The narration escapes the clear linearity of the written text, becomes multiple. Multiple voices and knowledges, multiple temporalities and spaces. In its hybrid character, Groth and Samson understand the audio paper as an entanglement, a »redisposition of Deleuze's definition of thought in science, philosophy and art.« (Groth & Samson, 2021). It is generative, a thinking|doing process as well as a technology of performance rather than of representation, an ethico-aesthetic practice where the producer, researcher, and listener positions are being folded onto one another, as many singular subjectivities. Transindividual. As Groth and Samson explain in their manifesto: it is »idiosyncratic«, »situated and

19 Presenting the audio paper through a *manifesto* rather than a *methodological* design is an interesting choice. It defies the idea of a blueprint for institutional application, without denying the invitation to experiment with what it is. As Natalie Loveless notes, the manifesto is a »call to action« (Loveless, 2019, p. 2), but in a different mode. An attitude of resistance and »response-ability«.

partial«, »multifocal«, »part of larger ecologies«. It »affords performative aesthetics«, »renders affects and sensations«, »has multiple protagonists« and »brings aesthetics and technologies together« (Groth & Samson, 2016). Through the multiplicities it encompasses, the audio paper intensifies the importance of an experience, it proposes what Debaise calls »alternative worlds«, possibilities, virtualities.

> »[…] we see the audio paper as an encounter between listeners, researchers, and nonhuman agencies alike. As a technological medium and interface, it moves away from a human-centered ideology and the linearity of communicating knowledge as data extracted from the field. Instead, it allows for a variety of cultural, technological, and material agents to speak.« (Groth & Samson, 2021).

THINKING-WITH SOUNDS | Re-collection of an attempt

0. Building a loop – a quick note

This fifth and last chapter is composed of two distinct but interconnected parts. The first part, which starts below, is a continuation of the thesis. It presents some of the sonic experiments performed over the last few years in written form, to which a few images are appended. The second part however, a chapter 5' or 5[1], can be thought of as an »audio chapter«. Partly following the model of the *audio paper*, by Groth and Samson (2019, 2016, 2021) introduced earlier, it will expand on the descriptions below and render the experiments in audio format. A narration will guide through it, loosely mirroring the written chapter, either through an alternative storytelling, or through the repetition of some arguments presented in what follows. The audio chapter can of course be used in combination with the present one, but can also exist as a »standalone« version. In this, the audio chapter is not merely a companion for the written thesis, but works as a feedback loop, intending to expand (at least to some extent) on the flatness reduction of a written description of sound. Moreover, it is not only a presentation of audio. On the one hand, it actively takes part in the thesis, in the *doing sociology* and *making-of theory*. On the other hand, through its construction, it proposes interactions, encounters, *thinking-with*[1]. As it

1 More details on the construction and use of the following audio chapter will be presented as an introductory notice.

will hopefully become clear during this chapter, its audio »counterpart« is an integral part of the iterative process of thinking|doing that I wish to experiment with in a *thinking-with sounds*.

1. Gathering a thinking | doing

Throughout this work, my intention was to explore to which extent other modes of knowledge production could be pursued within sociology, showing that it is also a political and ethical question. Through *sonic thinking* and a new materialist understanding of sound, as well as through the generative quality of techno-aesthetic/ethico-aesthetic thinking, I hope to have shown that it is not only a methodological possibility, but that this possibility also implies to (re-)think practices and situations. In academia, surely, but in a very much bifurcated world altogether as well. *Staying with the trouble*, as Haraway puts it. Not intended as a manual, I see this work as a walking through, a thinking-with, an experiment not conducted in the (actually non-existing) void of a laboratory (Latour & Woolgar, 1986), but which accompanied me for several years, changing me and changing with me. The preceding chapters were quite theoretical, but conceived in a way that shows an evolution in my thinking process leading to a *thinking-with sounds*. In a classical manner, it (hopefully) demonstrates a logical argumentation, which in that fashion, appears artificially seamless, as if writing reflected thinking in an uninterrupted flow, delivered in a certain unity. The hesitations, the doubts, the drafts, typing, erasing, typing again, all of that disappears in what is now the printed »final product«. A product from which the *doing* seems quite absent.

Therefore, in this chapter, I want to look in greater detail at the process underlying the written thesis, or better said, present the *doing* entangled with the *thinking*. It asks how the practices of sounding and listening are linked to the practices of thinking. Hearing itself might

lead to thought[2]. But does thinking make you sound? Does it make you listen? I will introduce some experiments in *thinking-with sounds* which I conducted over the last few years, and how they fit together with further reflections on particular theoretical elements. Considering the gained experience, I will also need to confront what could have been failures in proposing that *thinking-with sounds*. Failures are important[3]. A few precisions though. This should not be considered as the empirical application of what has been discussed earlier, from which I would now display the results. Similarly, the sound experiments do not constitute the empirical ground from which the theoretical discussion emerged. Following the thinking-doing combination proposed by Manning and Massumi (2014), both the processes of sounding and listening (the experiments), thinking, reading, writing etc. are deeply entangled and not divisible in a before/after, theory/practice (or the other way around). I am aware that presenting them in the fifth chapter could however indicate otherwise. It is a narrative choice, made (for the sake of the argument) to insist on those thinking|doing entanglements rendered more visible[4]. It is a particular gathering, a particular combination.

Moreover, beyond presenting the sound experiments I will attempt to organise them within propositions — as sorts of lure for feelings (Whitehead, 1978) — which will branch out to particular concepts, ideas, experiences, either implied or more fully developed throughout this work. Some will appear familiar, directly linked to specific parts, some others will need more »unfolding«, bringing new ideas. The propositions — within which the experiments will pop up — are not separated from each other but also communicating with, depending on, co-creating each other. They could have been integrated in earlier chapters

2 »Heard things are first and often a strangeness that makes you think.« (Paulus, 2020, p. 172).

3 On the importance of failures in research-creation, see Manning and Massumi (2014).

4 An alternative narration following the temporal evolution of the research would be possible.

but were more impactful when engaging more directly with said experiments. Again, a narrative choice. Not something forgotten, included in haste, but another way of showing the evolution of thinking, as repetition and difference. The intent behind this organisation is thus on the one hand to reflect on the process of *thinking-with sounds*, as already argued, but also on the other hand to include a certain openness that emerged through those experiments. They should not be considered as discrete fields of application, but again, as propositions, as possibles. It comes close to what Manning describes as *anarchiving* in relation to the project *Immediations*: »a *repertory of traces*« (Rasmi, 2018). The anarchive is not limited to the *archive* — i.e. the documentation of past events — even if it needs it. It is a »*feed-forward mechanism* for lines of creative process, under continuing variations.«[5]. The anarchive can be seen as part of an unfixed and vibrating magma, between archive and speculative thinking, a gathering of a multiple of impacts itself becoming generative, feeding into new individuations. The anarchive thus becomes a variation on van Loon's socio-logy as *Empiraterei* (2017) described at the end of the third chapter.

2. Échos de la pierre – experiencing sound formations

The premises

The project *Échos de la pierre* is an experiment I developed as an art installation, performed in three iterations. Its first rendition was part of an afternoon of performances and installations called *ResonanzRaum*, which took place at the University of Eichstätt-Ingolstadt in June 2019[6]. It was then proposed as a particular installation in the St-Willibrord

5 For a more complete definition of the anarchive, see: http://senselab.ca/wp2/immediations/anarchiving/anarchive-concise-definition/.

6 It was composed of *Écho de la pierre*, a MIDI Sprout workshop, which will be described in more details later in this chapter, as well as an interpretation of Alvin Lucier's *I am sitting in a room* (1969).

church in Gravelines, France, in September 2019. As I will explain in the next part, each iteration is not an exact reproduction of earlier occurrences, but a variation. They share some characteristics and differ in others. The main idea for this project came from a documentary seen on the French-German television channel Arte (Jampolsky, 2017). In this short documentary, researchers were measuring and analysing the acoustic particularities of the Mont-Saint-Michel, mainly focusing on one of the churches as well as a crypt[7]. Doing so, they were intending to demonstrate how, already from the Middle Age on, monks and architects were aware of the relationship between sound and construction. In the crypt for instance, the researchers discovered that a subject singing from a certain point could perceive natural binaural beatings. In a nutshell, this phenomenon means that both ears perceive slightly different frequencies, too much apart to be the same, but too close to one another for the brain to distinguish two pitches. This closeness in the frequency spectrum causes them to go in and out of phase. This produces a beating effect, a come and go of the sound. If the difference between both frequencies increases, the beating becomes quicker. If both frequencies come closer to one another, the beatings slow down[8]. The main church presented other qualities: through its resonating and reverberating qualities, the sound of a choir singing could be heard at a higher pitch. This was described by one of the researcher as the »choir of angels« because of the feeling that other voices were singing the same part on a higher pitched harmonic and because the reverberation, by smoothing out the edges of the sound, rendered a sound perceived as more beautiful than the »original source«. Both examples, added to historical documentation, showed that those buildings were conceived with sound in mind. The dimensions of the rooms allowing reverber-

7 They reproduced the same research in other locations in France as well, trying to build a sort of acoustic archeology (Manaud, 2016).

8 This phenomenon, which I will present later in my own renderings, does not need to be »binaural«. In that case, the beatings still work, again as a slight coming in and out of phase between two signals.

ations or echo to happen, but also the materials used were known for their acoustic properties.

Without needing to share the religious ground that even somewhat transpired through the documentary, the striking element about those constructions was the acknowledgement that sound was playing an active part in the gathering of the community, in what one could understand as the production of the »social«. In their dictionary of sound effects, Augoyard and Torgue describe reverberation as follows:

> »Reverberation is socially perceived as an indication of solemnity and monumentality. It signifies volume and large size. This monumentality can be sensed as functional and inherent to the use of some locations (cathedrals, concert halls) or as unpleasant and residual for others (train station halls, concrete underground parking garages). Reverberation is also perceived in terms of ›resonance‹, a term referring, in everyday speech, to reverberation in general. Through its architectural representation, reverberation is easily associated with various functions of power (religion, justice).« (Augoyard et al., 2006, p. 116).

