Wittgenstein's Philosophical Method: Towards a New Understanding of Philosophy of Science

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by

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"The language of science is a language under stress. Words are being made to describe things that seem indescribable in words – equations, chemical structures and so forth. Words do not, cannot mean all that they stand for, yet they are all we have to describe experience. By being a natural language under tension, the language of science is inherently poetic. There is metaphor aplenty in science."

Roald Hoffmann, 1981 Nobel Prize in Chemistry

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Abstract

This thesis explores the relationship between philosophy of science and Wittgenstein's philosophical method. It aims to answer the question: *Is there a philosophy of science in Wittgenstein's philosophical method*? It is concluded that such a connection exists and that this is supported by direct philosophical remarks by Wittgenstein.

A central challenge faced by philosophy of science as field, is its perceived detachment from scientific practice and the limitations of philosophical analysis of scientific concepts. By focusing on philosophy of science from a meta-philosophical perspective, the field can be linked to Wittgenstein and his philosophical method, which is defined by conceptual analysis.

Recent publications of conversations with Rush Rhees provide several direct remarks by Wittgenstein on the relationship between philosophy and science. Contrary to interpretations suggesting that Wittgenstein completely separates philosophy and science, I argue that his remarks to Rush Rhees suggest the fields can be related in accordance with Wittgenstein's philosophical method.

This thesis is structured as follows: firstly, issues pertaining to philosophy of science are related to Wittgenstein's philosophical method. Thereafter I set out what characterizes his method. Subsequently I analyze his explicit remarks on the topic from conversations with Rush Rhees, complemented by various other remarks by Wittgenstein on this subject. I identify two types of connections from these remarks, which are dealt with in two chapters: conceptual analysis as tool for the scientist and philosophically understanding science as activity.

Keywords: Ludwig Wittgenstein, Philosophy of Science, Philosophical Method

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Acknowledgements

During the writing of my thesis I found myself time and again lost on an adventure in the mind of Ludwig Wittgenstein, perhaps the brightest person that ever lived and writing about him, made the conception of this thesis both hard and interesting. Ideas and thoughts that appear so clearly in the mind may suddenly lose all clarity as soon as these are expressed in words and sentences. It certainly feels strange that I, and with me many others, study a philosopher and still have so much trouble of truly grasping his method of doing philosophy. Nevertheless, I strongly feel that the (dis)solution to the problem of life is to be found hidden deep down in the writings of Ludwig Wittgenstein.

I would like to express my gratitude to the people whom I'm greatly indebted to for their support. Firstly, my loving family and close friends who have always supported me and whom I've bothered with bits and pieces of philosophical chatter. In particular I would like to thank Anna and Isi for aiding me through their advice, hospitality and support. Secondly, my lecturers in philosophy over the years and in particular my supervisor Dr. Maria van der Schaar. The conception of this thesis wasn't always an easy, nor streamlined process, but I hope that the final product slightly makes up for it.

I always found it amusing how Wittgenstein's and my academic paths overlapped, venturing from engineering to philosophy. After this thesis, I too will leave academia behind. I won't, however, be a teacher (I would likely not be very good at it like someone familiar) and its probably for the best Wittgenstein didn't start a career in public policy like I'm planning for now. I'm not sure I will ever go back to academic philosophy, but I'll certainly never stop philosophizing!

I - Introduction

The subject of this thesis is the relation between Wittgenstein's philosophical method and philosophy of science. The central question that I aim to answer is: *Is there a philosophy of science in Wittgenstein's philosophical method?* I advance in this thesis that Wittgenstein's method allows for a connection to philosophy of science, leading to a new understanding of the latter. In this introduction I explain the rationale for this thesis, list the key questions that guide this investigation and outline its structure. I conclude with comments on the sources that I used and the academic framework of this research.

Wittgenstein's philosophy and philosophy of science do not appear to have a clear-cut connection for multiple reasons. Firstly, Wittgenstein refers to the sciences sparingly, especially in later writings. He even explicitly noted his personal disinterest in them (CV 79)[1]. Secondly, when Wittgenstein does refer to science, he is often focused on disassociating the philosophical method and the scientific method, for example by criticizing the influence of the latter on the mindset of contemporary philosophers and society (BB p18; Child 2017, 1-5). Thirdly, after presenting a line of thought in the *Tractatus*[2], that can retrospectively be considered as philosophy of science, he rejected general philosophical claims throughout his later philosophy as they appear to conflict with his philosophical method (PI 131). Finally, Wittgenstein consistently maintained a clear distinction between science and philosophy (TLP 4.111; PI 109), rooted in the linguistic approach to philosophy that Wittgenstein developed throughout his life.

These points suggest that a traditional conception of philosophy of science – one that seeks to define science or provide a theoretical underpinning of science – falls outside the scope of Wittgenstein's philosophy, particularly given his anti-metaphysical stance. This means that the idea of philosophy *of science* as a philosophical inquiry into science could be considered as an inherently misguided approach in Wittgenstein's philosophy. Contrary to this interpretation, this thesis aims to describe a direct relation between Wittgenstein's method and philosophy of science, demanding a rethinking of the latter. I

[1] In this thesis works by Wittgenstein are cited parenthetically and in abbreviated form. See the bibliography for an overview of used editions, translations and abbreviations.

[2] An application of the Tractarian logic of language to propositions of natural science is described concisely in a number of 'sixes' in the *Tractatus* (TLP 6.343, 6.36, 6.363), however the meaning of these statements is subject to interpretational debate given TLP 6.53, 6.54, 7 and will be discussed in chapter II, III and VI.

argue that Wittgenstein's philosophy allows for a direct relation between philosophy of science and philosophy, however, this requires an unorthodox notion of philosophy of science. I support this approach using two elements: Wittgenstein's consistent philosophical method and Wittgenstein's scattered yet significant comments on science throughout his works.

The key source for this thesis is a recently published account by pupil Rush Rhees recording a conversation with Wittgenstein on the relation between science and philosophy (CRR p35-39). This account can be considered extensive compared to Wittgenstein's other remarks on the subject and its analysis forms the central constituent of my argument. In addition to reiterating the ways science and philosophy are not related, Wittgenstein firstly remarks that in a particular way philosophy can be of use to the scientist and secondly that science can be apprehended philosophically to find out "what sort of activity it is". These remarks provide first-hand evidence of a connection between Wittgenstein's philosophical method and his views of science and serve as basis for this thesis, further supported by related remarks. Additionally, I built my argument on the premise that Wittgenstein's philosophy entails a method that shows a degree of consistency throughout his philosophical development (Koethe 1996; Kuusela 2011; Conant 2012; Wyss 2015). This approach enables me to draw from remarks on science from all periods of Wittgenstein's life; remarks that, like his method, demonstrate a notable degree of consistency as I will show throughout this thesis.

In order to attain the objectives of this thesis and answer the central question, I answer the following sub-questions:

- What is the 'classic' conception of philosophy of science and why is it incompatible with Wittgenstein's philosophy?
- What is Wittgenstein's philosophical method?
- How should Wittgenstein's explicit remarks, particularly those from conversations with Rush Rhees, on the relation between philosophy and science be interpreted.
- How is philosophy of use to scientists according to Wittgenstein?
- How can one philosophically understand what sort of activity science is without relying on metaphysics?

In order to answer the sub-questions, this research has been divided into seven chapters, which will collectively substantiate my thesis. I begin by delving deeper in the Wittgensteinian issues with philosophy of science as it is traditionally approached (II). Next I discuss the main pillars of Wittgenstein's philosophical method and comment on consistencies throughout his philosophical development (III). Thereafter, I analyze the conversation with Rush Rhees on the relation between science and philosophy and connect its content with other instances where Wittgenstein refers to science (IV). Using these remarks and drawing on the nature of Wittgenstein's method, I expand upon two links found in the previous chapter. I discuss how philosophy can be of use to the scientist, incorporating his methodological relationship to Heinrich Hertz (V) and investigate how science can be understood as activity from a philosophical viewpoint (VI). Finally, I accumulate these insights and return to the research question and research goals (VII).

An underlying theme of this thesis is that most mainstream conceptions of philosophy of science involve questions that are misaligned with Wittgenstein's method. These types of questions necessitate a metaphysical analysis for providing an answer, including: attempts to present a clear definition of science; strictly delineate its boundaries; establish a universally applicable method or model for scientific inquiry; or conduct an ontological investigation into elements such as laws of nature, scientific theories or unobservable entities. Particularly the assumption that philosophical analysis may extend our knowledge of science or elements from science, thereby operating on the edge of scientific discovery and anticipating questions that science cannot yet answer, implies a form of metaphysical inquiry that Wittgenstein rejects. I do not claim these are currently the only approaches to philosophy of science; my aim is rather to challenge these prevalent ideas using Wittgenstein's philosophical method. I seek to demonstrate how Wittgenstein's method, characterized by its focus on linguistics and conceptual analysis, offers a distinct way for philosophy to engage with science, without resorting to metaphysical speculation. Therefore, I link Wittgenstein's method with 'philosophy of science' as a whole. The question is whether a Wittgensteinian approach offers a robust alternative to traditional metaphysical inquiries in philosophy of science. Can philosophical questions about science be reframed in terms of linguistic analysis and

conceptual clarification as his remarks to Rush Rhees seem to suggest? In other words, does a strictly non-metaphysical philosophy of science exist.

The scope of this thesis is not limited to a particular period of Wittgenstein's writings. As Stern (2013) describes, there is at this point a manifold of Wittgenstein-conceptions, ranging from early to post-late, which form various combinations in terms of continuity. I adopt the generally accepted notion that there is at least an element of consistency throughout his writings in relation to his philosophical method, which transcends traditional divisions of Wittgenstein's writings. Consequently, I don't a priori commit to one reading of Wittgenstein and I don't limit my analysis to a particular period.

The main primary sources of Wittgenstein that are consulted in this thesis are the *Tractatus Logico-Philosophicus (Tractatus)*, the *Philosophical investigations (Investigations)* and *On Certainty.* Furthermore, several additional sources that originate from written material from Wittgenstein himself are inspected: *The Blue and Brown books, the Big Typescript* and *Zettel.* A crucial first-hand account of conversations with Wittgenstein's by Rush Rhees is used. In addition, Heinrich Hertz' work *The Principles of Mechanics presented in a New Form (Principles)* is consulted, as it had a significant influence on Wittgenstein.

Over recent years, the relation between Wittgenstein's philosophy and science has attracted modest interest from the philosophical community (Pears 1995; Caruana 2003; Tejedor 2014, 2020; Klagge 2017; Hutto and Satne 2018; Smith 2018). A different, more specific link, that has been researched in parallel is the relation between Wittgenstein and philosophical writings of Hertz and Boltzmann (Grasshoff 1998; Visser 1999; Janik 2001; Kjaergaard 2002; Preston 2008, 2016). It should be noted that when one looks at Wittgenstein's influence on philosophy of science in a broader perspective, there are many major philosophers of science of many different schools that implicitly or explicitly are substantially influenced by Wittgenstein. Examples are the writings of Carnap, Schlick, Kuhn, Feyerabend and Quine (Kindi 2017). However, an in-depth analysis that incorporates these indirect manifestations in philosophy of science falls outside the scope of this research. I focus on the direct relation between Wittgenstein's philosophical method and philosophy of science and thereby stay as close as possible to Wittgenstein's own remarks.

II - Philosophy of science; why invoke Wittgenstein?

Philosophy of science is not a prominent theme in Wittgenstein's writings. This is not only because this specific terminology wasn't yet universally established at the time, but also because the nature of his inquiries didn't address issues that are typically associated with philosophy of science. The clearest interaction is Wittgenstein's rejection of scientism, the idea that philosophy should emulate the scientific method. However, this does not necessarily mean that Wittgenstein's philosophy was antiscientific, a common allegation concerning his later works. In this chapter I argue that, although there is a lack of direct connection to issues in philosophy of science, Wittgenstein's philosophy links to it when the field is approached from a meta-philosophical perspective. Therefore, this analysis doesn't address traditional issues from within the philosophy of science but relates to the discipline as a whole. I firstly introduce philosophy of science, then provide a rudimentary summary of Wittgenstein's relationship to science and finally explain why philosophical difficulties concerning philosophy of science can be addressed from a Wittgensteinian perspective.