Those various functions of power are already sensible in the silence reigning over the ones who will dare speak or move. However, its expression is even more palpable in the time silence needs to take back its throne. It is the power of the institution directly tangible through sound. The monumentality — of the Church, of the administration, of the court — unfolds in the detention of knowledge and information. The silence becomes the forbidden, the inaccessible for the common mortal — retained by God, by the Executive, by Justice. The materiality of knowledge, retained, detained by the few, expressed in a silence kept until the hammer falling down breaks it. But then, sound, when emerging, is not only the judge, it also becomes the gatherer of the community. Reverberation as power is inscribed in particular gatherings, contributing to a form of discipline, the making of subjects, to which liturgy and singing also take part in. However, it is not only the meaning of the text sung that acts as discipline or gathering, but also the practice of sounding itself, in its materiality. By singing together in a

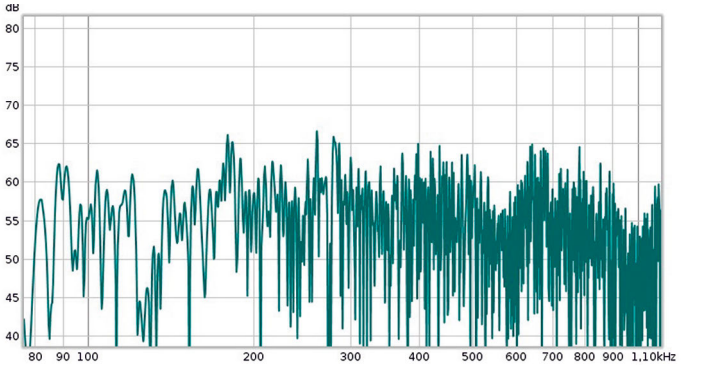
very resonant room, even more so where reverberation plays a supporting role (smoothing out the edges, gluing together the parts), a moment of communion in sound, through sound can happen. In this situation, a network made of stones, glass, wood, humans and of course sound — standing waves, echoes, reverberations, resonating frequencies — is being created. The sound becomes »social«, or rather part of it, producing it, because of the associations it creates. It is at the crossroads of various »intéressements«, as Callon would argue, not so much in the classical meaning of the word, but more through its Latin etymology, *inter-esse*, which literally means »in-between-being« (van Loon, 2014).

The installation

The concept behind the two occurrences of *Échos de la pierre* was therefore to emphasise the relation between sound and »the room«, and how they build a network that might produce what one could call »the social«, taking the quoted documentary as a starting point. How does this communion, gathering, can be understood, experienced, felt, when one does not start from the text, but from the sound? Is it possible to think-with the room, through sound? To produce a knowledge-generating and aesthetic experience of the room through sound? To engage with their materiality? Every room reacts differently to sound. Its dimensions, the materials composing walls, ceiling and floor, the absence/presence and dimensions of windows, furniture, people, animals, plants etc. All those elements have an incidence on the »frequency profile« of a room. Some frequencies will be absorbed, other will be amplified: the latter are the main frequencies of resonance. The intent was thus to detect the frequencies of resonance of a given room and play them back into it. The installation can be seen as the inverse process of what is pursued in building a recording studio. The studio is often thought of as a blank canvas where the engineer/producer can listen to the music undisturbed. Nothing should come between the speaker and the ear, not even the room itself as it would »denature« the sound, falsify the listening experience and lead the engineer/producer to decisions directly influenced by how the room made the sound sound. To produce a

generic recording studio, several techniques are used to soften the impact of the room, to reduce its resonant frequencies, to let the sound come to the engineer/producer »as it should be«. The spatiality of sound is being erased from the event. On the contrary, the installation intents to magnify and use those frequencies as its main instrument and bring the room to »express itself«, to be activated through sound. In doing so, it wishes to ask how the room and sound are co-constituting the experience one is »thrown into«.

Figure 1: Example of a frequency response measurement in RoomEq Wizard



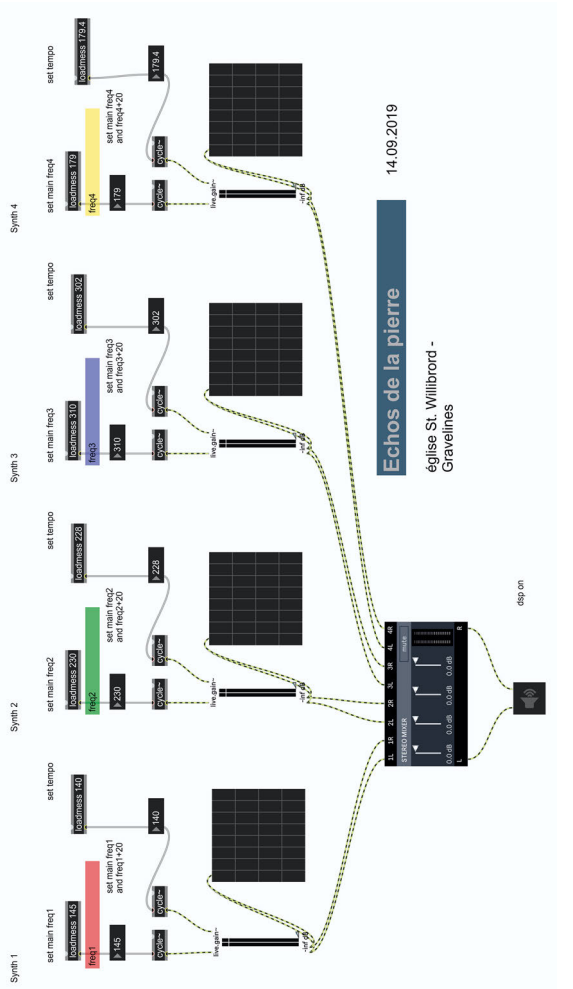
Source: Room EQ-Wizard, screenshot by author

To distinguish the resonating frequencies of a room, several measurements were made coupling the software RoomEQ Wizard[9] to a microphone with a »flat frequency response« — which means that it restores the sound »exactly« as it received it[10] — at different spots. In

9 This software is especially designed for this kind of measurements, mostly in the case of room isolation (i.e. recording studio preparation) and data analysis.

10 Those microphones, made specifically for measuring the acoustic profile of a room differ from other types of microphones like singing microphones, which are designed to support the frequency range of the human voice.

Figure 2: Max/MSP patch used in one of the performances



Source: Max/MSP, screenshot by author

each spot, the software generated a swipe of sound, from very low frequencies (15 Hz) to very high (20 kHz), which was played back through a couple of speakers. Still with the same software, the recorded data could then be visualised as a graph (fig. 1) as well as exported into various formats[11]. Because the microphone, calibrated to the speakers, has a flat profile and the room has not, the variations in the rendered spectrum can be interpreted as coming from the room itself. The most distinct values (»most resonating frequencies«) were then used to calibrate a set of digital synthesizers within the software Max/MSP using sinusoid oscillators (sine wave synths, giving a relative pure and smooth sound) which would be playing at those fixed frequencies during the length of the installation/performance (fig. 2)[12]. For greater clarity, each synthesizer's oscillator was doubled and detuned a few Hz, in order to simulate a beating as described above. Because each beating was set at a different frequency, each tone would »vibrate« at a different speed[13]. After this

11 The graph displays the frequency profile measured at a particular spot in the church. It displays the loudness (in decibels, on the Y-axis) for each frequency between 15 Hz and 20 kHz (X-axis, here only the chunk 80 Hz to 1,10 kHz is visible). Because of the microphone used (flat-response), and the sweep of sound at constant amplitude, it can be deduced that the fluctuations in loudness are a result of the room absorbing or reinforcing frequencies (depending of the materials, distance and orientations of the walls, etc). The most notable peaks (here around 160 – 180 Hz and 260 – 280 Hz for instance) can be considered as resonant frequencies at that particular spot. The harmonic content of the spectrum — i.e the relation between particular frequencies — is here not directly taken into account.

12 Another possible installation would be to have a synthesizer with a much broader frequency spectrum including each »most resonating frequency« of each position. Finer differences could be experienced between each position. The main drawback could be that including »too much« of those frequencies would produce a very full and almost noisy sound, which would make those fine differences also harder to hear. However, this has not been experimented with yet in the actual church.

13 In later experimentations, using around 20 partials of the same sound signals, the closeness between some of them produced a »natural« beating without having to implement it into the program and still retaining enough clarity.

setup, the installation can begin. The synthesizers will be playing nonstop in the room, producing a full harmonic drone haloing the participants who could move freely within it (and also to get out of the room if the constant sound signal was getting to difficult to bare).

The performances

The installation was proposed and performed the first time at my home university in Eichstätt, in the basement of one of the buildings, usually serving as a small theatre stage and rehearsing space. More a first try than anything else, it is a transposition of the thought experiment (experience the room through sound) in what one could consider as a »simple room«[14]. As explained above, it was part of a set of workshops/installation/performances, called *ResonanzRaum*, which took place in June 2019. In that case, the room was a rather »easy one«, almost a parallelepiped rectangle (excepted the inclinations of the ceiling at some places). It had a few windows and doors, some furniture (I only reorganised the chairs), a small stage, a ladder left in one corner, even a painting as some sort of screen on rolls (fig. 3). Soon after the drone started, the participants (colleagues and friends, quite familiar with each other) started moving around the room, feeling how the room reacted to sound. Some frequencies were amplified at certain positions, some beatings were getting out of synchronisation in other places. The participants stood up on chairs, went under tables, put their ears to the walls, touched them, touched the ground, closed their eyes, moved their heads. They were discovering, or rather re-discovering the room through sound. A sense of curiosity could be felt, the room was responding, through the resonance. Almost all stayed until the end.

14 Of course, no room is a simple room. I did not choose this one considering its history as a cloister however, but only as what I could »use« to try the installation in. The decision was therefore merely practical.

Figure 3: ResonanzRaum in Eichstätt

Source: Photograph taken by the author

The second iteration of the project was performed at a church in Gravelines in September 2019[15], a small coastal city near Dunkerque in France (fig. 4). The same methods were used for the measurements, spreading them over a few days, as I had to navigate between official services. The same synths were used, calibrated at different frequencies (following the measurements). Several main differences could be observed, in comparison to the first iteration. First of all, obviously, the room itself. Setting up the installation in an actual church with a reverberation time over two seconds (which means that a sound, be

15 I would like to thank the mayor Bertrand Ringot, the city's cultural department as well as the local parish, for lending me the equipment, promoting the event and giving me access to the church.

it loud enough, takes two seconds to decay completely) meant to be able to adapt the process, in terms of equipment used. The loudspeakers had to be powerful enough for usable measurements even in the most remote spot of the church. Because I only tried this installation type in one other room with much smaller dimensions, I had no idea if anything would even work, if the differences in resonance, due to the room, would manifest themselves, or even if the program designed for the first iteration would work properly in that new situation. Also, because the installation was being presented in a »working church«, I was unfortunately not given access to the altar for the measurements or the setup of the loudspeakers, where probably very interesting resonance phenomena could have been experienced, being right under a keystone[16]. The program had to be tweaked and rebuilt to respond correctly to the speakers, mixer and amplifier. The impact of the installation was greater than expected, at least in terms of the resonating effects, »moving around« the church. The resonating synth waves in a building with such reverberation also reinforced the idea of monumentality, as evoked above when quoting Agoyard and Torgue. The church was itself pulsating, very much responding to the drones, fluctuating at various speeds. A few spots were particularly surprising.