Philosophy of science

Philosophy of science can be pragmatically defined as a field that seeks to understand the underpinnings of science on a general level, as well as to understand elements that play a role within the sciences. It is "the application of philosophical methods to philosophical problems as they arise in the context of the sciences" (Hitchcock 2004, 1); a sound description, but one that leaves open which type of philosophical problems arise in the context of the sciences. Traditionally these are questions that relate to the scientific method, scientific knowledge and the nature of scientific discoveries. In essence philosophy of science therefore combines epistemology and metaphysics (Ladyman 2012, 5-8). This is because science is meant to provide us with knowledge that is not arbitrary, but thoroughly scrutinized, systematic and of a fundamental kind, aiming for truth or an approximation of it. This 'scientific' knowledge is obtained following replicable rules, methods or procedures. The investigation of these systematic procedures is epistemic by nature. However, philosophy of science extends beyond addressing epistemic concerns, as the products of science extend beyond factual knowledge. It also

desires to explain abstract concepts and structures, such as unobservable entities, theories or laws of nature. The understanding of these from a philosophical point of view crosses into metaphysics. While modern physics may be regarded as having supplanted metaphysics, philosophers can argue that physics inherently involves metaphysical considerations. While the boundaries between physics and metaphysics have shifted over time, questions about laws of nature or causation are seen as overarching those posed in physics. This means modern philosophy of science has evolved partially alongside scientific advancements, since new disciplines and discoveries introduce new methodological questions and conceptual problems. Nevertheless, fundamental questions about science in isolation appear to remain the same, regardless of developments in the sciences themselves. These epistemic and metaphysical questions involve our desire to understand the success of 'science' on a general level. These include attempts to find a clear definition (*What constitutes scientific knowledge and what does not?);* to understand its progress (*What is the universal theory or model of scientific advancement?);* or to describe its underlying principles *(How do causal processes work?* or *What are laws of nature?).*

Not only conceptually, but also throughout history philosophy of science undertook various shifts in scope and philosophical underpinnings. Science and philosophy, particular metaphysics, were more intertwined in the past than they are now. Natural philosophers blended philosophy and what became later known as science. With the rise of analytic philosophy and the parallel development - and success - of science as empirical endeavor, the fields became more clearly separated, particularly from a methodological perspective. In practice this meant science was performed less with the involvement of philosophical considerations. Nevertheless, science remained a topic of interest for philosophers and it has been explored from many different angles within the analytic sphere. The first half of the 20th century saw philosophers, inspired by its success, attempting to make science a central constituent of their philosophy. Philosophers such as Russell, those of the Vienna Kreis or Popper focalized on the complementary relation of the two, emphasizing formal language or logic. The 1960's were marked by the significant historical turn in philosophy of science, as Thomas Kuhn (1962) showed the mismatch between idealized models of science and the actual development of scientific discoveries. Subsequently, Kuhn and philosophers that followed, such as Feyerabend,

accentuated the influence of social structures and practices on scientific knowledge and its acquirement. Over the last decades the attention of philosophers of science ventured to other debates outside the search for a model of scientific progress (Psillos & Curd 2008, xxv), with examples like the realism-antirealism debate, which reinvigorated the empirical movement, Bayesian analysis and the role of society, values and ethics in scientific practice.

This all but comprehensive outline of philosophy of science is meant to show that neither from a conceptual, nor from a historical viewpoint a uniform notion of 'philosophy of science' exists. There are differing perceptions of what its scope should be, or which questions should be asked. Particularly noteworthy is the historical shift, in which Kuhn showed the need to incorporate actual scientific history and move away from purely theoretical, perpetual and all-encompassing frameworks of the 'ideal science'. Nevertheless, Kuhn too presented his own framework of scientific progress. The question I ask is on what basis general aspects of science are up to the philosopher to analyze? The answer relates to the possibilities of interplay between philosophy and science, which depends on philosophical method. In the last paragraph of this chapter I elaborate on this thought, but first I relate Wittgenstein to philosophy of science.

Science and scientism in Wittgenstein's philosophy

Wittgenstein, both in his early and late phases, is not often directly associated with philosophy of science and certainly not considered a philosopher of science; not once does he mention the phrase 'philosophy of science' throughout the *Notebooks*, *Tractatus*, *Blue and Brown Books*, *Investigations* or *On Certainty.* Although this particular phrasing wasn't customary until after his early period, it is telling, because philosophy of science as field appears to be unfitting of Wittgenstein's thought.

Throughout his early and later writings Wittgenstein makes clear how the relation between science and philosophy should not be seen, arguing that philosophy must never emulate science in terms of method or try to analyze propositions of science[3]. One could even infer from Wittgenstein's attempts to separate philosophy and science in terms of

[3]"Philosophy is not one of the natural sciences" (TLP 4.111, PI 109); "(…) propositions of natural science—i.e. something that has nothing to do with philosophy" (TLP 6.53); "Philosophers constantly see the method of science before their eyes, and are irresistibly tempted to ask and answer questions in the way science does" (BB p18).

method, that Wittgenstein did not hold science in high esteem or adhered to a philosophy that is dismissive of scientific analysis. However, the relation between Wittgenstein and science is more intricate. Wittgenstein started as engineering student, thereby likely becoming acquainted with the scientific method early on. Wittgenstein later became critical of what he perceived as an overly 'scientist' worldview, both from a philosophical and personal viewpoint. In light of remarks (CV 26) during his later period he came to be seen by some in the philosophical world as possessing an anti-scientific worldview. However, it should be stressed that his personal dislike of the 'worship' (LC 27) of science by contemporary philosophers should not be confused with a strictly anti-scientific philosophical position (Glock 2016, 239-241). Wittgenstein's philosophical target was scientism: Philosophy should not in any way emulate science, meaning the philosophical and scientific method are fundamentally different. This stands in stark contrast with various other philosophers. For instance, his mentor Russell envisioned a common methodology for science and philosophy (Irvine 2022), many members of the Vienna Kreis adhered to logical empiricism, using formal logic as basis for scientific methodology, and the more recent naturalism of Quine builds upon a connection between the methods of science and philosophy.

The philosophical attitude of Wittgenstein regarding the sciences should not be seen as acrimonious or indifference, as Wittgenstein did not completely ignore the sciences philosophically. The natural sciences are referred to a number of times in his writings, albeit sparsely and in different contexts. The work where references to science are most prominently included is the *Tractatus,* mainly in the 'sixes'[4]. The *Tractatus* is not an isolated case; references to science persistently show up, from the early *Notebooks* all the way up to the late *On Certainty,* often as examples or metaphors (NB 51; BB 47-48; PI 259; PI 269; OC 169-170; 300-309). This constitutes an interesting tendency since it may indicate that the sciences continuously were a frame of reference to Wittgenstein, not necessarily to philosophize about, but rather to juxtapose his philosophical statements against. Evidently, having strong anti-scientism standpoints doesn't exclude one from using examples from the sciences in a philosophical discourse. The question is whether

[4] See (TLP 6.3) and all subsidiaries. As these belong to one of the more questionable parts of the *Tractatus*, particularly in relation to philosophical method, I will touch upon these again in chapter III.

this use of scientific examples, being tools within his philosophical argument building, can be analyzed as disguised philosophical contemplations on science.

From a historical viewpoint Wittgenstein has evident ties to philosophers of science, which drew inspiration from his works in two distinct waves (Kindi 2016). First, empirical positivists from the Wiener Kreis in the early 20's, such as Carnap or Schlick, who were greatly inspired by the *Tractatus* and later, methodological relativists such as Kuhn or Feyerabend, that drew from the *Investigations*. However, it should be noted that these connections are one-sided[5] and Wittgenstein's philosophy and the aforementioned schools of philosophy of science are separated by a layer of interpretation. A reverse connection also exists; namely physicists-turned-philosophers Heinrich Hertz and Ludwig Boltzmann, by whose works Wittgenstein himself was inspired. Wittgenstein originally studied mechanical engineering; Hertz and Boltzmann were amongst the earliest influences on Wittgenstein (Monk 1990, 26). This is important, since they were physicists that produced not only scientific ideas, but also provided philosophical commentary on these ideas, in which Wittgenstein took an interest. The particular case of Hertz is discussed in greater depth in chapter V.[6]

Wittgenstein's ideas gained traction all over the philosophical world, during his lifetime and beyond, and philosophers of science form no exception. Nevertheless, his philosophical approach, rejecting abstract and foundational questions about knowledge, doesn't match with the issues normally addressed in philosophy of science, which pertain to epistemic and metaphysical questions. Therefore, it is necessary to investigate how Wittgenstein's philosophy may be connected to philosophy of science.

The challenge of defining philosophy of science - a Wittgensteinian problem

Philosophy of science is not a clearly demarcated field, occupying a grey area between theoretical and practical philosophy. It pertains simultaneously to abstract philosophical concepts and actual results from scientific practice. A straightforward reason science attracts philosophical attention is because it is considered to hold a privileged status with respect to the acquirement of knowledge. However, the intermediary position between

[5] Wittgenstein generally disagreed with interpretations of the *Tractatus* by the Wiener Kreis, who saw it as proposing a rigid logical framework for any meaningful discourse, whereas Wittgenstein saw it as showing the limits of such a framework. As the *Investigations* were published postmortem there was no interaction between Wittgenstein and schools of thought that were influenced by it.

[6] For the connection between Boltzmann and Wittgenstein in this context see Visser (1999).

theory and practice creates philosophical unclarity in terms of what philosophy of science can achieve. What sort of knowledge or ideas can philosophical analysis add to what science itself produces? A general allegation, especially in relation to the natural sciences, is that philosophy of science is out of touch with science. Modern natural science functions effectively without metaphysical or epistemic contributions by philosophers that analyze their underpinnings or methodology and renowned scientists have criticized philosophy of science.[7] Their criticisms highlight the misunderstanding between the two disciplines, reflecting the expectation that philosophy of science is an extension to scientific practice. In this interpretation philosophy 'paves the way' for science, preceding scientific advancement; an approach that entails a metaphysical attitude towards philosophy of science, assuming it can contribute meaningful non-empirical knowledge. Philosophy of science is a subdivision of philosophy that is difficult to define, holding an ambiguous position between theoretical philosophy and science, a human practice. It is inherently different compared to fundamental disciplines such as epistemology, ontology or logic because the subjects of these fields: knowledge, being or reasoning, are philosophically profound concepts that embody a high degree of complexity and abstraction. And, although these concepts aren't or cannot be fully comprehended or explicitly defined, one is inclined to acknowledge their fundamentality. It is different with respect to science, a human endeavor which stands on a lower level of abstraction, and the study of which is dependent on the interpretation of aforementioned fundamental philosophical concepts.

Philosophy of science therefore pertains to other levels of inquiry: questions that are traditionally ascribed to philosophy of science presuppose a 'metaphilosophy of science'; a philosophical position regarding the general relation between science and philosophy. This is because a particular relation between science and philosophy needs to be established before one can philosophize over particular elements of science, as philosophers of science often do. This is not meant normatively – philosophers are not

[7] Nobel prize-winning physicist Richard Feynman allegedly said that philosophy of science is as useful to science as ornithology is to birds. Nobel prize-winning physicist Paul Dirac said that philosophy of science was "just a way of talking about discoveries that have already been made" (Farmelo 2009). Steven Hawking (2010) states: "philosophy has not kept up with modern developments in science, particularly physics". Nobel prize-winning physicist Steven Weinberg (1994) said: "I know of no one who has participated actively in the advance of physics in the postwar period whose research has been significantly helped by the work of philosophers".

prohibited to ask certain questions that pertain to science. However, by asking certain questions on the nature of science or scientific concepts, hidden philosophical assumptions are involved, most importantly the general relationship between science and philosophy. This relationship could be classified as philosophy of science but is not conceptually on the same level as a discussion within philosophy of science where the focal point is often a subject taken directly from the sciences.

The detachment of philosophy *of* science and science itself also signifies a point of friction. If the goal of philosophy of science is not to be useful for science, it seems odd that philosophy of science can provide additional knowledge on a subject that simultaneously doesn't require this knowledge. One could argue that philosophy simply operates on a theoretical level that is unrelated to scientific practice. Nevertheless, science is not a purely theoretical idea and problematic issues concerning philosophizing about science without regards for its history and practice are widely acknowledged since Kuhn's *Structure of scientific revolutions* (1962). The question is whether philosophers are warranted to search for meaningful insights about 'scientific knowledge' and the nature of scientific discoveries outside of what scientists themselves find in their respective disciplines. Scientists also theorize and generalize, and they also contemplate their own methodology. Even the nature of concepts such as laws of nature are not completely outside the scope of physics and are not ignored by scientists. How can science and theoretical philosophy meaningfully analyze the same elements?

Two meta-philosophical aspects of philosophy of science link to Wittgenstein's philosophy: first, the relationship between philosophy and science, and second, the role of philosophical method. The former determines the possible degree of continuity between philosophy and science. The latter determines what types of questions the philosopher can pose, in this case in the context of science. Therefore, the nature of inquiry in philosophy of science links to an overarching methodological discussion in philosophy, which is one that pits armchair metaphysics against therapeutic analysis. This is not a black and white discussion, as many intermediate positions exist (D'Oro & Overgaard 2017, 8), but many questions of philosophy of science appear to necessitate a metaphysical analysis. Thus, which questions can be asked in philosophy of science predicates on the relation between science and philosophy as well as on one's philosophical method. Wittgenstein's method is characterized as being therapeutic,

oriented towards conceptual analysis, and grounded in linguistics. In addition, as I previously noted, Wittgenstein held that his method is fundamentally different from the scientific method. The question that follows is whether any 'therapeutic' or non-metaphysical branch of philosophy can be involved in philosophy of science – in other words: does a non-metaphysical philosophy of science exist? And if so, what kind of conceptual questions could it address? Wittgenstein, being staunchly non-metaphysical, made some direct comments on these issues, which I discuss in chapter IV. However, in order to appreciate these accordingly, I firstly discuss Wittgenstein's method, because the nature of his method is complex and philosophical interpretations are disunified.

III - Wittgenstein's method

This chapter introduces Wittgenstein's philosophical method and discusses its development over time. Not only was Wittgenstein's method highly unique in comparison to both contemporary philosophers and modern academic philosophy, it was also one of the most consistent elements over his morphing philosophy. Wittgenstein himself regarded his method as an extremely important part of his overall contributions to philosophy (MWL 5:1, 5:2). I use the term philosophical method to refer to his overall conception of philosophy, the synthesis of his methodology and objectives. In this chapter the relevant elements of Wittgenstein's method are mapped in order to project these onto philosophy of science.

It is well established that against the backdrop of the development of analytic philosophy, Wittgenstein's method was radical on many levels, including its relation to science. Philosophy and science were often seen as closely connected enterprises. Initially, natural philosophers blended scientific and metaphysical investigations in search of knowledge of the natural world. In the Kantian tradition, philosophy allowed for synthetic a priori knowledge, where concepts functioned as a priori conditions for the possibility of scientific knowledge. In the 20th century, science and its rigid methodology, inspired many philosophers, such as logical empiricists, to adopt a scientific philosophy, drawing on the logical analysis of logical atomists and formalists to ground all knowledge in empirical verification. Wittgenstein on the other hand, wasn't concerned with producing knowledge, nor grounding it, which he emphasized throughout his life: "My propositions are elucidatory" (TLP 6.54), "I want to say here that it can never be our job to reduce anything to anything, or to explain anything. Philosophy really is 'purely descriptive'" (BB p18), "In a sense philosophy is necessarily anti-scientific; because it is contemplative." (CRR p36), and "There must not be anything hypothetical in our considerations. All explanation must disappear, and description alone must take its place.*"* (PI 109). All these excerpts indicate a shift in philosophical focus, from a prescriptive and systematic style that involves abstract theory, towards a purely descriptive assessment of language. This led to a completely novel approach to what philosophy is and should achieve, including the absence of an intrinsic necessity to interact with or ground scientific knowledge.

Providing a concise description of Wittgenstein's method is not an easy task. Philosophical method is a meta-philosophical topic, but that does not mean that it can be analyzed in isolation from other constituents of philosophy. Glock (2016, 248-249) notes in his discussion of Wittgenstein's philosophical method that there is no such thing as a second-order meta-philosophical realm, meaning that a discussion regarding philosophical method is part of philosophy itself. One therefore has to interpret Wittgenstein's remarks on method while being aware of other parts of his philosophy. As I focus on Wittgenstein's complete body of work, I presume a degree of continuity, particularly regarding his method. My position aligns with the mild mono-Wittgensteinianism by Conant. Conant argues for three distinct elements of continuity in the works of Wittgenstein: aim, method and devils (Conant 2007, 66-71). These three elements represent the degree of coherency on three different levels. Firstly, philosophy can't pursue theories or a doctrine, but rather constitutes an activity. Secondly, there is consistency regarding the method by which clarification is achieved. Finally, Wittgenstein aims to overcome the obstacle of misinterpreting propositions in terms of meaning. Similar conclusions were also drawn by Kuusela (2011), who advocates a methodologically consistent conception of Wittgenstein's philosophy. I focus on the consistency of aforementioned elements of Wittgenstein's method as proposed by Conant, without attempting to resolve other issues in the resolute-ineffabilistic discussion[8].

From the earlier quotations of Wittgenstein, three key terms came to surface: descriptive, elucidatory and contemplative. They revolve all around the same vision on philosophy; eschewing the pursuit of theories, explanations or doctrines. I discuss three relevant aspects that I identified, which are all congruent elements of Wittgenstein's philosophical method. These are interconnected and not isolated qualities. However, they are not presented in a hierarchical order. Instead, my analysis can be viewed as a dissection of the contemplative-descriptive-elucidatory quality that Wittgenstein attributed to his philosophical thinking, separating it into more specific properties.

[8] See Bronzo (2012, 50-51)

Language and grammar

The *Tractatus* can be regarded as an investigation of the logic of language and its method is grounded in that process. In later Wittgenstein the all-encompassing logic of the language is replaced by the analysis of ordinary language in terms of its *grammar*, with ordinary language referring to its diverse uses across different contexts. *Grammar*, understood in a Wittgensteinian sense, designates a set of rules relating to the language game of a particular context or activity. A language game refers to the idea that the meaning of words is derived from context and practical use (PI 21, 22). Although Wittgenstein's method is grounded in linguistic analysis, the logical analysis of language in the *Tractatus* gives way to a purely dialectic method, centering on an analysis of grammar. The primary tool of philosophy is linguistic analysis, detecting misuse of language, the wrongful assignment of meaning, which brings about confusion. Language, by means of an analysis of *Grammar*, completely captures the realm of philosophy and the tools it has for conceptual analysis (TLP 6.53; PI 116). This can be seen as a Wittgensteinian adaptation of Hume's fork since the "analysis oscillates between natural science and grammar" (PI 392). Meaningful analysis is either done from within the realm of the natural sciences or as a form of linguistic evaluation. There is no room for another form that blends the two, because this would veer into metaphysical speculation (Z 358). There is no room to go beyond empirical or grammatical analysis by questioning or invoking hidden realities or entities that require the unearthing of non-empirical truths (BB p18; BT 320). The quote above from the *Investigations* is presented slightly in passing, however it is of great importance with respect to the topic of this discussion. This 'oscillation'[9] between natural science and grammar puts pressure on the space where philosophy of science operates, since it normally attempts to engage with both realms.

Clarity

The general impetus behind Wittgenstein's linguistic approach is to account for the 'bewitchment' of our language, the root of metaphysics. The keyword in this approach is *clarity.* Philosophy clarifies, not in the way that scientific theories or explanation can clarify how to understand some phenomenon or why something came to be, but to clarify in a very direct way the otherwise obfuscated meaning. Philosophy's task is to rearrange

[9] Wittgenstein also indicates this in *Zettel* (Z 438)

and clearly state what is known in order to show its intended use, eschewing any notion of advancement or theory-building (BT 92). The notion of clarity is closely connected to the act of questioning. For Wittgenstein not all questions were equal (Z 185, 590; OC 314, 315): many philosophical questions do not make sense, thereby criticizing the way philosophers ask questions in the way science does (BB p18). When philosophical questions are framed as if they were questions of science, one feels inclined to answer them, which is flawed from the outset. (TLP 4.003) This underscores the essence of clarification. Wittgenstein's response to illegitimate questions is the *dissolution* of them: attaining the insight that philosophical questions are grounded in a misunderstanding of the rules of language[10], rather than the absence of a piece of knowledge or theory.

Metaphysics as target

Wittgenstein's primary target was metaphysics (TLP 6.53; PI 116), and this is meant in an anticipatory way. The Wittgensteinian philosopher does not try to advance anything new, but rather awaits until a metaphysical claim is encountered. It is then the subsequent task of the philosopher to show that a mistake has been made, which on its own is philosophically an important and valuable exercise (BT 313). This is never a mistake within the confines of the factual, a dispute that could be settled by establishing an observation. The mistakes Wittgenstein speaks about are errors of meaning, or the absence of meaning. In early Wittgenstein this is attributed to a failure related to a misunderstanding of the logic of language and in later Wittgenstein to a failure related to misunderstanding the way ordinary language functions. Nonetheless, regardless of the systematic nature of early Wittgenstein, quietist themes like dissolving metaphysical confusion and blaming misunderstood language persist throughout his philosophical life.

In a nutshell: Wittgenstein analyzes language to bring clarity which leads to dissolving questions that tempt us to contemplate the metaphysical.

The development of Wittgenstein's philosophical method

One of the challenging elements of reading Wittgenstein is that he was not precise about his 'method' and how it changed throughout his life. As stated before, he attributed great

[10] In terms of its logic or its grammar, depending on the period.

importance to the development of a new philosophical method; almost akin to a Copernican revolution (though he didn't mean the shift from his 'old' thinking to his 'new' thinking). If one observes the way Wittgenstein describes his thoughts on this 'methodological' revolution or awakening they are quite consistent from the 'middle' Wittgenstein[11] onwards and already in the introduction to the *Tractatus* he clearly alludes to the dramatic shift in philosophy he expects the reader to undertake in order to be able to understand him. The challenge in assessing the development of his method is to understand his comments in the *Investigations: "*There is not a *single* philosophical method, though there are indeed methods, different therapies, as it were" (PI 133). I interpret this statement to mean that Wittgenstein highlights the multifaceted way of engaging in philosophy within different language games and forms of life, activities in which language games are played (PI 23), indicating there is not a single recipe for deconstructing a philosophical proposition, as the context and language that is used to present it greatly matter. In addition, there is reason to believe these passages in the *Investigations* (PI 130-133) should be read in contrast to the *Tractatus.* The "future regimentation of language" and "a preconception to which reality must correspond. (The dogmatism into which we fall so easily in doing philosophy.)" evidently are a commentary on the *Tractarian* method*.* This train of thought goes against those who wish to understand Wittgenstein as truly speaking here about a plurality of methods on a meta-philosophical level (Conant 2012, 640, 642). I argue this line of reasoning regresses into a semantical discussion about the word method, for I could call the combined 'methods' from (PI 133) the 'overarching' method of the *Investigations.* It is this conception of method, the overall approach to doing philosophy in the *Investigations* that stands on the same level as 'the right method of philosophy' in the *Tractatus* (TLP 6.53). This interpretation is supported by Wittgenstein's continuously informal usage of the word method throughout his writings (Kienzler 2016)[12]. The alleged generality and universality of the logic of language is dismissed in favor of a pluralistic approach with respect to his linguistic analysis. In his mature philosophy he strongly emphasized the use of examples (BB 125), or as he calls them, intermediate cases, (PI 122) instead of general statements (Savickey 2012, 543-546). However, this means his method has become more flexible

[11] Starting around 1930.
[12] See also (Wyss 2015, 22-24) for a discussion on the distinction between problem-oriented and overarching methods.

instead of a complete overhaul in all its aspects (Diamond 2004, 206-209). If one looks at the qualities of Wittgenstein's philosophical method multiple elements remain consistent throughout the transition from his early to late phase. Although the toolbox has expanded, the linguistic premise on which the Wittgensteinian method builds remains consistent. This is highlighted by the following excerpt of Wittgenstein:

> "It's like this. If you find your way out of a wood you may think that it is the only way out. Then you find another way out. But you might never have found it unless you had gone along the other way first. I should not be where I am now if I had not passed through what is expressed in the Tractatus."[13]

Even if Wittgenstein later deemed the Tractarian method of analyzing not the singular means of linguistic analysis or the definite expositing of the logic of language, he still believes there is merit to the essence of the Tractarian project. Its intention was never abandoned, rather its methodology was relaxed, and the scope was widened. Wittgenstein's method must therefore be understood in a liberal non-doctrinal fashion, defined by its overarching qualities, rather than distinct general instructions.

Wittgenstein's method and *Tractarian* philosophy of science

In exploring the possibilities of engagement between science and philosophy, I emphasize Wittgenstein's consistent method over the establishment of a direct connection between propositions of science and Wittgenstein's accounts of meaning, which unlike his method, fundamentally evolved throughout his development[14] (Bronzo 2012, 54). Despite his commitment against metaphysical speculation, Wittgenstein gives a type of metaphysical analysis of science in the *Tractatus,* which I can't disregard completely as it pertains so clearly to philosophy of science. An ineffabilistic reading of the *Tractatus* suggest the logic of language can be extended to our understanding of the propositions of science. This -in hindsight- limited conception of the use of language permitted the universal logical form to be reflected in propositions of science.

Based on this quality Wittgenstein presents a very concise philosophy of science in the 6.3's of the *Tractatus*. However, his exposition also belongs to a conflicting part of

[13] Wittgenstein - Public and Private Occasions (2003, 387)
[14] Unless one adheres to strong resolutism.

the *Tractatus*. The universal logical form of language hints at a uniform method for understanding propositions of science and thereby of reality, as true propositions of science may correspond to an objective reality (TLP 2.1, 4.01, 4.06), entailing a form of logical realism. This is blended with neo-Kantian elements (Caruana 2003, 589), reflected by the 'net metaphor' (TLP 6.341), which suggests scientific descriptions impose a framework on reality, organizing it rather than directly describing it. These types of statements appear to explicitly expound the general nature of science and have thus far-reaching implications for our understanding of science. However, as this interpretation is presented in the succinct *Tractarian* style, ambiguities remain. Firstly, Wittgenstein blends realist and antirealist notions, possibly in a contradicting fashion as scientific laws are hypotheses; they are contingent (6.3), yet logical propositions hold a necessary relationship with facts (4.06), suggesting a conflict between the 'sixes' and the earlier numbers of the *Tractatus.* In the *Tractatus* the applicability of scientific frameworks remains grounded in the logic of language and not in human cognition or mental faculties, which, in a strict neo-Kantian interpretation, would actively play a role in structuring experience. Secondly, understanding Wittgenstein's early philosophy of science is strongly dependent on how one interprets the *Tractatus*: either the propositions in *Tractatus 6.3* and subsidiaries are part of the senseless body of the *Tractatus*, meant to elucidate the functioning of language (TLP 6.371); or, they pose a genuine metaphysical interpretation of the natural sciences (TLP 6.34, 6.341) that links the logical syntax with an external reality, indirectly revealing certain aspects of it. I will not cover these issues further as purely *Tractarian* discussions fall outside the scope of this thesis.