For instance behind a pillar, only one specific tone could be heard. One step further, the full drone came back again. Finally, the participants were not academics anymore but a broader audience, some of them even part of the church community. The openness towards the project and the willingness to discuss it beyond sociological theorizing was an important part of the installation. The participants themselves, just as during *ResonanzRaum*, but following different interests,

16 The assumption regarding the particular resonating properties of the altar's position could be verified later on the same year, during the attendance of a mass. At that particular position, under the keystone, the priest did not need a microphone to be loud enough, which he employed at several other spots of the church, he did not even have to raise his voice more than usual. His voice seemed transported, reinforced at a distinct frequency range. The importance of that very spot for Catholic religion has thus been translated into sound as well, by giving the altar strong resonance properties.

Figure 4: St-Willibrord church in Gravelines, France

Source: Photograph taken by the author

were moving, experiencing the church, »their church«, anew. They were co-building the event and the making of theory in that sense, through their own experience of the event, but also through the resulting exchanges of impressions.

The recording

There is no actual recording of the installation. However, wondering about the relation between sound and space, and how space is being induced in a sound recording, I began to think about the possibility to make a sort of »dematerialised« rendering of what had been presented in the church. The idea was to take the same resonant frequencies, and by further analysis to replicate the particular resonating characteristics of the church. The same sine wave oscillators could be used and recorded in a digital audio workstation (or DAW) and be processed afterwards to »re-create« the church in Gravelines. This is a very common process in music and sound recording. To give the illusion of a partic-

ular room, of liveliness, of realness, to give the music more depth and movement, reverberation is added as an effect to the instruments and voices. The process, originally made in actual reverberation chambers, is now mostly done using digital tools, either as external units or so-called effect plugins in music software. Through those effects, it is possible to re-create a room or create a room that was never there in the first place[17].

I experimented with two distinct approaches[18]. The first one had all sine waves recorded in a stereo signal, without any processing. Afterwards, an array of »EQ« effects were applied on the recording, i.e. filters sculpting the sound, either taming or reinforcing particular frequencies. The EQs were then calibrated to follow the measurements. For instance, where the measurements showed a high resonance at 180 Hz, the EQ was »boosted« at the same frequency. Each measurement position was then processed one after the other to give the impression of walking through the different positions, as if walking around in the church. A global reverberation effect was then added to give the signal more width. This approach was discarded after a while however. Both the process itself and the result were too artificial, and the link to the actual performance had been somehow lost. Moreover, the process was very impractical and not precise enough, having to drag and draw lines with the mouse on the graphical interface for each setting, which meant hours of »point, click and drag«.

17 One of the best examples for a room that never was can be found in the recording of Joy Division's *Unknown Pleasures*. The drums were recorded on the roof, therefore sounding very »dry« (no walls for the sound to bounce back), and were heavily processed afterwards to create an artificial room through reverb effects. See this interview of Martin Hannett, producer of *Unkown Pleasures*: https://www.youtube.com/watch?v=XI-w7LjSNi4.

18 Needless to say that I am neither a sound engineer nor a programmer. The process is very much trial and error based and only represents the extent of my knowledge on the subject. There are without doubt better approaches, using better tools. However, due to my personal interests, and on the basis of experimenting with a *thinking-with sounds*, a more »do-it-yourself« orientation seemed preferable to me.

The second approach was made possible through a feature in the RoomEq Wizard software, already presented above. Not only is it possible to export the measurements as text files, but as Impulse Responses as well. Without going too much into technical detail, Impulse Responses files can be understood as renderings of the acoustic characteristics of a room. It is a modelling of how sound behaves in a room, according to the acoustic measurements of that said room. A particular reverb effect — called a convolution reverb — can be used to load those files and then process the incoming sound »through« the room modelling. The result is a quite »realistic« reverberation. Those convolution effect plugins can be found in every DAW software. However, I decided to use the programming language and infrastructure SuperCollider, dedicated to music composition and sound synthesis. One of the advantages of SuperCollider, which nevertheless has a steep learning curve, was the ability to process quite a lot of information without much CPU usage (IR convolution reverbs can be very demanding) and to automate some actions (for instance reading the measurements directly from a text file rather than typing them one by one). In one »simple« program, the sine wave synths could be generated and played, the IR loaded and tweaked, the result recorded to a stereo audio file in one »homogeneous« performance. In total, more than 30 impulse responses were used, around 10 for each »aisle« of the church, corresponding to each measurement position. To reinforce the »re-creation« of the room, not only the measured frequencies were used, but the amplitude ratios as well. The sound processed through the IRs was then sequenced in a fictional »walkthrough« of the church, smoothly transitioning from one position to another, in a cross-fade following a linear curve, which although quite artificial, would indicate a constant and steady walk without footsteps, somehow reinforcing the uncanny ethereal floating of the sound, the eerie feeling of a church pulsating along, through which the listener as ghostly presence is navigating.

3. Thinking-with sound in iterations: repetition and rhythm

As already mentioned, the present work can be thought of as an array, an ensemble of iterations, each in its own fashion linked to *sound formation* and *thinking-with sounds*. It includes the two performances and the recording related above, but also the other experiments, the written work, the next chapter. The term *iteration*, borrowed from Manning and Massumi who use it in *Thought in the Act* to describe particular instances of their research-creation process (Manning, 2013; Manning & Massumi, 2014), can be understood as the repetition of a particular event in the sense of Deleuze[19]. Different from generality within which the terms are interchangeable, the repetition implies difference. It is a sequence of singularities (Deleuze, 1981). In the case of the sound experiments, conducted over the span of three years (when including the stumble and fumble), similarities can be traced between some of them, without however making them interchangeable terms. They are never the simple reproduction of the former occurrence, but imply a variation within the experiment itself.

For example, between the two first instances of *Échos de la pierre*, the performances in Eichstätt and in Gravelines, I used the same program (made in Max/MSP), the same sound generators (three or four digital sine wave oscillators). One could argue that they were re-presentations of the same piece. Although distinct, they retained the same global organisation, as if following a »score« (there actually never was a score per se). Nevertheless, they still are singular events. And even if there had been a score, two interpretations of a particular one do not produce identical representations. The score might appear to be a stable object, but it is not a generality rendering each representation inter-

19 It is also a process implemented in most programming languages. In those cases, it simply means repeating a particular instruction, function, over time. Even if the temporal separation is not felt as much due to the processing capabilities of modern computers, the iterations are still sequenced and indexed, one after the other.

changeable[20]. Difference, then, can be expressed in many ways. From the participants to the room itself (one being a university drama rehearsing room in the basement of a former Capuchin monastery, the other one being a 16th century church), their walls, their floors, the height of the ceiling etc. As if different instruments were played in different keys. From the knowledge gained after the first representation to the new challenges I faced during the second. In the duration of the performance itself, even. But also due to their temporal sequencing. After *ResonanzRaum*, I resumed writing what is now an aborted second draft. After *Échos de la pierre*, I started to re-think the whole organisation of the thesis. The recording was made in two distinct and very different approaches, separated by several months, reflecting my own change in which tools to use. Knowledge had been gained in the meantime. For instance, I started to learn the programming languages Supercollider and Csound, I drifted away from Max/MSP to prefer open source alternatives (such as Pure Data) and text based programs (such as SuperCollider).

I am not saying that there is a direct causal link but that the sequencing of the events matters as much as the event themselves to understand their singularity, as particular samplings of the sonic flux. The event as iteration therefore allows to think difference even in similarity, and it is precisely in that difference that knowledge can be generated. It is evolutive, depending on the milieu in which it emerges, a difference actively »made« (Deleuze, 1981). If Walter Benjamin saw a loss of a medium's aura after technical reproduction in the industrial age, the experiment as performance, as simulacrum, as particular iteration generates it anew each time. It is not a mere copy, but adds momentum, a possibility for further reflection.

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20 This seems to be true even in the representation of classical music, as the conductor Seiji Ozawa shows in his conversations with the author Haruki Murakami (Murakami et al., 2017). However, one could still note that it has been of one the great illusion of Western musical traditions to believe that the »score as music« — as written and visual representation — could render an immutability and perfect reproducibility of the music as event (Sha, 2013; Solomos, 2013).

> »Il ne suffit pas de multiplier les perspectives pour faire du perspectivisme. Il faut qu'à chaque perspective ou point de vue corresponde une oeuvre autonome, ayant un sens suffisant : ce qui compte est la divergence des séries, le décentrement des cercles, le ›monstre‹. L'ensemble des cercles et des séries est donc un chaos informel, *effondé*, qui n'a pas d'autre ›loi‹ que sa propre répétition, sa reproduction dans le développement qui diverge et décentre.« (Deleuze, 1981, p. 95).

One could even argue that each iteration becomes that simulacrum, refuting a distinction between original and copy, but affirming a difference, beyond representation, or rather »underneath« it, which for Deleuze, leads to the »real experience«, as encountered in the first chapter. The simulacrum, as difference, generates knowledge. In relation to my own practice, each iteration is an engagement with the process of thinking-with sounds, not as application, but altering it, constituting it. Thinking|doing. This is true of the experiments described above, as well as the ones following, but this is true of the written thesis as well, itself becoming a particular iteration, another individuation, another expression of a *thinking-with sounds*. Understanding the iteration as *simulacrum* can however only be helpful through what it sets into movement, as proposition, not as methods following a principle. And this is probably why *thinking-with sounds* as whole, even if multiple, even if moving, does not entirely fit the description, though one could argue that thinking in iterations »flirts« with the idea: it probably contains a too strong principle but are not copy of a model, rather variations based on the difference. However, through the relation between simulacrum and chaos, Deleuze's understanding of the concept allows to think in multiplicities and thus, in the multiplicity of modes of knowledge production:

> »Le système du simulacre affirme la divergence et le décentrement ; la seule unité, la seule convergence de toutes les séries est un chaos informel qui les comprend toutes. Aucune série ne jouit d'un privilège sur l'autre, aucune ne possède l'identité d'un modèle, aucune, la ressemblance d'une copie. Aucune ne s'oppose à une autre, ni ne lui est analogue. Chacune est constituée de différences, et communique avec les autres par des différences de différences. Les anarchies

> couronnées se substituent aux hiérarchies de la représentation; les distributions nomades, aux distributions sédentaires de la représentation.« (Deleuze, 1981, p. 356).

4. A rhythmic thinking

Beyond the simulacrum however, thinking in terms of difference and repetition and the resulting importance of sequencing leads to another concept developed by Deleuze, with Guattari this time, namely the concept of *rhythm*. Because the sequencing of events matters that much, and because a thinking in iterations is not a mere reproduction of past events, but a repetition bringing difference, a *thinking-with sounds* is also a *rhythmic thinking*. For both authors, the rhythm is what drives the process, it is what introduces the difference. It is fundamentally different from the »meter« or measure, which is considered as a rather static return of the identical, either following equal units of time or repeating itself the same element or event (Deleuze & Guattari, 1980). The meter is seen as »non-productive (or only reproductive) and thus empty periodicity, a static repetition that does not produce difference (Herzogenrath, 2017a, p. 111). On the contrary, rhythm is productive because of the difference it implies in the repetition:

> »C'est qu'une mesure, régulière ou non, suppose une forme codée dont l'unité mesurante peut varier, mais dans un milieu non communiquant, tandis que le rythme est l'Inégal ou l'Incommensurable, toujours en transcodage. La mesure est dogmatique, mais le rythme est critique, il noue des instants critiques, ou se noue au passage d'un milieu dans un autre. Il n'opère pas dans un espace-temps homogène, mais avec des blocs hétérogènes.« (Deleuze & Guattari, 1980, p. 385).

Ritournelles

In the relation between rhythm and milieu operated here, and through the ever-going transcoding characteristics of rhythm, one could under-

stand it in terms of individuation as transductive. It is transductive because it »grows out of the edges«: it is an operation producing a milieu and separating itself from it, evolving within it and further structuring it, »de proche en proche«, »from one place to the next«[21]. This transductive quality of rhythm can be expressed through Deleuze and Guattari's use of the *ritournelle* in *Mille Plateaux*. The *ritournelle* or *refrain* is itself repetition and difference, a multiplicity gathering and fixating (it is for instance the *logos* of the refrain, the child singing in the dark to gather strength), but also »impacting« individuations as new iterations, an opening, an improvisation. The ritournelle is therefore itself a movement of transduction. Each individuation co-produces its own milieu in distinguishing itself from it, remaining bound to it, which means, that it changes it as well. It is at the same time an ordering, an »agencement« of chaos, into a territory (more on the territory later), which is already a gathering, but also a »departure«, a re-configuration of that territory and its exceeding towards other »agencements« (Deleuze & Guattari, 1980).

In looking closer at the *ritournelle* and its relation to rhythm, this might explain why Deleuze and Guattari propose that the rhythm and the »rythmé« are on different planes. The »rythmé« as a particular individuation, bound to a milieu, the rhythm, as what cadences, sequences, and co-produces the individuation, is an in-between, always a becoming, driving the individuation[22]. A *thinking-with sounds* in iterations can thus be understood as a rhythmic thinking. It becomes a thinking in *ritournelles*, which are generative, engaging with the multiplicity of modes of knowledge production, intensifying experience, which reminds of

21 »[…] a physical, biological, mental, social operation through which an activity propagates within a domain, by founding this propagation on a structuration of the domain that is realized from one place to the next.« (Simondon, 2005, p. 32; English translation quoted from: Barthélémy, 2013, p. 230).

22 One could argue that the rhythmic component of the iteration ends the comparison with the programming language, which more often than not, is enclosed in its idiosyncrasies and language limitations and remains bound to the meter as the logic of code. However, this would not entirely be true, as »transcoding« between different languages is possible.

Guattari's own ethico-aesthetic paradigm, described in the fourth chapter (Guattari, 1992). The iterations themselves become what is »rythmé«, what is individuated. It has been shown in the third chapter, that for Simondon, operations of individuation are not only found in beings only, but also in thought and knowledge production (Combes, 2013; Simondon, 2005). The performances in Eichstätt and Gravelines are therefore particular individuations, not only of the *sonic flux* but also of a *thinking-with sounds* as well. The different bodies, »rythmés«, another pulsation, giving rhythm. Furthermore, when arguing that the written thesis can also be thought of as an iteration, it is precisely in that sense. As gathering, it is a particular individuation, a particular »actualisation« of the rhythm into the »rythmé«.

Moreover, those rhythmic practices can be understood as so much *ritournelles*, because of the processes of territorialisation and deterritorisation they operate on what's being »rythmé«. The *ritournelle* as territorial assemblage can fixate, but it can displace, it can move and reconfigure as well as mark a territory, a boundary. Christoph Cox explains how the evolution of music, from being conserved as score, to its recording to physical media and later on »dematerialised« into MP3 files are particular expressions, particular *ritournelles*, in turn territorialising, deterritorialising and/or reterritorialising the sonic flux (Cox, 2018). The rhythmic component of a *thinking-with sounds* also presents traces of the *ritournelle* in the particular performances and experiments described above.

As Deleuze and Guattari note, those processes are not only spatial processes, not only topological mappings and geographical boundaries, but »existential territories«, more or less fixating rituals and subjectivities. The *ritournelle* is a territorial assemblage, which itself is a gathering, a collection (Deleuze & Guattari, 1980). A *thinking-with sounds* as *ritournelle* is territorialisation in its situation and the acknowledgement of its situation. It is also a gathering of everything that is *thought-with*, not only sounds, but theories, concepts, sensations as well. In that sense, it is a »theoretical ritournelle«, as Guattari would put it (Guattari, 1992). However, through the aesthetic practices of sounding, listening, of the doing entangled in the thinking, the *ritournelle* is not only theoretical,

but it also locates through sound, it actualises the sonic flux into a particular place: »Le territoire serait l'effet de l'art…« (Deleuze & Guattari, 1980, p. 388). An art that is however not the privilege of human beings[23]. The question which follows is then if and to which extent the territory, as place of emergence of expressive qualities, is also where knowledge production happens? Or, in the case of *thinking-with sounds* if indeed it shows the multiplicity of possibles, of modes of knowledge production, being a *ritournelle*, a gathering?

> »La ritournelle, c'est le rythme et la mélodie territorialisés, parce que devenus expressifs, — et devenus expressifs parce que territorialisants. Nous ne tournons pas en rond. Nous voulons dire qu'il y a un auto-mouvement des qualités expressives.« (Deleuze & Guattari, 1980, p. 389).

Dissolving meaning

As already mentioned, the inspiration for *Échos de la pierre* was the work of Olivier Manaud, showcased in an Arte documentary on the Mont-Saint-Michel. Beyond this example, Manaud focuses on Roman abbey churches built between the 11th and 13th centuries (Manaud, 2016). The core argument is that in the medieval era, abbeys and churches were built as music instruments rather than only »functional« buildings. According to this premise, Manaud argues that there is an analogy between the resonance of a church as a building and what he calls the »inner and spiritual resonance in the heart of the believers, members of the Church as a gathering.« (Manaud, 2016, p. 55, transl. by the author). This particular relation, between the community and the place itself, is based on sound. It even requires a reciprocal acceptance through sound. It becomes a sort of tuning between the church — as a building — and the community, to which Manaud refers to as the »hospitality« of the church. In other words, the ones willing to »sound« in that

23 They quote here Olivier Messiaen's work on birds. I would add the work of Vinciane Despret in *Habiter en oiseau* (2019) and of Baptiste Morizot in *Manières d'être vivant* (2020).

building should learn its language first, in order to be fully welcomed by the place, just like a musician learning to play her instrument. Music or sound which would not respect the acoustic particularities of the church would only »transform this hospitable place in a place of gruelling combat.« (Manaud, 2016, p. 63, transl. by the author). What is interesting here is the »how to use« manual of a church as an instrument that Manaud is giving, or at least referring to. By understanding the resonant frequencies, and the harmonic relations between them, singing is magnified through the church. Neglecting them, for instance having a lot of people speaking at the same time, the magnifying reverberation turns sound into an indiscernible mush. Hospitality can therefore be understood as the capacity of the church to »sound good«. The church is welcoming because it sounds welcoming.

What remains unclear is to which extent the church as building and the Church as gathering are indiscernable in the notion of hospitality, i.e. to which extent Manaud's writings do bear the trace of transcendental aesthetics, as one could argue with Cox (2018). It is built as an analogy, but is it also meant as a prerequisite? A combination of resonances (acoustic resonance of the building and the community singing, spiritual resonance of the community of believers with the ethos of the Church) in order to access the »Divine«? Moreover, and remaining within the church as building and the hospitality as an acoustic welcoming, one could still argue that just like any other instruments, practices of improvisation and »alternative techniques« could be employed. It is already a strong aesthetic judgement to consider the possible sonic mush as »gruelling«, thus limiting the sonic potential of a place to what is deemed beautiful by a very particular and situated canon. Still, it reminds of Simondon's aesthetics, which are not simply considering the church as a tool and its function to fulfil, but an aesthetic *with* the tool, with the church itself.

In any case, and outside the religious meaning of the church's »hospitality«, there is a respect towards the place, a sonic materialist encounter with the church, as an instrument, as an actor, or rather, a network of actors, sounding and listening. It is a composition, in the sense of Latour (2010a), towards sounding, a composition with the room, with

the wood, the glass, the stone, with the bodies inhabiting it. A comeback of the magical through the aesthetic? An encounter extending beyond western traditional music. Indeed, churches are becoming more and more sought after locations for concerts and sonic experimentations, which go far beyond liturgical and classical music. Composers like Kali Malone, Maria W. Horn and others engage not only with a given church, but with the church organ as well, mixed with electronics, working and »sculpting« sound, and how the church responds to it. The sonic experience is indistinguishable from an experience of space itself. *Échos de la pierre*, working with digital synthesizers also follows this path. Spirituality can be part of it, but unlike what Manaud thinks, it is not a prerequisite or could become quite critical as well. However, he is right by stating that: »The fact of inhabiting a place, including and mostly in a sonic way, makes this place a living reality and thus in perpetual mutation.« (Manaud, 2016, p. 63).