The larger issue I wish to address, is that many of these 'sixes' appear to contradict the elucidatory nature of Wittgenstein's method. His statements explicitly engage with the limits of scientific language, as Wittgenstein provides prescriptive philosophical commentary on the nature of scientific propositions and their relationship to the world (TLP 6.3, 6.341, 6.37). As indicated earlier in this chapter, a congruent aspect of Wittgenstein's method was his target: metaphysics. When addressing science in the 'sixes' Wittgenstein appears to be troubled by certain metaphysical preconceptions relating to science. Wittgenstein was concerned with interpreting science in a way the realist-antirealist discussion was to be avoided altogether (Kjaergaard 2002, 138). He noted that science describes regularities, and that its most basic results such as laws of

nature don't explain (TLP 6.37), nor are these laws fundamental necessities (6.341). He realized that laws of nature are being misappropriated as *terminus* for knowledge (TLP 6.371, 6.372). Wittgenstein was occupied by the limits of knowledge and explanation, and how science may be bound within the empirical realm without the necessity of being grounded in a metaphysical framework. He challenged the notion that science grants privileged or direct knowledge of reality, for which philosophy of science should subsequently find an epistemic foundation. The logical framework Wittgenstein proposes in the *Tractatus*, considering his method and later remarks, led him ultimately to dogmatisms as well (PI 114; BT 101), as he disregards the contextual nature of meaning and proposes a rigid logical system that mirrors the structure of reality. This includes a sharp and formalized delineation between propositions of logic and empirical facts, which he later critiques (PI 131). Yet it is important to remark that these problems are reminiscent of the themes he addresses much later in *On Certainty,* suggesting the relation between science and philosophy in light of foundational problems of empirical knowledge occupied him over a large timespan. I will come back to this in chapter VI.

IV - Wittgenstein on the relation of science and philosophy

A challenge of Wittgensteinian analysis is that his method is mostly defined by second-tier qualities – scope, clarity, goal. What remains obscure is a clear and specific outline of how conceptual analysis is applied. Wittgenstein's later writings show many examples, but don't explicitly describe how a conceptual problem is solved from start to finish. However, a key property of conceptual analysis is that there is no one fits all algorithmic approach to (dis)solving conceptual problems, as the dissolvement is grounded in a change of attitude (OC 92) – seeing the question not as question anymore. Vagueness itself is a feature of Wittgenstein's method, possibly as a deliberate resistance to prescriptive models which are reminiscent of the scientific method (PI 65). The challenge is to reinforce how Wittgenstein's method, despite its complexity and lack of rigidness, is relevant to the analysis of science.

This chapter aims to assess Wittgenstein's direct remarks on the relation between science and philosophy. The lack of explicit descriptions of the philosophy-science relation leaves philosophers to speculate about the implicit consequences of his philosophy for science. This has led to a diverse group of diametrically opposed philosophers of science that all cite Wittgenstein as an influence in spite of Wittgenstein's congruent methodology (Kindi 2016, 599). The question is how Wittgenstein's method, as discussed in chapter III, allows for an interaction between science and philosophy. The hierarchical relation between science and philosophy in Wittgenstein is not particularly clear, despite them being on different levels: "The word "philosophy" must mean something which stands above or below, but not beside the natural sciences" (TLP 4.111). If it were clear what hierarchical relation philosophy and science have, their interdependence could be mapped. Thus, to better comprehend how Wittgenstein understood this relation, explicit remarks on this subject are required. As indicated in chapter II, Wittgenstein generally defines the relation of philosophy and science as a whole in an apophatic fashion, which leaves a gap in understanding, because knowing in what aspects science and philosophy are different only provides indirect clues on how to establish a positive relation.

A conversation with Rush Rhees and similar remarks

A key source for understanding the relationship of philosophy and science comes from the relatively recent publication of notes by Rush Rhees, which document conversations held with Wittgenstein between 1939 and 1950. The notes cover a broad range of topics, but one conversation from 1947 directly addresses this thesis' subject: "Question of the relations of science and philosophy" (CRR p35-39). An initial answer reiterates his viewpoint about philosophy being un-scientific in method: "In a sense philosophy is necessarily anti-scientific; because it is contemplative", a characterization that is clearly related to his notion of philosophy being descriptive (PI 124), stating what is possible independent of all discoveries and inventions (PI 126). Wittgenstein remarks that as long as science is dominated by engineering, it has no use for philosophy (CRR p36). This makes sense given Wittgenstein's philosophical method. The task of an engineer is to create or produce; it is inherently pragmatic, unoccupied by questions of general understanding, which is why Wittgenstein argues that philosophy acts as a counterweight to science as long as it is purely concerned with engineering (CRR p36). This is potentially a reflection of Wittgenstein's personal dislike of society's focus on advancement (CV p56, p63) whereas he insisted that philosophy is not about progress. However, in the next passage Wittgenstein provides a positive relation between his idea of philosophy and science:

> "But science is what scientists do. And they are not always concerned with advances in engineering. They write systematic treatises on a subject, for instance. Say a treatise on Wave Mechanics. And where the work of the scientist is concerned with what we may call clarification, philosophy may be of help to him. Though this help may not be direct, — simply the fact that a certain form of philosophical investigation is going on." (CRR p36)

This passage indicates that Wittgenstein allows for some leeway regarding the boundary between philosophy and science and suggests the possibility for philosophy to play a role in relation to the sciences. Wittgenstein makes a distinction between an engineering research and a treatise on wave mechanics to account for the difference in the epistemic goals that pertain to either type of inquiry. In a 'systematic treatise' in a subject in physics the scientist is not only processing empirical data, but also extrapolating to explain the regularities underlying a certain phenomenon. The scientist may introduce concepts or make general claims to account for the evidence. On itself, neither of these examples

explicitly involve philosophical considerations in the Wittgensteinian sense. After all, the method of philosophy of Wittgenstein has nothing to do with explanations, theory or doctrines, which he considers bad philosophy – metaphysics (Z 458). This means the explanation or theorization still should pertain to the realm of science. However, the philosophy of Wittgenstein, as already evident in the *Tractatus*, 'awaits' until somebody wishes to say something metaphysical (TLP 6.53). If it was the case that the scientist oversteps the limits of language, indeed "philosophy might be of use to him ", because it is then that the process of conceptual clarification comes into play. And in accordance with Wittgenstein's method, not in a direct way, since philosophy will not aid the scientist in performing scientific activities or guide the scientist towards understanding the nature of scientific concepts in a direct and methodologically clear fashion. "When a scientist is doing science, he isn't contemplating science; and he is never in a position to do so" (CRR p38). Wittgenstein's remark emphasizes that within a certain activity, such as doing science there is no room for self-contemplation in the philosophical sense. It is exactly for this reason that when engineering is the prime activity of a scientist philosophy has no relevance; engineering is geared towards a pragmatic advancement, with a concrete and clearly defined goal in mind; e.g. design such and so or build a bridge with these dimensions and capacities. However, there is also a part of science which aims at the discovery of laws, generality and structure and Wittgenstein refers to this part. He invokes a treatise on wave mechanics as example, likely a reference to the novel and highly abstract theories of Schrödinger published in the decades before this conversation took place. However, this example also could allude to the early influence of Hertz, who published a treatise on contact mechanics that Wittgenstein knew very well and will be discussed in depth in the next chapter. The question is: why is the scientist sometimes in need of clarification, while clarification or contemplative thinking can absolutely play no direct or explicit role in the process of doing science?

Although Wittgenstein rarely spoke about science, there are scattered clues that confirm some thoughts expressed in the conversation with Rush Rhees. In 1936 Wittgenstein wrote "A scientist says he pursues only empirical science or a mathematician only mathematics and not philosophy, — but he is subject to the temptations of language like everyone; he is in the same danger as everyone else and must

beware of it"[15]. The implications are clear: the workings of language permeate all forms of communication and expression, including those within science. Therefore, the possibility of being 'bewitched' (PI 109) by the workings of language can also befall scientists. Wittgenstein provides an example in the *Blue and Brown books* (BB p25-26), when he speaks about a question posed by Saint Augustine: "What is time?". He firstly invokes the symbolism of exact calculus: "When we talk of language as a symbolism used in an exact calculus, that which is in our mind can be found in the sciences and in mathematics. Our ordinary use of language conforms to this standard of exactness only in rare cases." Wittgenstein juxtaposes the precision of symbolism in an exact formula against the formulation of the question 'what is time?'. He suggests that to answer this question, more uncertain concepts or definitions need to be introduced, creating a vicious philosophical cycle. Whereas everyday 'what is?' questions might not puzzle us, the question 'what is time?' does. In the *Blue and Brown Books* Wittgenstein was developing his analysis of grammar to understand these types of puzzles and indeed it is the grammar of 'time' we fail to understand. In these cases, abstract concepts are combined with questions like 'why is' or 'what is', indicating the desire for general explanations or definitions (Z 339). Wittgenstein calls these questions "utterances of unclarity, or mental discomfort" (BB p25) and points out that these questions don't demand a causal explanation (MWL 9:23, 9:24), although this is often wrongly assumed. The above example involving the nature of time is important, because one can imagine a scientist in a comparable situation. A scientific mindset incentivizes to ask questions like *why is* or *what is*, demanding causal or ontological explanation (MWL 5:30). Within science the transition is often made from symbolic formulae to the contemplation of a general scientific concept because intangible or invisible entities are often proposed within physics and chemistry. Then a scientist might be tempted to ask and answer such questions, which resemble causal ones, but underhandedly necessitate a contemplative approach. In that case the question in itself is already the source of confusion (BB 169) [16]. But how does the scientist know which question one is supposed ask, if conceptual

[15] (MS 151, p6). MS 151 has been published as *Notes for Lectures on "Private Experience" and "Sense Data"*, however this bracketed comment was omitted in the publication. Fortunately, Kuusela (2013) made mention of it. See Appendix A for the note, dated 1936.

[16] Wittgenstein refers in both mentioned instances of the *Blue and Brown Books* to Hertz as well. I will discuss that connection further in chapter V.

questions sometimes present themselves as causal ones, such as the example above on the nature of time? I come back to this in the next chapter.

As I discussed in chapter II, the ambiguous term philosophy of science covers multiple possible levels of philosophical inquiry. The previous paragraph pertains to conceptual analysis being of use within scientific practice. However, another layer that philosophy of science covers, is an assessment of what science *is*. The question that follows in the context of this thesis is whether one could philosophize about science using Wittgenstein's method. The conversation with Rush Rhees provides insight into this possibility. Wittgenstein notes: "Philosophy is contemplative (…) This may indeed be important for an understanding of what sort of thing, what sort of activity science is" (CRR p36). This appears to be supportive of the possibility of attaining philosophical insight into the nature of science. How does this attitude link to the inherently non-metaphysical nature of Wittgenstein's method? The phrasing 'understanding what sort of thing' science is might lead one back to traditional questions in philosophy of science; about a general theory of scientific advancement for example. However, this is a return to the assumption that science is a privileged procedure that may grant us exclusive knowledge of the world. The grounding of this would require a metaphysical framework to explain why science can cross this bridge.

I argue that the contrary is the case, and not only because philosophizing about laws of nature or theory choice violates the core principles of Wittgenstein's method (no explanations, no theories, no doctrine). Wittgenstein explicitly notes that we can understand what sort of thing / activity science is *because* philosophy is contemplative. Firstly, Wittgenstein is mostly interested in other possibilities of doing science, reiterating a focus on possibilities of phenomena he also expressed in the *Investigations* (PI 90). A concrete example is given by Rush Rhees: "Wittgenstein used to come back again and again to viewing scientific inquiry as it would appear in other surroundings: if it did not have the importance in the lives of a society which engineering gives to it in ours; if it had something like the importance which ritual has in ours."[17] These type of contemplations are different compared to the earlier mentioned universal themes in philosophy of science. His focus on "*Vielgestalt"* (CRR p36) – a 'multifaceted'[18]

[17] Rush Rhees Collection, UNI/SU/PC/1/13/1, mentioned in (CRR p39).
[18] CCR provides this as translation of *Vielgestalt*.

approach to science can be seen as a clear rejection of the search for a universal notion of science. Wittgenstein approaches science philosophically as practical endeavor from an anthropological perspective, rather than as theoretical entity, focusing on what sort of activity science represents within human life. This contemplative approach does not aim to define science in a reductive or metaphysical sense but seeks to explore how language and language games intrinsic to science shape its practice and the way scientific knowledge is conveyed. For instance, this perspective may consider how the specific terminologies and communicative practices used within the scientific community influence not only the performance of science but also the transmission and interpretation of scientific information across different contexts. This links to the theme of convincing and learning, something Wittgenstein touches upon frequently in *On Certainty* (OC 100-105, 160-165), but already was on his mind in the *Tractatus* (TLP 6.363, 6.3631). I will extensively cover this in Chapter VI.