Coming back to Deleuze and Guattari, *Échos de la pierre*, and beyond that, concerts and installations, in a church or in other places, are indeed practices both of (re-)territorialisation and of de-territorialisation, as proposed earlier when introducing the *ritournelles*. They engage with the materiality of the place, of sound itself. As art practices, they locate, delimit, they place a boundary (Deleuze & Guattari, 1980). They situate, build and inhabit a territory in mutation, through the actualisation of the sonic flux as individual sounds and their production as »music«, their engagement with the church as building. With raw sonic material however, as well as through experimental and modern uses of a church organ, or through »alternative techniques« not belonging to the classical canon of »church-acceptable« music, and also beyond the twelve-tone equal temperaments tuning system[24], meaning, sig-

24 See the work of composer and oud player Khyam Allami: https://isartum.net/. He developed a browser-based application in cooperation with the CTM Berlin to experiment with tunings outside the classical Western systems. His approach is a great reflection on power relations within musical notation and tuning systems, but also branches out to the implications such power relations had and still has on the conception of instruments and digital tools for music production. For instance, the fact that out of convention and habit, most

nifications, representations shift gears, and become multiple, through the experience in sound. Questioning of biases, relations of power and alienation are becoming possible, in how territories are being produced and reproduced, through sound. In this, it is also de-territorialisation, because it exceeds the original hospitality of the church as described by Manaud, without however taking anything from the resonant characteristics of the church as building. Through its sonic expression beyond »welcoming sounds«, the territory of the church is re-modelled. If »church music« is already a *ritournelle* territorialising through liturgy but also through the expressive quality of sound, the installation at once de-territorialises (»extracts« the church as building from the Church as ethos) and re-territorialises it, creating a new territory within the church as building. Those dynamics are of course not the prerogative of the mentioned installations. To remain within the church, one could argue that Black gospel music, through its history, is itself already a particular and very powerful *ritournelle* at the crossroads of processes of territorialisation and deterritorialisation. In all cases however, in the focus on sound, as *thinking-with sounds*, the practices are co-prehension, co-constitution of the situation through the aesthetic, particular individuations of the sonic flux: »Meaning and sense dissolve into rhythm; identity and self are absorbed into space.« (Cox, 2018, p. 101). The following quote by Deleuze and Guattari expresses well this movement of territorialisation and deterritorialisation through sound, a sonic flux

tools communicate via MIDI, a protocol based on the 12-tone equal temperament system (other protocols bypass this cultural bias however, for instance with the Open Sound Control protocol), or the predominance of the Western piano keyboard layout in composition and in the production of synthesizers (Wilde, 2019). In short, Allami and others challenge the inherent biases and sonic colonialism present at the heart of software and hardware used in music production and education. As they expose in a discussion panel for the CTM festival, the designs and functions of musical tools contain music theories and conventions. The question they ask is which ones, why those in particular and why not others. See the discussion at https://www.youtube.com/watch?v=lwvVj2mPY0Q.

»avant la lettre«, a sonic materiality reinforcing the importance of experience:

> »Il semble que le son, en se déterritorialisant, s'affine de plus en plus, se spécifie et devienne autonome. […] Cette puissance, le son ne la doit pas à des valeurs signifiantes ou de ›communication‹ (qui la supposent, au contraire), ni à des propriétés physiques (qui donneraient plutôt le privilège à la lumière). C'est une ligne phylogénique, un phylum machinique, qui passe par le son, et en fait une pointe de déterritorialisation. Et cela ne va pas sans de grandes ambiguïtés : le son nous envahit, nous pousse, nous entraîne, nous traverse. Il quitte la terre, mais aussi bien pour nous faire tomber dans un trou noir que pour nous ouvrir au cosmos.« (Deleuze & Guattari, 1980, p. 429).

Re-creating a room

As explained above, the »recording« of *Échos de la pierre* could be considered as a »dematerialised« rendering of the performance that never was. This might strike as paradoxical, having underlined heavily the materiality of sound in the previous chapters. It is indeed a slight but nonetheless determining misuse of language. Even though the performance is being confined in a digital audio file, produced from a purely digital program, it does not mean that it has lost its materiality. As Cox notes, even digital sound is very much material, the data must exist somewhere (Cox, 2018). It is rather a reterritorialisation, from the church to the storage medium. Cox appends another Deleuzian — or rather Guattarian (Shields, 2003) — duality to territorialisation/deterritorialisation processes, which is that of »actualisation«/»virtualisation«. For Cox, and following Pierre Lévy, this duality can be defined as follows: »Virtualization is a process that involves detachment from the present (the here and now) and movement towards a general problematic field from which new actual entities are generated as solutions.« (Cox, 2018, p. 50). Referring to this definition, it is easy to understand the sound files for *Échos de la pierre* sitting on my hard drive as virtualisation. They detach the performance from the present. They are easily

moveable to another drive, to a network, to a remote place, an undefined somewhere sometime. Real but not actual (Shields, 2003). In that manner, according to Cox, the virtual sound file is deepening the fluidity of sound. It »accelerates the circulation and replication of audio recording, dereifying it, rendering it as pure information that confounds the logic of scarcity on which commodification depends. All these modes mark out various ways in which the sonic flux is interrupted, cut, sampled, captured, diverted.« (Cox, 2018, p. 75). Those processes gain in depth and movement however, when read through another understanding, closer to Actor-Network Theory, also encountered earlier:

> »A subjective mode of engagement is oriented towards *virtualisation*; it is the creation of multiple possibilities between the no-longer and the not-yet, a zone of potentiality in which ›things could take place‹. An objective mode of engagement is geared toward *actualisation*, the limitation of possibilities that we can associate with a ›becoming‹ real; subjectivation is the enablement of action, of inaugurating possibilities and thereby, for example but not exclusively, the need for decision.« (van Loon, 2012, p. 199).

In the case of sound recording, there is indeed a movement of *virtualisation*, but as Cox notes, it is a deterritorialisation of memory, of storage, although only to the extent where computer hard drives and servers work flawlessly, to the extent that programs and devices able to decode the files still exist[25]. Nevertheless, each time the file is being played, following a process of conversion, from data to physical movement, there is an actualisation. A movement of objectivation. As Cox writes, »a cut« in the sonic flux. At the same time however, the sound itself, the recording, moves, allowing for an encounter, it could become »ethical« in van Loon's sense, which means that it does not remain »indifferent« but cre-

25 Schrödinger's music and compatibility: what does a file become when no computer can read it? An extreme actuality? Dead, unusable, fixated? Or extreme virtuality, a quantic object existing in several states at the same time? Not having any means to read it: how does one know if the file is damaged or not?

ate new potentialities, new associations[26]. In other words, the cut in the sonic flux is also what propels it forward. In that case, the recording becoming »anarchive«, enabling new iterations, contributing to the rhythm. The deterritorialisation of *Échos de la pierre* works in a similar way: it is archive, anarchive as virtualisation of memory (in relation to the event that never was). It is also presenting a virtual room, based on the actual, but exceeding it. It is the construction of a room with potentialities not yet or no longer actualised.

5. Thinking-with space

Thinking-with sounds is inherently a spatial thinking: »a place is generated by the temporality of the auditory« (LaBelle, 2010, p. xvii). This has been introduced in the third chapter, when describing Schulze's sonic thinking. This has been amplified here through the driving rhythms of territorialisation and deterritorialisation. Rhythms and their expression in *ritournelles* are at once bound to a territory — which is not a milieu, rather an »act« territorialising rhythms and milieux (Deleuze & Guattari, 1980) — as well as to »the forces of deterritorialisation, and of becoming.« (Herzogenrath, 2017a, p. 112). Rhythm carries multiple foldings and unfoldings, at the same time a physical localisation, due to the very nature of sound and a situation in the sense of Haraway (1988). What a *thinking-with sounds* allows however, is not so much a thinking *about* space. The processes of (de-/re-)territorialisation are not bound to a location, like filling an empty container, nor are they considering space itself as an inert and already constituted object. Instead, it can be thought of as a *thinking-with space* itself, or as Dereck McCormack (2008) puts it, a *thinking-space*:

26 It could, but it is not necessarily the case. The distribution of music through streaming services in computer generated playlists as »wallpaper« music could be a limit bordering »indifference«. See the work of Liz Pelly (2019) on the subject.

> »In contrast [to a thinking about space], *thinking-space* might be better understood as the co-intensive sensing, in affective-dynamic terms, of the creative processuality of something in the world forcing us to think: that which, as Deleuze puts it, ›is fundamentally an object of encounter rather than recognition‹« (McCormack, 2008, p. 3).

In attempting to challenge the field of geography through research-creation practices close to Manning's description, McCormack therefore shifts how space is to be understood and »used«. To do so, he combines Deleuze and Guattari's *ritournelles* (mostly focusing on Guattari's particular contribution and experiments) and Henri Lefebvre's own understanding of rhythm and rhythmanalysis (2000; 1992). *Thinking-space* or *thinking-with space* thus engage with multiplicity and the intensity of experience. It proposes another geographic practice that becomes an experiment opening into other modes of knowledge production:

> »The key point is that despite some differences in their theoretical orientation, both Lefebvre and Guattari point to the importance of the refrain of thinking-space as both process and noun: with respect to process it is about inflecting thinking through affective encounters of different degrees of intensity; and with respect to the latter it is about producing facilitating contexts — sites of experience and experiment for thinking relations between bodies, concepts, and materials of various kinds.« (McCormack, 2008, p. 7).

Following McCormack, one could again repeat the argument above and initiated in the third chapter that a *thinking-with sounds* is necessarily a *thinking-space*, even in its »deterritorialised« digital setting, creating, re-creating the room. There is however another particular *thinking-space* happening, in the relation between sound, its propagation, and its encounters with other actors, bodies, materials, that can be best described through Alvin Lucier's 1969 piece *I am sitting in a room*. In this piece, Lucier is reading a text out loud, recording and playing it back into the room. The playback is itself recorded, played back, and so on, repeating the cycle of playback and recording. Because the recording is

also picking up the resonance of the particular room in which the signal is played back, the particular resonant frequencies are being amplified in each instance so that after a while, those frequencies are »taking over«. Repeating the process always brings a bit more of the room. The spoken words are progressively disrupted, becoming a homogeneous drone. The text read by Lucier is a description of the piece and of the process happening:

> »I am sitting in a room different from the one you are in now. I am recording the sound of my speaking voice and I am going to play it back into the room again and again until the resonant frequencies of the room reinforce themselves so that any semblance of my speech, with perhaps the exception of rhythm, is destroyed. What you will hear, then, are the natural resonant frequencies of the room articulated by speech. I regard this activity not so much as a demonstration of a physical fact, but more as a way to smooth out any irregularities my speech might have.« (Lucier & Simon, 1980, p. 30).