In summary, while Wittgenstein's method seems to resist traditional philosophical accounts of science, the conversation between Wittgenstein and Rhees showed two distinct and positive paths for Wittgenstein's contemplative analysis to meaningfully interact with science. The first is the potential for philosophy to assist the scientist engaged in systematic writing, which may involve clarification and proneness to metaphysical confusion. The second is the exploration of what sort of activity science is from a contemplative, rather than a prescriptive approach. In the following two chapters these two aspects are investigated, examining how they are an extension of Wittgenstein's method as described in chapter III.

V - Can Wittgenstein's philosophy be of use to the scientist?

In chapter II, I addressed inherent difficulties of philosophy of science as field and subsequently in chapter IV, I identified two connections between science and Wittgenstein's philosophy, derived from conversations with Rhees. Wittgenstein notes: "And where the work of the scientist is concerned with what we may call clarification, philosophy may be of help to him. Though this help may not be direct, — simply the fact that a certain form of philosophical investigation is going on" (CRR p36). In this chapter I analyze this statement in relation to Wittgenstein's method. I subsequently connect it to Hertz' work, which serves as case analysis to assess of the type of help Wittgenstein envisions philosophy can offer science.

The central challenge in breaching the gap between science and contemplative philosophy from a practical perspective, is how to philosophize 'about' science, and at the same time avoid an intrusion into science itself or engaging in metaphysical speculation. Given Wittgenstein's linguistic conception of philosophy, the solution should lie within an analysis of language itself. By definition any explanatory or causal analysis of propositions of natural science should not be considered (TLP 6.53; POP 365), and metaphysical theorization is to be avoided altogether. Therefore, what remains as subject of philosophical inquiry is the language related to science, approached through conceptual investigation. However, a sharp and clear delineation between science, conceptual analysis and metaphysics only exists in an idealized conception of language, in which meaning is always clear and it would always be apparent which type of investigation is going on. In reality the innate complexities of language might not allow for such a straightforward division, (BB p23-25; PI 120). Wittgenstein indicates that assertions which contain a metaphysical misrepresentation of grammar can be formed using the same words that describe a fact of experience (BB p56, 57). As stated in the previous chapter, Wittgenstein acknowledges[19] that scientists, like anybody else, can succumb to the temptations of misusing language. In this context a form of philosophy that is relevant to science can be understood. The key is to recognize that this is not a special form of philosophy that is particularly tailored towards science, since philosophy doesn't explain

[19] (MS 151, p. 6). Retrieved from Kuusela (2013)

or deduce anything (PI 126) nor provides a foundational ground for what has been discovered (PI 131-132; BT 71-72). The only distinguishing aspect is the scenario that calls for philosophizing: a scientific context wherein some form of generalization, structuration or systemization is taking place.

Conceiving of philosophy of science in this manner implies that whether the 'philosophizing' is done by the scientist or a philosopher is irrelevant. According to Wittgenstein, philosophy is an activity that is not confined to philosophers in a philosophical context. This is exemplified by a relatively obscure, but crucial passage from the *Nachlass:* "Philosophy is an instrument, which only serves against philosophers and the philosopher inside us"[20] Philosophy in the Wittgensteinian method is a tool, which can be employed to clarify. The statement above may appear to strongly limit the scope of philosophy, but I believe it implies the opposite. The 'philosophers' represent (academic) philosophy in general, the usual target of Wittgenstein's pursuit of clarification. However, the 'philosopher inside us' represents the human tendency to misuse language. This tendency can manifest itself in any kind of situation, meaning that a formal philosophical context is not required for philosophical questions to arise. Wittgenstein's earlier comment about philosophy not being of use in an engineering context shows that he does not envision any significant philosophical confusion arising in the pragmatic and progress-oriented practice of engineering. However, when it comes to a systematic treatise, a product of the scientist's aim for general description, it seems plausible that conceptual confusion might occur, as language becomes increasingly detached from its ordinary use.

A contemplative philosophy of science thus reduces to an analysis of scientific language[21], which is no more special than any ordinary one (PI 34; TLP 4.002). The following passage illustrates this:

> Unrest in philosophy comes from philosophers looking at, seeing, philosophy all wrong, namely, as cut up into (infinite) vertical strips, as it were, rather than into (finite) horizontal strips. This change in understanding creates the greatest difficulty. They want to grasp the infinite strip, as it were, and they complain that this is not possible piece by piece. Of course, it isn't, if by "a piece" one understands an endless vertical strip. But it is, if one sees a horizontal strip as a whole,

[20] Translated from German: "*Philosophie ist ein Instrument, das nur zum Gebrauch gegen Philosophen und den Philosophen in uns dient"* (TS 219, 11)

[21] I mean here more than mathematical formulas and models; the collective means of description and communication in science.

definitive piece. – But then we'll never get finished with our work! Certainly not, because it doesn't have an end. (BT 92)

This passage underscores that the totality of the language in a game, including the language game of science and scientific discourse, serves as the basis for conceptual analysis within the sciences. Individual concepts gain their meaning within the totality of language used in a particular context, as opposed to their reduction in isolation. This parallels the earlier mentioned example of Saint Augustin who asked: "What is time?". An analysis of the vertical individual strip of the concept time appears to necessitate an infinite accumulation of new concepts and leads the philosopher astray (BT 304-305). Meanwhile a horizontal understanding of the *grammar* of time in this context should lead to the repudiation of such a question[22]. Subsequently, by combining the question of Saint Augustin with the strip-metaphor of Wittgenstein, it becomes imaginable that a scientist, during the quest for systematisms and generality, might unintentionally engage in a line of questioning that warrants conceptual analysis, rather than a scientific solution. It is then that he might try to venture 'into' the vertical strip, searching for explanatory answers to a what- or why-question beyond the scientific framework of research (BB p27-28; Z 313-315). A scientist, in particular one that concerns himself with 'systematic treatises' of a general kind can be regarded as a 'philosopher' in the sense that they are amongst the furthest distanced from the natural use of language (BT 430). Distance from ordinary use of language is a quality that Wittgenstein often assigned to philosophers and named as general cause of conceptual confusion (PI 133; OC 406, 467). This train of thought opens a pathway for philosophical engagement within science, since confusion of grammar can indeed affect the scientist, who might deal with great levels of abstraction.

Two issues arise. The question is whether the delineation between a philosophical question that needs dissolving and a scientific question that needs resolving is as clear as the previous division might suggest, particularly since Wittgenstein asserted that philosophical elucidations will not aid the scientist directly. A second issue relating to

[22]Already in the *Tractatus* Wittgenstein was well aware of this problem. However, he was then still convinced he could improve upon the formal systems of description by Russell and Frege to mitigate such conceptual confusion through a general procedure. See (TLP 3.32, 6.111).

this is the impossibility to conceive of a 'wholesale'[23] procedure to attain this 'dissolution' of a question. This dissolution pertains not solely to the successful application of a method of grammatical analysis, but also to achieving an unvexed state of mind. It is this therapeutic quality that seems difficult to associate with the fundamentally inquisitive nature of scientist, which revolves around generating questions rather than letting go of them. Wittgenstein assesses that contemplative analysis can never be integrated in scientific practice as a tool, so when would a scientist know of the need for contemplative analysis and, since there is no universal or algorithmic approach to this, how would it indirectly aid him?

A philosophizing scientist: The case of Heinrich Hertz

To answer these questions, it is useful to inspect the writings of Heinrich Hertz, his relation to Wittgenstein and an interpretative discussion between Allan Janik and John Preston. Hertz (1857 – 1894) was a German physicist, belonging to a productive generation of German researchers[24]. His most important 'work' in philosophical context was *The Principles of Mechanics presented in a New Form (Principles)*. Regardless of this book not being a philosophical work[25] and not being as scientifically impactful as Hertz' discoveries on electromagnetics, it was recognized in retrospect to be of high philosophical importance because of its preface (Baird et al. 1998).

In this preface Hertz provided an introduction to his treatise on contact mechanics, involving philosophical contemplations. During Hertz's life, novel theories in physics challenged pre-existing ones, primarily due to strong advances in measurement. Previously Newtonian classical mechanics were considered the blueprint for theories in physics. However, new discoveries such as electromagnetism and thermodynamics, challenged the Newtonian way of thinking (Hoffmann 1998). Newtonian mechanics and its possible flaws were also present in Hertz's work, yet he disagreed with contemporary physicists-philosophers in their quest to reform Newtonian physics by replacing the old fundamental terms with terms of energy (PM p16, p26). Hertz took a different approach to account for the failing Newtonian framework and targeted one of four Newtonian

[23] Hereby utilizing the terminology of Cora Diamond (2004), who argues that Wittgenstein's philosophical method, including the *Tractatus*, utilizes a piecemeal method to assess philosophical questions.
[24] For an extensive biography in philosophical context see: (Kjaergaard 2002) and (Barker 1980).
[25] Hertz 'philosophizes' exclusively in the introduction whereas the rest of the book is a scientific treatise on contact mechanics.

fundamentals: force (PM p14). Hertz felt the problems with Newtonian physics were rooted in a misunderstanding of force on a conceptual level and not because of a lack of understanding of force as a 'real' world phenomenon. By clinging to the view that theoretical entities are in themselves a part of the world, one misses that they are a form of description, rather than direct causes. The correctness of a description can be verified through observations from the external world, yet the description itself forms no part of an objective reality. The 'solution' of Hertz on Newton's concept of force is given in the third part of the introduction of *Principles*. He starts with three fundamental conceptions: time, space and mass. These are according to Hertz independent ideas; objects of experience. He acknowledges that a picture of the world that conforms to laws is only presupposed, as it is beyond our senses. In other words, to form a complete picture one has "*(...) to imagine confederates concealed beyond the limits of our senses*." (PM p30) It seems that force, in the previous Newtonian sense, was one of these invisible things, beyond the sensible realm. However, Hertz concludes that there is a fundamental difference between the observable entities and constructed entities that are used to picturize this lawlikeness of the world. He argues against the necessity to accommodate for an incomplete picture by introducing a new 'hidden' concept with a distinct ontological status:

> "(…) statements which one hears with wearisome frequency, that the nature of force is still a mystery, that one of the chief problems of physics is the investigation of the nature of force, and so on. In the same way electricians are continually attacked as to the nature of electricity. Now, why is it that people never in this way ask what is the nature of gold, or what is the nature of velocity? (…) With the terms "velocity" and "gold" we connect a large number of relations to other terms and between all these relations we find no contradictions which offend us. We are therefore satisfied and ask no further questions. But we have accumulated around the terms "force" and "electricity" more relations than can be completely reconciled amongst themselves. We have an obscure feeling of this and want to have things cleared up. It is not by finding out more and fresh relations and connections that it can be answered; but by removing the contradictions existing between those already known, and thus perhaps by reducing their number. When these painful contradictions are removed, the question as to the nature of force will not have been answered; but our minds, no longer vexed, will cease to ask illegitimate questions." (PM p9)

Hertz warns against the mystification of concepts in the natural sciences such as force. After mentioning electricity and force as concepts that are prone to raising questions,

Hertz compares them to gold or velocity and asks why their nature does not raise questions. He indicates that for both groups no complete understanding is possible, yet there is a difference. In the case of gold, the amount of known relations is large, yet not contradictory to us, and therefore one is satisfied. However, the amount of relations in the notion of force is large, which proves to be of difficulty because contradictions persist. The natural route to take from a scientist's point of view would be to expand upon these contradictions and try to improve a system of representation in order to solve the questions that remain. However, Hertz argues that the 'solution' lies not in finding complexity, but in finding simplicity, as new relations cannot accommodate for these *illegitimate* questions. The mistake of an overabundance in relations within a representation must therefore be corrected with a reduction of elements, instead of wandering in a continuously expanding representation that was founded on unclear concepts.

Understanding Wittgenstein in light of Hertz

Wittgenstein mentions Hertz on multiple occasions throughout his writings (TLP 4.04, 6.361; MWL 7:17, 7:103; BT 421; BB p26, 169). Besides the aforementioned references, a quote from Hertz was the motto of an early version of the *Investigations*[26]. In addition, in published notes in *Culture and Value* he lists the persons that influenced him (CV 19).[27] Hertz and Boltzmann are the first two of ten enumerated, indicating that there is something Wittgenstein obtained at an early stage from Hertz that pertains fundamentally to Wittgenstein's perception of philosophy and that stuck with him throughout his life, including his shifts in his thinking. This is consistent with the context in which Wittgenstein generally refers to Hertz; being remarks about his philosophical method[28]. Theodore Redpath (1990) recounted that the previously cited paragraph of Hertz, summed up philosophy in Wittgenstein's eyes. On another account, discussing the method of philosophy, Wittgenstein invokes Hertz in describing the method of philosophy as he saw it at that point: "As I do philosophy, its entire task is to shape expression in such a way that certain worries disappear. ((Hertz.))"[29] (BT 421). It seems plausible that there exists

[26] See (MWL p203, footnote)
[27] The full list: *Boltzmann, Hertz, Schopenhauer, Frege, Russell, Kraus, Loos, Weininger, Spengler, Sraffa.*
[28] A second much-studied connection is the similarity between Hertz and the *Tractarian* picture theory of language.
[29] Original typesetting

a connection between the method of philosophy of Wittgenstein and the way Hertz employed the philosophical statements in the introduction of the *Principles*[30]. The notion of clarification to make problems disappear instead of solving them is clearly reminiscent of Wittgenstein's philosophical method. Hertz was in principle a physicist, not a philosopher, but Hertz' motivation to incorporate a form of philosophical analysis, is in line with Wittgenstein's comments from the conversations with Rush Rhees on the possible 'use' of philosophy by the scientist. This reading of Hertz is different than other approaches of the Hertz-Wittgenstein relation, which investigate whether Hertz' work provides a basis for Wittgenstein's philosophical method and aim to explain that Wittgenstein was directly building upon Hertz's philosophy[31]. These arguments assume a profound degree of philosophical inspiration that Wittgenstein took from Hertz's method. John Preston (2016, 115-117) convincingly argues against such readings on the basis that many commentators limit themselves strictly on the introduction of the *principles*, thereby misunderstanding his scientific project and overstating the fundamental qualities of his method of clarification. One that also relies on creating a novel representation in the form of an alternative hypothesis, purely by clarification of the grammar of the concept of force. I read Hertz the other way around: seeing whether Hertz applies philosophy in vein of Wittgenstein, within the confines of his own project. I do not intend to prove that Wittgenstein emulated Hertz, I assume that they operated according to similar intentions and investigate retrospectively whether Hertz employed philosophy in a scientific context that complies with Wittgenstein's method.

A common reading is that Hertz clarified and thereby eliminated force from his mechanics using conceptual analysis. I follow Preston's line of reasoning in concluding that this conclusion bears the testimony of an overvaluation of the philosophical component of Hertz's work. Preston regards the relation between Wittgenstein's overall philosophical method and Hertz's one of creative appropriation (Preston 2016, 121). Therefore, the question is, assuming that Wittgenstein's method is not a one-on-one reflection of Hertz's, what can be learned from Hertz given Wittgenstein's remarks to

[30] Note that Wittgenstein also uses other parts of Hertz's work – even beyond the preface - in the *Tractatus* (TLP 2.1, 4.04, 6.36, 6.341). I will leave these connections aside, as they have less to do with philosophical method and more with purely *Tractarian* ideas of representation and the picture theory of language.

[31] See for example: "Hertz delivered to Wittgenstein a highly original hermeneutic technique that would influence all his thinking and in fact become the cornerstone of his mature philosophical method" (Janik 2001, 148).

Rush Rhees? Was Hertz utilizing philosophy in vein of Wittgenstein, and was it of use to him - even though the success of his elimination of force is dubitable since the resulting system of mechanics was retrospectively seen as obscure? I start my argument by addressing two conclusions by Preston regarding the Hertz-Wittgenstein relation:

> because Hertz's mechanics is itself part of his philosophical project (…), he attains his philosophical aim only if his mechanics actually work. (Preston 2008, 51)

And,

> He "clarifies" the concept of force by constructing a new "representation", which he thinks of as a hypothesis, and by replacing the entire existing representation, including its presentation of force, with this new, improved representation. (Preston 2008, 65)

These quotes suggest that the answer to the question is negative. Firstly, philosophy wasn't particularly of use to Hertz and the clarification was ultimately more scientific than philosophical. However, I argue the contrary based on Wittgenstein's comments to Rhees: "in a sense philosophy is necessarily anti-scientific,; because it is contemplative"; something that Wittgenstein reiterates throughout his writings (CV p7; BB p18; PI 109). Furthermore, he said: "this help may not be direct, — simply the fact that a certain form of philosophical investigation is going on" (CRR p36). If one compares these statements to Preston's, an idea can be formed of the contemplative role of philosophy. The problem with Preston's interpretation is that the clarification processes in science and philosophy are being mixed up. Because philosophy is contemplative and necessarily anti-scientific, it does not matter whether or not the elimination of force in Hertz's mechanics works out. What matters is that some form of conceptual clarification preceded the attempt. It would be strange that a conceptual clarification would have as ramification that the concept suddenly disappears from the scientific description in Hertz's mechanics. While Preston is right to denote that Hertz replaces the old conception of Newtonian mechanics with his own (without force), he is wrong to assume that Hertz misses his philosophical aim when his mechanics don't work out. The conceptual clarification of force does not necessarily entail its removal from the scientific description of mechanics. The following Wittgenstein quote illustrates this: "The source of all the difficulties of physics is that statements of physics and rules of grammar get mixed up." (WVC p53) Wittgenstein used

this in the context of 'time' but it bears resemblance to what Hertz thought about concepts like force and electricity. To better understand this connection, observe a similar sentiment by Wittgenstein from a period later in his life:

> Nothing is commoner than for the meaning of an expression to oscillate, for a phenomenon to be regarded sometimes as a symptom, sometimes as a criterion, of a state of affairs. And mostly in such a case the shift of meaning is not noted. In science it is usual to make phenomena that allow of exact measurement into defining criteria for an expression; and then one is inclined to think that now the proper meaning has been found. Innumerable confusions have arisen in this way. (Z 438)

This firstly relates to the underpinning of Hertz's project in the *Principles,* namely why the notion of force or electricity keeps on unjustifiably puzzling scientists, leading them into wondering about the 'nature' of such concepts. It also helps to dichotomize the conceptual understanding of force and the scientific usage of force. Scientific (empirical) and linguistic (conceptual) analyses mirror each other in the sense that they can pertain to the same context. However, that does not mean that philosophy should bring forth scientific success to meaningfully partake in the scientist activities. In that regard it does not matter philosophically that ultimately Hertz's particular description of mechanics was not universally adopted and can be described as not very successful (Preston 2008, 48-67). Conversely it would be strange if a conceptual change of thought would *directly* cause a fundamental scientific development. The 'aim' of a conceptual process is inherently unclear as it can never be useful in a direct way.

The important takeaway is that a conceptual change is implicitly brought about through perspicuous linguistic exposition. However, this change seems to be a change in mentality, not a declared one, and therefore has a therapeutic notion to it, involving a thorough change in mindset. "In philosophizing we may not *terminate* a disease of thought. It must run its natural course, and *slow* cure is all important. (…) (Z 382). To illustrate, James Klagge (2017) writes in a response to Peter Hacker on the topic of conceptual change the following:

> "Hacker asserts: 'Philosophical problems stem from conceptual confusion. They are not resolved by empirical discoveries.' That much is true, but he continues: 'and they cannot be answered, but only swept under the carpet, by conceptual change'. That is much more questionable, for it conflates conceptual change through evolution with conceptual change by stipulation." (Klagge 2017, 201)

This entails the consequence that this way of practicing philosophy of science comes implicitly along with 'doing' science. Thus, the conceptual change will never come about in an arithmetic or a mechanic fashion, where a conceptual confusion is 'solved' or, like Hacker's interpretation, chosen to ignore; a description that doesn't capture the mental turnaround required for a conceptual change. A remaining difficulty is which role philosophy plays compared to the scientific part. Philosophy is something that is not natural sciences, it must stand above or below them (TLP 4.111-4.116). Therefore, it cannot mean that philosophical components directly ground the actual scientific contents, or that they follow directly from scientific results. The Wittgensteinian variation on Hume's fork I introduced in chapter III helps understand this predicament. Wittgenstein says: "the analysis oscillates between natural science and grammar" (PI 392; Z 438). So instead of the idea that conceptual analysis 'borders' or precedes empirical science, one can think of conceptual analysis as a constant background presence in a state of continuous interaction with the factual side. It is therefore also that Hertz's program must be understood as a scientific one. It is rather that philosophy, by means of linguistic analysis, weaves through scientific practice, instead of providing a clearly applicable method of clarification. This is why the removal of force from Hertz's mechanics is from a scientific viewpoint not guaranteed at all. Merely making inquietudes like force vanish on command is not scientific but is neither warranted by conceptual analysis. There cannot be a clear relation between a change in conceptual understanding and a scientific improvement. However, that is exactly how it should be, because otherwise the 'metaphysical' barrier will be broken – "the help will not be direct, just a form of philosophy that is going on" (CRR p36). This is why Wittgenstein indicated that the help of philosophy would only be indirect. The best way to describe the help is a general awareness of the linguistic element of scientific practice, aiding the scientist in handling propositions that pertain to both scientific facts as well as concepts. This is different compared to how for example Glock (2017, 100) envisions the role of conceptual analysis, seeing it as a Lockean *underlaborer* of science, akin to the role that logic and mathematics play. I argue that this stance attributes a far too active role to conceptual philosophy, leading to an overly mechanical approach to its utilization[32], whereas

[32] See the quote by Klagge (2017) before: "conceptual change by stipulation".

Wittgenstein clearly advocated against the idea of switching on command between conceptual and factual analysis (OC 318-321).

This is how Wittgenstein envisioned philosophy and science interacting: “Considering different possibilities may help you to see how it is; whereas the search for explanations and causes may keep you from looking”(CRR p39)[33] and: “Is it not strange that science and mathematics use sentences, but do not talk about understanding these sentences?”[34] Philosophy is not an underlaborer of science; it rather labors in support of the scientist. Hertz’ elimination of force was not a purely conceptual elimination; otherwise it would have been of direct use to him. He assessed the meaning of force differently after a philosophical contemplation, provoking him to try a different scientific approach. The elimination of force itself was scientific, resulting in a different scientific representation of empirical facts. The philosophical part is an awareness that there may be a different approach entailed in certain concepts, that were previously masked by certain preconceptions concerning these concepts. This is reflected in Wittgenstein’s focus on seeing the other possibilities (CV p9; CRR p39), freeing concepts from preconceptions that might drive us towards causal inquiry (PI 570). Practically, this ‘attitude’, could for example help the scientist in formulating research questions, a practice that requires the scientist to verbally formulate a knowledge gap. Wittgenstein gives an example: "What are the ultimate constituents of matter? (It is a typically metaphysical question; the characteristic of a metaphysical question being that we express an unclarity about the grammar of words in the form of a scientific question.)” (BB p35). Although this is a relatively clear example of a metaphysical research question, one may imagine how the formulation of research questions or conclusions in actual language raises the possibility of conceptual unclarity interfering with the scientist; a thought which provides a slightly more practical outlook on the relation I discussed.

Thus, I hope to have shown in this chapter that a pragmatic connection between philosophy and scientific practice exist, grounded in the notion that scientific language itself is prone to conceptual confusion.

[33] Cited from a letter to Maurice O’Conner Drury, 19/11/1967 (Rush Rhees Collection, UNI/SU/PC/1/13/1)
[34] TS 114 (unpublished; folio 80), Wittgenstein Archives – Bergen.

VI - Understanding what sort of activity science is

In the previous chapter I examined Wittgenstein's remarks on the potential usefulness of philosophy to the scientist, highlighting that conceptual confusion may arise within the context of science. However, as noted in chapter II, philosophers of science are traditionally concerned with broader questions about science itself, such as epistemically grounding scientific knowledge or ontologically assessing concepts fundamental to science - endeavors that conflict with Wittgenstein's method. Nevertheless, as described in chapter IV, Wittgenstein placed importance on understanding what sort of *activity* science is, a notion I elaborate upon in this chapter (CRR p36).

Wittgenstein indicates that a scientist never contemplates science, while actively engaged in it (CRR p36, 38), meaning a scientist is neither concerned, nor helped by philosophers trying to define or unearth a foundation to science. Therefore, the conceptual analysis that may benefit the scientist which I explored in the previous chapter is always contextual. Like the case of Hertz, it occurs within the framework of a specific scientific inquiry rather than as abstract contemplation of *the* scientific method or theory change *in general*. This is why attempting to understanding what sort of activity science is will never benefit the scientist (OC 474); a general understanding of science is not required to reflect on a concept in a scientific context. In this chapter I discuss what understanding science as activity entails. I firstly outline the novelty of this approach, then assess Wittgenstein's foundational analysis in *On Certainty*. Afterwards I describe how science can be understood as form of life and lastly contemplate Wittgenstein's philosophy of science in context of the aforementioned.