By describing exactly what he intends to do, Lucier actually takes away the importance of the text itself and in a (possibly unintentional) wink to McLuhan, re-invests the acoustic space. Indeed, the words describing a process are repeated over and over. This repetition, as an aesthetic choice, already empties the text from meaning, or rather, gives a new dimension to the description it contains, escaping linearity. Its endless repetition underlines the absurdity and lets the listener wonder if any text is the same. It mirrors the repetitive nature of sound itself (as repetition of cycles of a waveform over time). However, even more than that, the very action of sound which through resonance destroys the text, actually destroys the word and thus the meaning of that word. The linearity of the text is being swallowed by the all-encompassing sounding room. Through speech, microphones, loudspeakers, and a room, a thinking-with sound became a thinking-space, as it shows the possibility but also the fragility of speech and thus of sound. But even further than that, the dislocation of speech becomes the dislocation of the performer's identity (Cox, 2018), leaving no place for a constituted and fixed subject. There is a co-creation of a particular sampling of the sonic flux,

an encounter, a co-prehension reinforcing the materiality of sound and of the room, another individuation.

The process underlying *Échos de la pierre* is similar[27], even if it loses the meaningful/meaningless aspect of the text. By flooding the room with sound, according to its resonating characteristics, another movement is taking place. Not from the text to the drone, but between each position, each corner, each encounter with the sound source. If *I am sitting in a room* is a storytelling, *Échos de la pierre* almost appears as a sonic mapping. In both cases however, resonance and reverberation are the acoustic phenomena at the core of *thinking-space*. They underline the repetition, the anarchive, the multiple. As expressed in the anthology *Spectres II*:

> »To resonate: *re-sonare*. To sound again — with the immediate implication of a doubling. Sound and its double: sent back to us, reflected by surfaces, diffracted by edges and cornes. Sound amplified, swathed in an acoustics that transforms it. Sound enhanced by its passing through a certain site, a certain milieu. Sound propagated, reaching out into the distance. But to resonate is also to vibrate with sound, in unison, in synchronous oscillation. To marry with its shape, amplifying a common destiny. To join forces with it. And then again, to resonate is to remember, to evoke the past and bring it back. Or to plunge into the spectrum of sound, to shape it around a certain frequency, to bring out sonic or electric peaks from the becomings of signals.« (Bonnet & Sanson, 2020, p. 9).

Without relying too much on the metaphorical power entailed in resonance, the quote nonetheless »resonates« with how I experimented with *Échos de la pierre*. The materiality taken seriously, the rhythm of the work itself pulsating forward. *Échos de la pierre*, just like *I am sitting in a room* and many other similar experimentations are engaging with space in a very generative way. To come back to what I described in the third chapter, as *thinking-space*, they not only are *in* space, but they *activate* space. Between fleeting heterotopias (Foucault & Defert, 1999), new

27 It is also inspired by Lucier's work.

possibles, new purposes, co-production and co-creation. In that sense, a *thinking-with sounds* becomes topographical (LaBelle, 2010), or rather, it becomes topological: a pursuit of multiplicity, an acknowledgement of complexity (Shields, 2013). The territories becoming a »partition« as Despret notes, drawing networks of sonic territorialities (Despret, 2019).

6. The event as theory-building

Ethical_machines

Also part of *ResonanzRaum* was another smaller workshop, quite different from *Échos de la pierre*, but still one amongst multiple iterations. A repetition with difference that started back in 2017 in another workshop at the University of Alberta in Edmonton, Canada. A life-changing moment that set my research on a new track. The workshop, which was led by Ipek Oskay, was a first introduction to the MIDI Sprout, with which the participants could then experiment themselves. As already explained in the introduction, this first encounter could probably be considered as one of the first impacts, perhaps even the original iteration of *thinking-with sounds*. Willing to share what was then experienced, I proposed a similar workshop back in Eichstätt, where colleagues and friends took part in[28].

The MIDI Sprout (fig. 5) is a device made by Data Garden which measures »biofeedback«[29], i.e. very small current differences between two poles through a couple of sensors (put for instance on the leaves of a plant, but it also works on human hands), and translates those measurements into MIDI data (both notes and control messages). This data can

28 I will only focus on this particular event. Other iterations also include the experimentation with generative and responsive environments inspired by Sha's work (2013), adding light, temperature and movement sensors to the MIDI Sprout. It is still an ongoing process.

29 The more scientific description for this phenomenon would be »galvanic response«.

be used to trigger musical instruments which understand MIDI data, either through a computer (instruments plug-ins, software synthesizers) or hardware instruments with MIDI capability. In other words, this device makes the plant »sing« or »play music« by itself[30]. Using the MIDI Sprout, I had no particular intent in delivering a scientific account for how to »communicate« with plants. Still, one could argue that communication does happen through play, the plant becoming not an instrument itself, but a co-"performer«, producing »notes«. The idea behind the workshop was therefore to propose this playful environment bringing together humans and non-human actors, and consequently to reflect on distributions of agency. Who is the actor? Who is the subject/object? Why is this important?

After showing how the device worked (i.e how the electrodes could to be placed onto the leaves, the relation between the device and the computer etc.), I first let the few participants free to engage with the situation without too much intrusion from my part. Following a series of technical and rather »reasonable« questions, based either on a genuine interest, politeness and a scientific habitus, another mode of experiencing quickly surfaced and lasted as long as the »workshop« itself lasted: an intense playfulness and curiosity.

Without much indication, they started touching the plants, caressing them, noticing that the pitches went higher, the notes played louder, quicker. The plant was reacting to touch and movement, to warmth and water (we watered one of them). It was a logical reaction, the translation of biodata measured between two poles into a language understood by a computer, itself translated into notes. Still, it was moving. And moved by random pitches, they went on. They started comparing how they touched the plants, they removed the electrodes to put them on other leaves. They discovered for instance how the electrodes needed to be

30 The limitation of this device is the MIDI protocol itself, based on the 12-tone equal temperament tuning system, which as already mentioned unfortunately situates the device in a very westernised music culture. In further renderings of *ethical_machines*, the data has been translated into other scales in order to escape this bias.

Figure 5: MIDI Sprout with a Pilea peperomioides

Source: Photograph taken by the author

»linked« in a closed circuit for it to work: the plants need to share a common root to »close the loop«. They soon removed the electrodes from the plants altogether to put them on their own bodies. They passed the electrodes from body to body, to »see« if one sounded differently than the other, trying to distinguish differences, singularities in the notes being played. They touched each other the way they touched the plants. They put the electrodes on different bodies and built a chain, holding hands, each electrode being placed on the extremities and noticed it worked,

noticed that the holding of hands was not much different than for the leaves to share the same root: it closes a loop, a circuit. They played and laughed and took the plant in the »circle« and thus closed a bigger circuit. They included the plant and built an interspecies network of play, letting their bodies generating sound together. They talked to, with and about the plant and its reactions, they sang to and with the plant. *They*, of course, is actually *we*, as I was not standing outside as a mute observer, but also part of the plant/human/computer group. A very touching moment that built a new network, a new bodily experience which went beyond the separation human/non-human, simply through the work of translation made by the device. It also brought other feelings and memories, in my case, it transported back a few years, to my first encounter with the device. But most of all, it carried a sense of play, that remained throughout the workshop.

There was a co-prehension, the co-creation of a situation where human bodies, plant bodies and technological bodies formed associations translated into sound. In this very particular situation, there was no attempt to make sense of what happened, to try to understand »what« the plant was trying to communicate (which would only lead to mere projection of human intentions). It was only about the experience, the feeling of bodies and sound co-constructing. In a nutshell, *ethical_machines* proposes to experiment with an active reconfiguration, redistribution of agency and show how the »social« is being constantly reshaped, a result of encounters rather than a principle guiding actions (Latour, 2005). Through the device, the plant becomes subjectified, like a musician in free improvisation, reacting to the milieu, with a multiplicity of potentialities opened up. At the same time, through the range limitation due to the MIDI protocol, but also at the moment a note is being expressed, depending on which instrument plays that note, there is an actualisation, a fixation. The human actor, in its interaction with the plant and the device also becomes more or less objectified: the plant, through sound, invites to engage, to react, to interact. Again, it calls for actualisation. The definition of a new territory, the playing of a new *ritournelle*.

Generative practices

In each case, each example, processes of thinking and sensing, of prehending, experiencing were intertwined, interwoven. The activity of thinking was co-created by the experience, and vice versa. There was a magma of thinking-feeling which was immanent to the present situation but also transported (through memories or mind wandering for instance) beyond this one simple moment. The thinking-with sound as practices of research-creation in *Échos de la pierre* co-produced a thinking-space. It gave it new intensities, or rather, it reinforced other modalities of experience and knowledge production but also abstracted the relation to space, through sound. It activated an already codified, an already produced space. It reactivated it on new terms even. It produced it anew (Lefebvre, 2000). One could even argue that those practices constructed a new heterotopia (Foucault & Defert, 1999), an *other space* where sounding was being put forward and existing at the intersection of human/non-human associations, where sounding was the defining moment in the production of space. The rules of entering/exiting the space, the times applied were particular to the installation, to the situation. A *ritournelle*.

Both with *Échos de la pierre*, which was a bigger »project«, as with *ethical_machines*, the event was itself, as thinking-with sound, *theory-building*. They are not ethnographic observations that need to be codified, understood and explained as data. The processes themselves were the methods, an ensemble of iterations of a project of research-creation, and constitute a part of the theory building. The text-oriented description of those works can only remain that: a description, and fatally, a reduction. But a narration that at the same time »adds« to reality rather than taking from it. The practices of sounding, sensing and thinking, combined within the installation produced new associations or intensified already existing ones. They were practices of knowledge production, practices of creation. Those practices are not to be explained only from an egological perspective, nor generalized into rationalised rules. They exist in the event, in the moment, in between, encounters always including more than one entity, always in movement, inviting thinking,

writing, inviting new practices of sounding, listening and activating space.

The importance of failing and stepping back

The experiments are themselves not perfect, they are a »work-in-progress« and not a finite object, a process-oriented thinking to which the descriptions are only snapshots. They do inherently present some failures, and biases that can be worked upon. The reflection of my own situatedness was surely not enough, or at least did not go to the extent I was wishing for[31]. Moreover, and probably directly coming from this lack of reflection, I was too present in each experiment. The designs and executions were too unilateral to express and experience with enough finesse and care, even in the playful MIDI Sprout event, which could have had a more dynamic design leaving more room for improvisation. Not that they were absent and that I was the careless triumphant researcher, pseudo-composer. I believe I engaged with enough respect with others, either members of a church community, colleagues, or non-human actors embedded in the experiments. Still, I probably took too much space in the *thinking-with sounds*. Almost an inverse, if I took too much space, I probably did not take enough time, and went too quickly. In the case of the church and its community, or in the case of the plant and the MIDI Sprout, more time could have been spent, probably, to take more differences into account, to account for the multiplicity of modes of existence. It is through Vinciane Despret that this »slowing down« and care is best expressed:

> »Il ne s'agit pas de s'interdire les comparaisons et les analogies, de s'abstenir de chercher les coïncidences ou les convergences d'intérêts, il s'agit d'essayer de le faire avec attention, de prendre soin de ce que l'on crée comme mises en rapport, de savoir que la mauvaise foi est à l'œuvre qui prétend que ce qui insistait à la différence n'insistait pas assez. Bref, de veiller à ce que ce qui éclaire une situation sous un

31 I realised the biased implications of MIDI only after the experiments.

> jour nouveau n'écrase pas tout sous la lumière de l'explication. Qu'on nous donne des loupiotes.« (Despret, 2019, p. 46).

On a more technical note, the experiments, designed as thought-probes »one shots« rather than longer on-going installations, should have been more carefully crafted. Indeed, the responsivity and thus generativity of such environments could have been increased and further reflected upon, as Sha (2013) and Solomos (2013) demonstrate. A set of questions that without doubts calls for further research, and which possibly extended beyond the scope of this particular work and of my own capabilities.

Nevertheless, those failures were necessary. If I take *thinking-with sounds* seriously, I must consider the said failures as as productive and knowledge-generating as the experiments themselves. Not only do they say much about what could be tweaked and better planed, they also teach me much about myself and my own situatedness, about the importance of stepping back, of »letting go«. About how to stay with the trouble, and to embrace it, deal with it, fight within it. About how important the encounter is. As Manning and Massumi argue, thinking back to their own practice:

> »Techniques of relation access their creative potential most when they operate at the edge of what they are preconceived to do. For this to happen, they must embrace the eventuality of their own failure as a creative factor in their process.« (Manning & Massumi, 2014, p. 103).

What does it have to do with sociology?

From the description of those experiments, as well as from the reflections either emerging from or leading to them, one could surely ask to which extent this indeed could be part of a sociological research? Those experiments are not finished products, they are thought probes, as I just mentioned. However, even at this stage, they show, through the encounters they lead to, a variety of possibilities. A multiplicity of modes of producing knowledge, of modes of engaging with space, with

others. This time, it is not a step back, but a step forward, or better said, towards. Towards the situation, the encounter, the trouble. Toward the real, felt, experienced, shared. In its gathering, in its impulses, a *thinking-with sounds* does say much about what we consider to be »the social«. It underlines the importance of materiality within knowledge production. It is indeed a magical, joyful and playful engagement, generating knowledge, adding to reality. It is a topological, sociological thinking|doing leading to a multiplicity of further unfoldings as Empiraterei (van Loon, 2017). In terms of space, it is an activation, a re-activation, re-production. In terms of agency, it is a reflection about how it is being distributed in a situation, and how it evolves. It is a question about how those ethical objects described by van Loon work, not as objects of inquiry, but as sociological tools.

In her recent work *Habiter en oiseau*, Vinciane Despret mentions the *Phonocene*, thinking-with Haraway:

> »C'est ne pas oublier que si la terre gronde et grince, elle chante également. C'est ne pas oublier non plus que ces chants sont en train de disparaître, mais qu'ils disparaîtront d'autant plus si on n'y prête pas attention. Et que disparaîtront avec eux de multiples manières d'habiter la terre, des inventions de vie, des compositions, des partitions mélodiques, des appropriations délicates, des manières d'être et des importances. […] Vivre à notre époque en la nommant ›Phonocène‹, c'est apprendre à prêter attention au silence qu'un chant de merle peut faire exister, c'est vivre dans des territoires chantés, mais c'est également ne pas oublier que le silence pourrait s'imposer.« (Despret, 2019, p. 161).

Thinking-with sounds could be thought of as a sociology within the *Phonocene*. Not only listening to others, humans and non-humans, but through listening, also collecting, or rather, following traces, actors sounding, co-composing and engaging in a magical and playful way. *Thinking-with sounds* is therefore not only a methodological or theoretical posture, which only makes sense in epistemological debates, but ultimately a political and ethical one. It hopefully permits to do

sociology differently, in the *trouble*, slowly and carefully. And not forget that silence could impose itself.

FEEDBACK | Sound Formations

Introductory notes

The last chapter (or chapter 5[0]) gave a re-collection of the sound experiments and associated reflections at the core of this research project, and of *thinking-with sounds* altogether. However, like every presentation or description of sound in written form, the result is quite flat and silent. No sound to be heard, only the description of sound, which repeats the issue already discussed through Murray Schafer and others in chapter 2. Even if most of the experiments could not be presented in full display, due to the very situational character of the installation, glimpses, vignettes of sound can still be proposed. This is what is intended with the following chapter: proposing a sonic peek into what constituted the thinking and writing, listening and sounding processes of this work.

As already mentioned, this *audio chapter* is inspired by Groth and Samson's *audio paper* (2019, 2016, 2021), which allows to experiment with alternative presentation of scientific arguments through the use of sound and other media. However, in contrast to the examples presented after their manifesto, this audio chapter is not the result or recording of a live presentation in front of an audience. It is an *assemblage* or *bricolage* of sound pieces and bits of text. Moreover, the very intent of the present chapter differs from the *audio paper*. Indeed, the chapter itself does not propose a scientific argument — much like a paper would do — enhanced through the use of sound. Instead, sound itself is what constitute the argument, an »archive« of what has been

experimented with throughout the past few years. The sound does not enhance the text, rather it is the text that illustrates sounds, or works in combination with them. The theoretical reflection is already presented in the chapter 5[0], and would only be repeated without much »added value«. This does not mean that Groth and Samson's *audio paper* is problematic, rather that the following chapter does not entirely fit the description[1]. Because of its conception, another engagement with the written text could be taken. Much shorter, much looser in its narrative style. But also inviting the mythical figure of the nymph Echo. Her invocation drives the *thinking-with sounds*, not as metaphor or personification, not as representation, but as vector, as storytelling, as fictional force. In this, the *audio chapter* is also inspired by other forms of sociological narrations, creative practices at the heart of sociological writing processes[2].

Although the audio chapter works as an archive, another important aspect of *thinking-with sounds* is the engagement with others, the response-ability, the co-creation of a situation, an experience. Reminding Sha's description of technologies of representation and of performance, the question thus arising is to which extent this particular form of presenting knowledge — i.e. the audio paper/audio chapter — could be also become an instrument of knowledge production in itself. In other words, beyond representation, can they become a technology of performance? Can interactivity and generativity be implemented in a way that does not reduce the audio chapter to a recording, and if yes, how?

From this question came the possibility to present a more or less »responsive« audio chapter, where the listener/receiver would be acting as co-composer, co-creator of the experience. Indeed, if the experiments presented in chapter 5 show a multiplicity of actors and of modes

1 Groth and Samson show very well the generativity of the audio paper in its »live« presentation, which resonates with Schulze's understanding of sonic thinking (Schulze, 2018).

2 Examples of such narrative experiments are presented in the Australian sociological zine *SOFIZINE*. https://sofizine.com/about/

of knowledge production in their particular settings, in their audio representations, they are merely that, representations where the listener's agency appears quite limited. Or at least, the distribution of this agency is clearly defined. A listener receiving an object, a product created by the »composer«, »producer«, »researcher«, in an *a priori* defined sequence. Speech, performance, alternative storytellings can of course propose a different engagement, and move, produce new subjectivities, but can this distribution be expanded, worked upon, remodelled? Is it possible to conceive an audio chapter without this *a priori* fixated linearity so that it itself could become an »ethical object« (van Loon, 2012)? An assemblage of blocks, tools, moments, that can be re-organised by the one listening/reading it? Where each experiment performed and recorded, where the text written down could be re-arranged, building each time another chapter, an »open work« (Magnusson, 2019)[3]? An invitation to take part in the process rather than consuming a finished and stable object. In other words, by proposing to co-arrange the events, field recordings, re-creation of *Échos de la pierre* and *ethical_machines*, by building a narration that can be re-organised, could it »feed back« into the process of *thinking-with sounds*?

Two possible approaches could be taken, in order to implement this interactivity. On the one hand, building a program allowing the reader/listener to change the order of sequencing, as well as parameters within the »blocks« composing the sequence. This possibility would come the closest to a *technology of performance*, where the distinction between producer/consumer is re-arranged and the co-creation of the event becomes central (Sha, 2013). This departs from the *audio paper* to build a »responsive« multimedia environment. However, because this chapter is a recollection of past events, and already performed experiments, this co-creation would have been artificially re-created

3 Magnusson, who reflects on the »open work, directly referring to Umberto Eco's eponymous book, mostly focuses on musical notation. However, his argument can be expanded to other types of notation and storytelling, as his references to Deleuze and Guattari's own narrative experiments in *Mille Plateaux* would indicate.

without actually having an effect on the experiment itself. Moreover, the archiving sense, as well as the proposed argumentation, being subjected to change, would not come across, being constantly remodelled[4]. In an unexpected return, Ong's (2002) understanding of the text and its immutability as »truth telling« (or at least as scientific argumentation which nevertheless requires a leap of faith) is also sneaking back, wherein the »open work« seems quite contradictory. How can one present a thesis if it is being entirely reshaped upon its reading? This does not mean that interactivity must be discarded altogether. Indeed, on the other hand, the *audio chapter* can be thought of as an installation/exposition of materials. Although coming closer to technologies of representation, i.e. with limited interaction possibilities, the exposition allows for a partial co-construction of the narration. If the experiments are presented as fixed »results«, the navigation between them is free and non-fixated, allowing for a variety of sequencings, just like when navigating an exposition at a museum. A compromise which, following Groth and Samson, does not strip away the generativity of a knowledge presented in such a way. Each navigation between »rooms« or »pages« are therefore also part of the thinking|doing process at the heart of a *thinking-with sounds*[5]. Moreover, the very practice of reading and listening is not a passive reception. There is already a co-prehension.

The installation/exposition as an open website can therefore work as *anarchive*, giving the possibility of »feed forwarding«, which is central to research-creation (Manning & Massumi, 2014). This organisation — although limited in its possibilities for engagement — still allows for repetition and difference, for various and singular samples of the sonic flux, from which the personality and intent of the composer

4 This also asks another question, which is defining but not in the scope of this work: the notion of authorship and »intellectual property«, which needs to be rethought in the conception of such a work

5 The building of an interactive environment with much more possible entanglements is not completely discarded however. Going beyond the scope of this work, it still remains a possible and fruitful engagement with a *thinking-with sounds*, which will be pursued.

as »one and only« could be strongly diminished, rather emphasizing on the possibles and the multiple. The exposition, although relatively static, presents potentialities of engagement, of movement, of change. At least more than through fixating the performance to a single audio file, in which the linearity would have been too powerful, the tools used reduced to representation, without any reflection on how agency is being distributed. Through this »assemblage«, a certain dimension of openness is kept, in how to read and listen to the chapter. From a fixed sound object without many potentialities, the chapter regains some fragility, virtualities, potentials of further individuations. It is a possibility to present the work done in audio form, to organise it around a particular but non-exclusive narration, to step back without stepping away.