Science as activity compared to science as ideal

Wittgenstein's later approach to philosophical analysis treats science as activity connected to a form of life and associated language games, rather than grounding it in a formalized structure. In doing so he denies science a privileged metaphysical status, where the term 'science' refers to an idealized notion, rather than a human activity with practices and traditions. Wittgenstein takes an anti-foundationalist approach with respect to scientific knowledge. A generalized, or idealized view of science is metaphysical, because it assumes essential qualities – ontological or epistemic – that transcend the

cumulative empirical investigations of scientific practice. These essential qualities pertain to the nature of the realities that science supposedly reveals or the nature of knowledge it may produce. This metaphysical view approach to 'classic' philosophy stands in opposition to Wittgenstein's conceptual analysis, as I discussed in chapter II. Understanding science as a collection of human activities, that is of 'rules', means it is grounded in practice, like any other activity. This viewpoint challenges what I call speculative metascience disguised as philosophy of science. If one sees science as an object of study, it implies science is 'out there' to be studied; with discoverable methods and laws, and thereby a unique tool to attain privileged knowledge of the world. Science, in this view, resembles a law of nature - a discoverable blueprint for attaining knowledge.

However, science as activity should be understood differently. For Wittgenstein, philosophy consists of an analysis of language because of the latter's "paramount role in human life" (BT 194). Science, therefore, must be seen as a collection of language games that, regardless of their importance to the society we currently live in, are driven by human practices and beliefs. Wittgenstein writes:

> In a scientific investigation we say all sorts of things, we make many statements whose function in the investigation we don't understand. For not everything is said with a conscious purpose; our mouth simply runs. We move through conventional thought patterns, automatically perform transitions from one thought to another according to the forms we have learned. (RPPII 155)

Science is not merely an exchange of scientific propositions; it is an activity, and the communicative aspect of science is subject to the workings of human language like any other activity. Therefore, understanding science as activity must mean understanding the role that grammar and language games play in science acknowledging science's significance in society arises from how it is practiced, not from any essential qualities. Wittgenstein's contextual understanding of meaning is thus reflected in his view of science, offering a novel approach to circumvent the philosophical urge to metaphysically or epistemically ground scientific knowledge.

Wittgenstein *On Certainty*

On Certainty is particularly relevant to this discussion as it offers an activity-based alternative to seeking an epistemic founding to knowledge. In the manuscript

Wittgenstein gives an anti-skeptical analysis in response to G.E. Moore's *Here is one hand* argument, by providing a detailed analysis of the nature of certainty, doubt and the grounding of knowledge, critiquing the pursuit of absolute grounding for certainty. Written between 1949 and 1951, *On Certainty* reflects themes similar to his remarks to Rhees in 1947. Critiquing the attempt to find absolute grounds for certainty relates to the effort to ground science in fixed principles. Given that scientific knowledge is often viewed as the most certain form of knowledge, *On Certainty* has strong implications for science, and we see this in the discussion from 1947 as well.

Like any work by Wittgenstein, *On Certainty* generated a wide range of interpretations, including to what degree it constitutes a distinct shift in thinking compared to the *Investigations*. Undeniably, Wittgenstein explores epistemic themes that were not present in the *Investigations.* Most importantly, in *On Certainty* Wittgenstein separates knowledge and 'foundational certainty' (Moyal-Sharrock 2004, 36), addressing the role of certainty and doubt in our practices and forms of life. Since science is also understood as activity – a form of life (CRR p36), it may be interpreted similarly, suggesting Wittgenstein provides a concrete vision on science in agreement with his conceptual method. Wittgenstein states that:

> "(…) it belongs to the logic of our scientific investigations that certain things are indeed not doubted. - We just can't investigate everything, and for that reason we are forced to rest content with assumption. If I want the door to turn, the hinges must stay put. - My life consists in my being content to accept many things." (OC 342-344)

This implies that the 'life' of the scientist is no different from that of the ordinary person. The game of science can only function based on implicit agreement to basic assumptions, for example the existence of regularities in nature. Wittgenstein's method suggests looking at science in practice and under what assumptions the game is played. Yet these assumptions, or hinge propositions, are to be left alone, as the moving of the door – practicing science –, predicates upon a steadfast system of convictions (OC 102, 103). Wittgenstein indicates these assumptions are inherent to the logic of scientific investigations. This should be seen in contrast to his *Tractarian* thought, as he is not referring to a universal logical form that shows the possibilities of propositions of science.

Instead the fixed position of hinge propositions within a system of convictions is rooted in its practice (OC 137-140) and not in a transcendental logical form (TLP 6.124).

In chapter V I discussed that *within* the context of a particular scientific inquiry, conceptual and empirical considerations may simultaneously take place, based on Wittgenstein's remarks on how analysis 'oscillates between natural science and grammar' (PI 392; Z 358). However, this categorization doesn't account for the hinges – the basic certainties in a system of convictions (OC 172, 173), which seem to be connected to scientific practice instead of individual scientific contexts. Wittgenstein writes on this: "Indeed the correspondence between our grammar and general (seldom mentioned) facts of nature does concern us. But our interest does not fall back on these possible causes" (RPP I 46). Here Wittgenstein contemplates the different relation between grammar and 'general facts of nature', which appear to be different from ordinary contingent propositions of natural science. In *On Certainty*, Wittgenstein refers to these as 'general empirical propositions' (OC 273), which we consider to be certain and do not discuss. Wittgenstein, in his 'post-late' period, is rethinking the relation between empirical propositions and grammar, challenging the once sharp separation between them (OC 98, 309, 319). He argues that past experiences, both mine and others', collectively account for certainty they give me (OC 275); not through explicit justification, but because they are embedded in a shared culture and common history. This represents a transition in Wittgenstein's thought, where certain empirical propositions in a system transform to unquestionable certainties, forming the background of our thinking and actions, allowing for example the game of science to be played.

In the *Investigations* Wittgenstein just contended the search for foundation in philosophy (PI 124, 126). Wittgenstein however was later intrigued by G.E. Moore's argument that common-sense empirical propositions can be a foundation for knowledge. Wittgenstein saw that certain propositions appear to be simultaneously foundational and empirical or that "contingent facts can also belong to grammar" (Moyal-Sharrock 2004, 41). He proposed a pragmatic framework as alternative for epistemic grounding, showing how doubt and certainty are rather embedded in forms of life and dependent on practical activities and shared cultural norms. Nonetheless, Wittgenstein struggled with the idea that propositions may change by stipulation from being empirical to a norm of description (OC 167), fearing he may regress back to general or prescriptive Tractarian rules of

language (OC 321). Thus, Wittgenstein considers hinge propositions to function in a system of convictions, which is acquired through practice. “It is not single axioms that strike me as obvious, it is a system in which consequences and premises give one another mutual support” (OC 142). It is therefore not one proposition that switches in isolation. Wittgenstein uses a river and bedrock analogy (OC 94-99) to illustrate how basic certainties collectively form a foundation that allows knowledge to exist. However, the basic certainties are not logically necessary; the bedrock may slowly alter, under the influence of the stream of empirical experiences (OC 96). This is, however, not an epistemic shift; it is a transformation in form of life. As our culture and language-games slowly evolve, so does the conceptual bedrock at the bottom of our convictions (OC 256).

Science as activity, rooted in a form of life

In 1966, physicist Richard Feynman, known to be critical of philosophy of science, was asked to give a lecture on the question ‘what is science?’ (Feynman, 1969). In line with Wittgenstein’s remark on scientists not being in a position to contemplate science (CRR p36), Feynman admitted he did not know the answer. Instead, he recounted how he became acquainted with science, using concrete examples of how one can be taught to understand science. His eventual description of science is the capacity of mankind to share experiences, combined with the attitude of scrutinizing these shared experiences in case of doubt. This description is surprisingly pragmatic and corresponds to Wittgenstein’s remarks (OC 275), reducing science to a collective activity and mindset, instead of a formal description, and emphasizing the paramount role of doubt.

However, being an activity, science also rests on basic assumptions. Therefore, the specific doubt involved *in* science as part of the game, must itself be ‘scientific’. We might call it the game of reasonable doubt (OC 323). To understand science as activity is to perspicuously describe how science is practiced. This is a conceptual exposition of the unfounded certainties in actual scientific praxis, showing these are not subject to justification, but allow scientific knowledge to exist (OC 296). So, when does this transition between empirical fact to basic certainty in the context of science take place; when is doubt ‘scientific’ and when unreasonable?

Consider flat earth theorists, who devise elaborate experiments to prove their hypothesis. When their experiments fail, they reject the apparent logical conclusion that their hypothesis is disproven, indicating a profound misunderstanding of the role of doubt in scientific practice (OC317). This behavior implies a rejection of the whole history and consensus of science, showing this doubt is of a more fundamental kind. Even if they ultimately were convinced after many experiments, were they really doing science? Proving the earth is round was only valuable to scientific practice ages ago. Science in practice constitutes an intricate interplay between trust and doubt in collective knowledge. A child learning science by doing a chemical experiment is not trying to prove (once again) some chemical relation. It is to grow accustomated to the way scientist think and draw conclusions (OC 296-299). A scientist conducting experiments to check if the earth is round, misunderstands the way doubt and certainty are embedded in the tradition of science as activity. A scientific experiment is significant at one moment in time and not at another. It is not enough to follow the correct method; one must also understand the collaborative nature of science. Someone who distrustfully proves existing scientific theories, would know in the end many things we know without having done them. One might say that he now learned the scientific method, but this is not the case. It's a profound philosophical doubt that precedes such an endeavor, reflecting a disagreement in spirit and not in scientific considerations (OC 259, 261).

In the *Investigations* Wittgenstein described this disagreement as one in form of life, not opinion (PI 241). By learning to do science and acquiring the attitude and practice that comes with it one enters what Wittgenstein calls a "community which is bound together by science and education" (OC 298). It's the common understanding of science in practice that enables agreement in judgements (PI 242). Scientists rest content with their findings, for their belief in their practice is rooted in an unquestionable system of convictions. This is why philosophers are to observe and assess the nature of this agreement in the practical sense, focusing on use and on how science *persuades* (OC 263, 612), rather than on the question what science or proof in general is. In light of Feynman's explanation, I discussed earlier: to understand what science is, is to look at what scientists do – "what we are supplying are really remarks on the natural history of human beings" (PI 415).

Wittgenstein's philosophy of science

Rush Rhees recalled Wittgenstein seeing philosophy as contemplative, which he often illustrated by the idea that science could be different:

> (…) Seeing that there are other ways in which people might do things (such as carrying on scientific research), (…). You will remember that Wittgenstein used to come back again and again to viewing scientific inquiry as it would appear in other surroundings: if it did not have the importance in the lives of a society which engineering gives to it in ours; if it had something like the importance which ritual has in ours. Or imagining a society in which there was nothing like our science — especially, in which there was nothing like science as an institution. (CRR p39)[35].

These remarks underscore the idea of science as activity and give a hint in what a contemplative philosophy of science might entail. Surveying science as form of life, in the context of our culture and society, allows us to understand the possibilities it offers. Wittgenstein thereby undercuts the notion of an idealized or optimal science as philosophical point of attention, since his treatise of basic certainties offers an alternative by grounding scientific knowledge in a non-epistemic, contextual manner. Thereby he shifts philosophical attention to conceptual issues that stem from science's role in our worldview and society.

For Wittgenstein the philosopher does not need to be ignorant of science. In fact, he remarks: "Is scientific progress useful to philosophy? Certainly, The realities that are discovered lighten the philosopher's task, imagining possibilities" (LWPP I 807). Rhees also recalls Wittgenstein saying every philosopher should have studied science, but not to understand its way of questioning, nor for help understanding reality (CRR p37). It might be that understanding the way science functions can help the philosopher to understand its influence on other parts of life. Child (2019) describes that Wittgenstein was not hostile towards science as such, but towards a scientistic worldview and its dominance in all other facets of life. Some scholars (Hutto and Satne 2018; Beale 2019) labeled Wittgenstein a liberal, relaxed or grammatical naturalist due to the possibility of interaction between science and philosophy, his profound anti-metaphysical stance and the role of observations of natural facts in his method. However, all agree Wittgenstein's

[35] Cited from a letter to Maurice O'Conner Drury, 19/11/1967 (Rush Rhees Collection, UNI/SU/PC/1/13/1).

method is not easily classified as either a form of naturalism or of anti-naturalism. I agree with Beale (2019, 88) to 'stop' at the idea his work has 'naturalistic aspects', a term that sufficiently captures the engagement between science and philosophy I explored in this thesis.

What role would the Wittgensteinian philosopher of science play? As concepts of science find their way to philosophy and daily life, one possible answer is addressing a misappropriation of scientific propositions or challenge dogmatisms in philosophical or societal discourse that originate from a simplistic conception of science (Child 2019, 86). When propositions of science are utilized outside scientific practice they are prone to losing context or nuance. Within the context of scientific practice and its accompanying grammar, concepts like energy[36] or those of quantum mechanics are recognized as extremely difficult to understand rightly, while in public or even philosophic discourse they enter in a simplified form. Wittgenstein exemplifies this by discussing how popular scientists might say that objects that appear solid are not solid at all:

> We have been told by popular scientists that the floor on which we stand is not solid, as it appears to common sense, as it has been discovered that the wood consists of particles filling space so thinly that it can almost be called empty. This is liable to perplex us, for in a way of course we know that the floor is solid, or that, if it isn't solid, this may be due to the wood being rotten but not to its being composed of electrons. To say, on this latter ground, that the floor is not solid is to misuse language. (BB p45) [37].

This reveals a conflation of the language game of 'solidness' in an ordinary context and the different rules of 'solidness' at quantum level. It shows the conceptual misunderstanding when one takes concepts out of their common context. The way 'solid' is used in a common setting is so distant from the solidness in the quantum world they become different concepts, originating from different practices, sharing a common vocabulary (OC 213). It is in this case that the contextual nature of meaning, even in science, shows: "The truth of certain empirical propositions belongs to our frame of reference" (OC 83).

[36] Feynman (1969) names energy as an example of a scientific concept that is very hard to get right, but in scientific education often is presented in an overly simplistic manner.
[37]This relates to Wittgenstein's contempt for popular scientific writings, which he thought greatly contributed to the neglect of other means of understanding the world (Beale 2019, 80).

To conclude, understanding science as activity means recognizing it as a collection of human practices shaped by language games. By describing how non-metaphysical conditions allow for scientific knowledge, Wittgenstein defies traditional prescriptive frameworks and thereby de-idealizes science and positions it as part of our form of life. Thus, Wittgenstein allows for meaningful philosophical engagement with science, true to his method, assessing the influence of practice and culture on science and vice versa. Wittgenstein thereby reduces our philosophical understanding of science to descriptive analysis of practices instead of prescriptive metaphysics.

VII - Conclusory remarks

I hope to have set out throughout the chapters of this thesis the potential interactions between Wittgenstein's philosophical method and philosophy of science. I showed that Wittgenstein's method, characterized by its focus on conceptual analysis rather than epistemic or metaphysical commitments, offers two distinctive ways to engage with scientific practice. After outlining how philosophy of science can be reframed as Wittgensteinian field, I assessed Wittgenstein's method and presented two explicit remarks by Wittgenstein on a positive relation between science and philosophy.

Firstly, within a scientific context, Wittgenstein's method can provide a form of 'conceptual help'. When scientists engage in generalizations or systematic treatises, conceptual analysis may clarify potential ambiguities in the language they use. While this type of philosophical intervention does not offer direct benefits or new scientific results, it fosters a heightened awareness of conceptual preconceptions that may affect their scientific inquiry. This conclusion was ten supported by a case analysis of physicist Heinrich Hertz, whose philosophical reflections on the concept of force demonstrated how conceptual clarification can lead to new scientific approaches, even though these do not directly translate into scientific discoveries.

Secondly, Wittgenstein's conceptual approach does not reject philosophy of science as a field but redefines its scope to understand what sort of activity science is. Contrasting traditional epistemic or metaphysical conceptions aiming to establish absolute foundational principles or universal theories, Wittgenstein's method aims to clarify the concepts and language used in actual scientific discourse and reinterprets science as an essentially human activity. This reading is supported by Wittgenstein's exposition in *On Certainty* of doubt and basic certainties in the grounding of knowledge. Thus, a philosophical conception of science is presented which positions scientific knowledge within forms of life and is sustained by hinge propositions.

Through these two forms of engagement, I have shown that Wittgenstein's philosophical method is not ignoring science, nor is it incompatible with science, thus shedding new light on a much-disputed part of Wittgensteinian scholarship. Additionally, certain 'vexing' issues within philosophy of science, such as the search for an epistemic

foundation to science, are deflated by a contextual understanding of science that is grounded in practice.

Two limitations of this research are the following: Firstly, the social sciences have not been sufficiently explored, as Wittgenstein's references to science generally concern the natural sciences, meaning it is more difficult to project his original remarks on this type of science. Nonetheless, it may be an interesting opportunity to extend my analysis to the social sciences. Secondly, as I identified different forms of engagement between philosophy and science, this thesis resulted in two distinct analyses, even though they are both connected by Wittgenstein's method. Future research could expand the two pathways I discovered, for example by presenting more case studies of conceptual analysis aiding a scientist (perhaps relating to Boltzmann), or investigating the notion of science as activity in relation to the philosophy of education and concept formation.

In conclusion, the research question *Is there a philosophy of science in Wittgenstein's philosophical method*? has been answered positively through the two pathways that I substantiated in this thesis and is supported by Wittgenstein's remarks. Given Wittgenstein's unique method, rooted in practice and resisting traditional divisions in philosophy, I believe we can speak of a new understanding of philosophy of science.

Abbreviated referenced works[38]

By Wittgenstein

NB Wittgenstein, Ludwig. *Notebooks 1914-1916*. Edited by G. H. von Wright and G. E. M. Anscombe. Translated by G. E. M. Anscombe. Oxford: Basil Blackwell, 1961.

TLP Wittgenstein, Ludwig. *Tractatus Logico-Philosophicus*. [1922] Translated by D.F. Pears and B.F. McGuinness. New York: Routledge, 1961.

CV Wittgenstein, Ludwig. *Culture and Value: A Selection from the Posthumous Remains*. Edited by G.H. von Wright in collaboration with H. Nyman. Revised edition of the text by A. Pichler. Translated by P. Winch. Oxford: Blackwell, 1977/1998. [German–English parallel text.]

LC Wittgenstein, Ludwig. *Lectures and Conversations on Aesthetics*. Edited by Cyril Barrett. Oxford: Blackwell, 1978.

BT Wittgenstein, Ludwig. *The Big Typescript: TS 213* [1933]. Edited and translated by C.G. Luckhardt and M.A.E. Aue. Chichester: Wiley-Blackwell, 2005. [German–English parallel text.]

BB Wittgenstein, Ludwig. *The Blue and Brown Books*. Edited by Rush Rhees. Translated by Peter Winch. 2nd ed. New York: Harper Perennial, 1990.

PI/POP Wittgenstein, Ludwig. *Philosophical Investigations*. Translated by G.E.M. Anscombe, P.M.S. Hacker, and Joachim Schulte. 4th rev. ed. Oxford: Wiley-Blackwell, 2009. References to Part I under PI and Part II under POP.

RPP I/II Wittgenstein, Ludwig. *Remarks on the Philosophy of Psychology* (Vol. 1 & 2). Edited by. G.E.M. Anscombe and G.H. von Wright. Translated by G.E.M. Anscombe. Oxford: Blackwell, 1980.

LWPP I/II Wittgenstein, Ludwig*. Last Writings on the Philosophy of Psychology,* (Vol. 1 & 2)*.* Edited by G. H. von Wright and H. Nyman. Translated by C. G. Luckhardt and M. A. E. Aue. Oxford: Basil Blackwell, 1982.

Z Wittgenstein, Ludwig. *Zettel*. Edited by G.E.M. Anscombe and G.H. von Wright. Translated by G.E.M. Anscombe. Oxford: Wiley-Blackwell, 1981.

OC Wittgenstein, Ludwig. *On Certainty*. [1951]. Edited by G.E.M. Anscombe and G.H. von Wright. Translated by D. Paul and G.E.M. Anscombe. Oxford: Blackwell, 1969/1974. [German–English parallel text].

Lectures and conversations

WVC Waismann, Friedrich. *Wittgenstein and the Vienna Circle: Conversations recorded by Friedrich Waismann*. [1929–1932]. Edited and translated by B.F. McGuinness. Oxford: Blackwell, 1979.

MWL Wittgenstein, Ludwig, and George Edward Moore. *Wittgenstein: lectures, Cambridge, 1930-1933: from the notes of GE Moore*. Cambridge UK: Cambridge University Press, 2016.

CRR Wittgenstein, Ludwig, Rush Rhees, and Gabriel Citron. *"Wittgenstein's philosophical conversations with Rush Rhees (1939–50): From the notes of Rush Rhees*." Mind 124, no. 493 (2015): 1-71

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PM Hertz, Heinrich. *The Principles of Mechanics presented in a New Form, translated*. [1894] Translated by D.E. Jones and J.T. Walley. New York: Dover, 1956.

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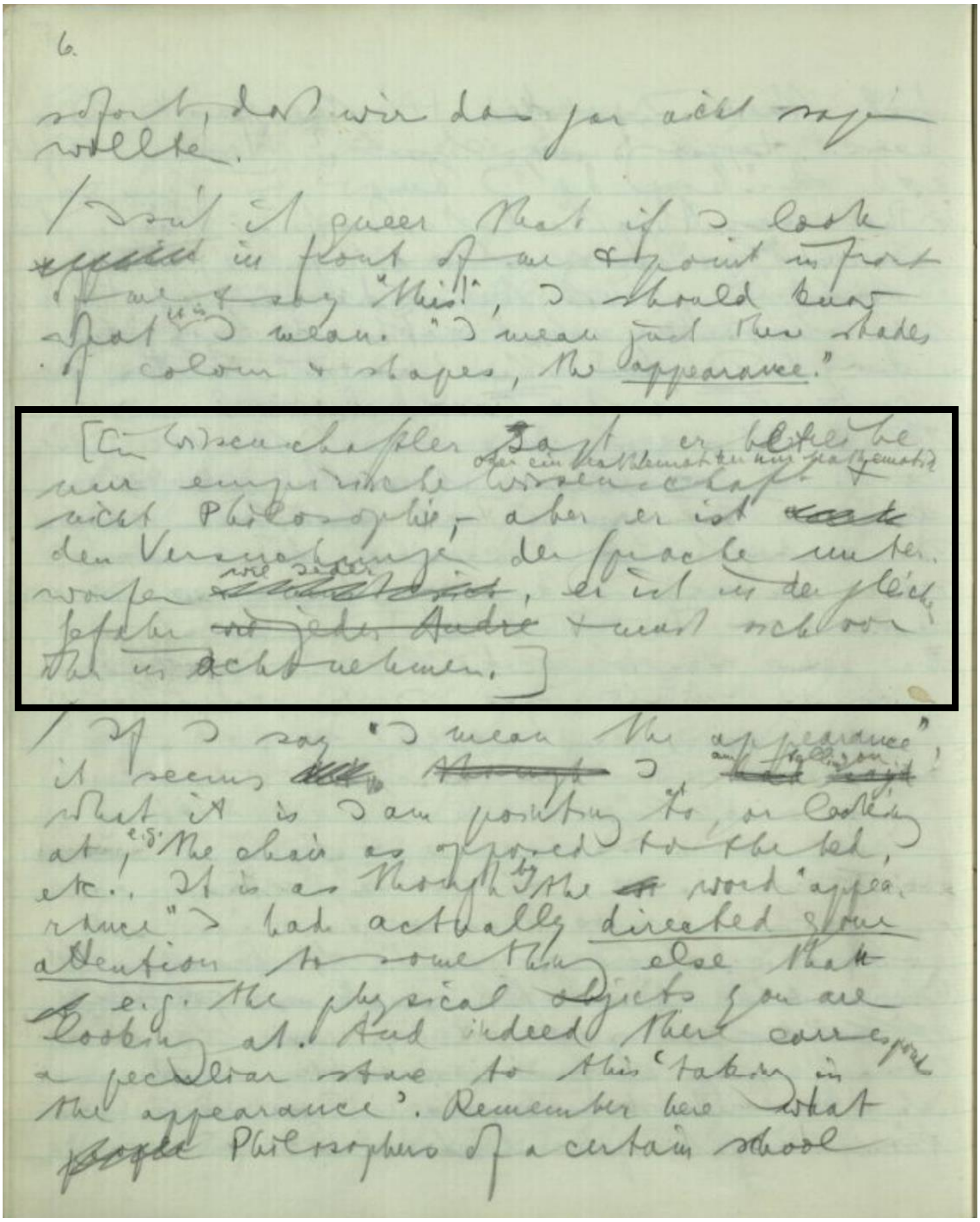
6.

sofort, daß wir das gar nicht sagen wollte.

/ Isn't it queer that if I look in front of me & point in front of me & say "this!", I should know what I mean. "I mean just these shapes of colour & shapes, the appearance."

[Ein Wissenschaftler sagt er betreibe (oder ein Mathematiker nur Mathematik) nur empirische Wissenschaft & nicht Philosophie, aber er ist den Versuchungen der Sprache unterworfen wie wir selber, er ist in der gleichen Gefahr & muss sich vor ihr in acht nehmen.]

/ If I say "I mean the appearance", it seems as though I by this means said what it is I am pointing to, or looking at, e.g. the chair as opposed to the bed, etc. It is as though by the word "appearance" I had actually directed your attention to something else than e.g. the physical objects you are looking at. And indeed there corresponds a peculiar stare to this 'taking in the appearance'. Remember here what Philosophers of a certain school