Implying response-ability, interactivity and engagement also means to reflect on the possibility to change things, to work beyond the listening/reading, to continue the *thinking-with sounds*. Proposing an open website forces me to perform in collaboration with a system and to reflect on my own situatedness. It forces me to engage with it carefully, rather than to propose a finished product, an audio black box where too much of that »gatekeeping« would have been at play, too much knowledge retained. Even if sound sounds, knowledge would have remained silent. Consequently, it was important that no barriers (or as few as possible) were preventing from using this *audio chapter* and possibly build upon it. Therefore, for the sake of clarity and ease of use, I decided to embed it temporarily into a set of web pages (hosted on a personal domain). This allowed me to build a rather simple (quite minimalistic) interface, allowing to easily build an assemblage of multiple media formats and texts. The pages are therefore easy to access and to use, hopefully avoiding any kind of »expert« knowledge-keeping. Moreover, the interactivity does not stop at the consumption of the audio chapter, but should keep the possibility of »feed-forwarding«. To do so, every experiment featured in the chapter is also kept open. For each one, a very small »score« loosely represents how the experiment works — as an invitation rather than indication. A list of the equipment used (and/or alternatives) is provided as well as links to each software, which are

all free and open source. In addition, all files, programs and patches I used for the experiments and recordings are also available to download and free to use, with all their mistakes and inaccuracies. Only through this openness can the iterative and generative character of *thinking-with sounds* be pursued, beyond my own contribution.

You can access the audio chapter by scanning the QR-Code below:

Conclusion

Not a book about sound

Sound Formations is not a work about sound. It is not a work about the »formation« of sound, even if it deals with sound as »in-formation«. It is a work made with sound and through sound. It has been proposed as a »thinking|doing« within which sounding and listening are as generative as the practices of reading, thinking, writing, observing, analysing etc. It is a work of sociology, and about sociology as experimental practice, as »research« (Latour, 1999). In the fashion of Callon's sociology of translations, I started with a simple but still valid controversy that motivated the work: the alienation of knowledge from its materiality. I argued that through a combination of new materialisms, speculative philosophy, radical empiricism and sonic thinking, other modalities of knowledge production could be pursued, modalities which intensify the importance of experience, and which consider knowledge production itself as a very material practice thus challenging the hegemony of practices deemed »scientific« in spite of others, denied and declassed. As a possible (but not exclusive) path to follow, I argued that practices of sounding and listening could play a central part in this venture, not only in their scientific character, either illustrative (data sonification) or as a tool for inquiry, but in the very aesthetic force and potentials of the sonic flux questioning the subject/object and nature/culture dualisms. Not as the symbol for a regained materiality, i.e. the materiality of sound moving bodies, against the immaterial knowledge kept silent in (quite material) books, but as a vector of production itself inviting a

multiplicity of actors. Sonic thinking not as metaphor but as research practice in sociology.

To do so, a particular posture more than an overview of methods has been introduced and developed. A posture that acknowledges situatedness, but also the need for engaging with other modes of knowledge production: a political and ecological urgency that should not only be addressed within sociology, itself remaining an object of inquiry, but as what moves the researcher and is of undeniable importance. Matters of concern at the heart of what it is that sociologists do. It is a critical posture infusing in practices of »doing sociology« to which the aesthetic play also becomes central as thinking-with sounds. Sociology as Empiraterei, as ethico-aesthetic, as sonic thinking. In this, *Sound Formations* is a proposition, a combination of philosophical thought, sociological theory and aesthetic practices merging into something else, something not yet defined. An entanglement of thinking|doing, an intensification of experience through the sensible. It surely is an epistemological questioning of research practices, but beyond that, it is a way of becoming with that is critical and radical. The alienation of knowledge from materiality is also an alienation of knowledges struggling for legitimacy, and of bodies producing and conveying those knowledges. The alienation of the discarded, the displaced, the undocumented, the objectified bodies disappearing at borders. But also the alienation of non-human bodies, terrestrian, earthlings and critters, kept silent. Thinking-with sounds is a thinking-with others. The few sounding experiments conducted throughout this project, in all their imperfections, might at least show this: the multiplicity of actors involved. Impacts creating contacts, remodelling experience and inviting to slow down and be careful. A process made of trials and errors, still in becoming, in formation.

Bringing back magic

Thinking-with sounds, in what it sets into motion, in the sonic activation of space, in its intimate shaping of experience, is therefore *magical*. Not a mystical occult conjuration, however. Not only a return to the original

magical phase either, of which a glimpse through the aesthetic thought seems possible, a phase of »unity« in the sense of Simondon, where no a priori distinction between subjects and objects had been made. It is in its combinatory exploration that *thinking-with sounds* is magical, an alchemy not seeking transmutation as *solve et coagula*, but co-creation, playing with a magma of intensities between philosophy, science and art. It takes seriously the enchantment »of the world«, not in the sense of Weber, i.e. as something left behind, only meant in its denial: enchantment as what Modernity extinguished, disenchantment. Instead, it is here meant in the sense of Jane Bennett (2001, 2010), as something to look for, to listen for, to compose with, not only in the mystical and natural ideal of an archaic fairy world, but also in the technical and the scientific. Enchantment in the vibrant materiality of the reality we are plunged into.

In other words, the magical is here also a question of knowledge, of how it is being constructed, but also how it is being presented and performed. Somehow resonating with Sha's »exercise of philosophy in the mode of art« (Sha, 2013, p. 1). Consequently, if indeed — as Vinciane Despret shows — knowledge is to be understood as an addition to reality rather than an explanation, every experiment, every bit of knowledge production might be considered as magical, a speculative moment of proposing other narratives and various versions of the world. A thickening, an addition to the real. Through aesthetic thought and research. A way of bringing other actors to speak and sound, to shift and to impact on our experience of the real, to co-create »alternate worlds« (Debaise, 2015b). As Haraway puts it, a way to stay with the trouble: SF as speculative fabulation, science fiction, speculative feminism, *sonic fiction*, *sound formations*. *Thinking-with sounds* as theory making, an already generative incantation not necessarily subjected to the written explanation. Or rather, conceiving writing itself as becoming, part of the process, as a generative sonic fiction (Schulze and Kodwo Eshun) as speculative fiction (Haraway thinking-with Ursula Le Guin).

Sociology to come?

Thinking-with sounds as a magical practice, an ethico-aesthetic ecosophical engagement. A very personal and defining conviction moving the writing and sounding composing this work, gathered as a collection of impacts moving me, and also moving back through recoil and feedback. It is not the delivering of something better, a solution »clé en main« to explain and comprehend the world, but an experiment, a genuine *what if*, en somme.

In his new book *La musique à venir* (2020), the composer and director of the *Groupe de Recherches Musicales* (founded in 1958 by Pierre Schaeffer) François Bonnet also proposes to think about possibles. In his case, he asks what the music to come might be. Beyond tools and territories, music might still not have yet become, or rather is still becoming. Positioned at the threshold of meta-stability, on the verge of saturation, Bonnet speculates onto which paths new individuations of music, of the sonic flux, will set us? An uncertainty, an unsettling not-yet. Isn't it already what it is, when one wishes to stay with the trouble? Attentive and careful about what is to come? Reflecting on the »could have been«, but not because of a nostalgic deception, desperation. An openness rather, to what is unsaid and undone. Isn't it what Haraway also calls for when she asks us to be response-able: a careful look at what is becoming, beyond our own experience and existence, but in the multiplicity of actors entangled?

Echoing Bonnet's question, I feel drawn to also ask myself what the sociologies to come might look like, possibly even to consider *Sound Formations* as an analogous proposition to Bonnet's manifesto: sociology is itself yet to come, itself still becoming. *Thinking-with sounds* as sociological practice might therefore only be that: a reflection on its own individuation, a speculative ad-venture in what it might mean to do sociology. I believe this is already of value. I ended the first chapter by stating that without those questions, without those thoughts to think-with — and even though they might often aim beyond sociological practice as a »day job« and move towards more personal inclinations — I could not »do« sociology seriously. At this point, now closing this work, I am convinced

that this reflection was necessary, itself working as an impact. It made me consider what I do under a quite different light, feeling that *thinking-with sounds* might lead, seriously and within the trouble, to a very playful sociology. An opening.

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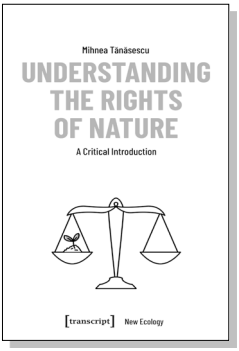

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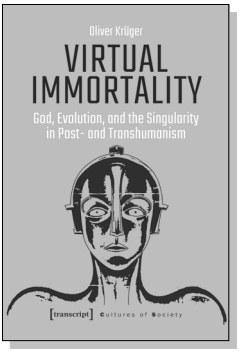

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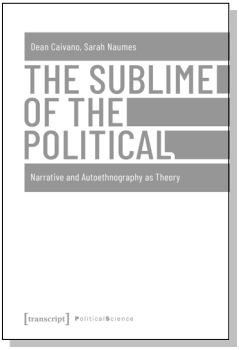

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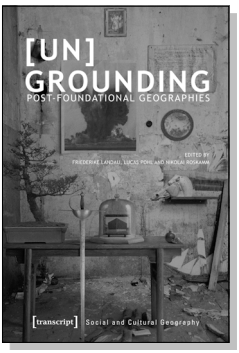

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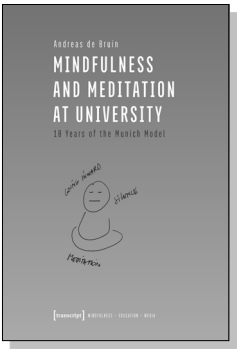

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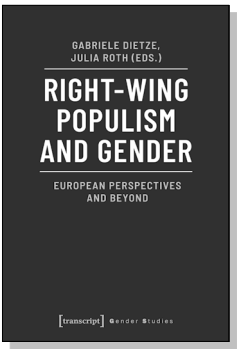

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