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The methods of metaphilosophy

Kant, Maimon, and Schelling on how to philosophize about philosophy

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0 Introduction

In this work, I investigate the thought of three philosophers — Immanuel Kant, Salomon Maimon, and Friedrich Wilhelm Joseph Schelling — under the hypothesis that all of them contribute a methodological solution to the problem of establishing the scientificity of theoretical philosophy. They all engage in an attempt "to promise [...] to metaphysics the secure course of a science" (KrV, Bxviii-xix). While nowadays the project of a 'scientification' of philosophy has been abandoned by most philosophers, things looked quite differently for philosophers throughout modernity, and especially so at the end of the 18th century. These philosophers did not pursue such a project out of delusions of grandeur, nor due to gross neglect for scientific practice and its standards. On the contrary, their renewed push for a scientification of philosophy arose from direct engagement with the sciences and their methods. In light of the revolutions in modern science, philosophers began to feel a pressure to secure the scientific status of their own discipline. From Kant's *Critique of Pure Reason* (1781/1787) onwards, and throughout the majority of German idealism, we can trace an on-going debate about what theoretical philosophy is, and what it ought to be, framed within the context of science.[1] This book is dedicated to investigating one specific methodological programme that evolves from these

[1] I agree with Franks who defines German idealism as a "family of philosophical programs" that share "a common origin in Kant's critical philosophy", and "seek to complete the revolution begun by Kant", which can be condensed to the claim that the truth of synthetic a priori propositions such as those in physics or mathematics "consists [...] in conformity to the *a priori* conditions of human knowledge, which constitute the objects of human knowledge, objects that are thus mind-dependent" (2005, pp. 13-4).

debates: that of devising a methodological solution to the problem of how philosophy can investigate itself.

This research programme arises from a specific concern with philosophy *about* philosophy, which I call "metaphilosophy-first". And what unites its proponents is their shared view that all philosophy must begin with a methodological investigation into what philosophy as science should look like. In other words, metaphilosophy is not treated as that one branch of philosophy concerned with metaphilosophical theories, but as *the* fundamental discipline, in which all other philosophical disciplines must be grounded. Moreover, metaphilosophy-first views hold that metaphilosophy, as the fundamental science, must come in the form of a specific method. Beginning with Kant, and continuing throughout German Idealist philosophies, one is bound to encounter a rich variety of philosophical methods that are specifically designed for the purpose of producing metaphilosophical theories. These metaphilosophical theories are concerned not only with "the inquiry into the nature of philosophical question and the methods (to be) adopted in answering them" (Overgaard, Gilbert, & Burwood, 2013, p.4): what characterises metaphilosophy-first as a family of research programmes is exactly that it contains an investigation into the nature of *metaphilosophical method*, inquiring into the nature of metaphilosophical questions and the methods to be adopted in answering them.

My focus in this work will be on Kant's *propaedeutic method*, Maimon's *method of fictions*, and Schelling's *method of nature-construction*. I shall argue that it is through the theoretical lens of this specific understanding of metaphilosophy-first that we can understand them as unified by one research programme. In contrast to other metaphilosophy-first programmes of the time, all three philosophers are united in their metaphilosophical belief that the philosophical methods used to answer metaphilosophical questions must be developed in continuity with the methods of the sciences. As early philosophers of science, Maimon and Schelling follow Kant in designing their methodological solutions in light of some of their conclusions from the reflective enterprise of analysing the forms of theoretical and experimental practice within certain sciences, and especially their analyses of sciences that were still in formation. It is my contention that their solutions to the problem of

metaphilosophical method are continuous with earlier programmes of experimentalist philosophy. In the spirit of the *Instauratio Magna*, and its calls for a methodological revolution in the sciences, Kant, Maimon, and Schelling sought to overcome the limits of the "speculative", non-scientific, philosophy of their day through a revolution in philosophical method. Moreover, they integrated the idea that "observations and experiments can ground philosophical claims" (Anstey & Vanzo, 2016, p. 87) into the domain of metaphilosophy, developing experimental methods for the investigation of philosophy itself. However, and this will be the core concern of this book, this led Kant, Maimon, and Schelling to advance their own brand of philosophical experimentalism. As we will see, to establish the nature of a philosophy that is truly scientific, they put forward a method that is both speculative *and* experimental.

In preparation for the study of the individual metaphilosophical methods and their connection to a distinct research programme, I provide a brief introduction to the discipline of metaphilosophy, and show how this discipline is conceptualised within the context of Kant's broader philosophical framework. I then give a brief outline of how this leads Kant to his commitment to metaphilosophy-first, and why this commitment results in a methodological research programme that is taken up by many Early Post-Kantians. In turn, this will necessitate a preliminary exploration of some of the concepts and methods that characterise the context of Modern science, within which theoretical philosophy needed to assert its status as a proper science.

0.1 Metaphilosophy

Since the beginnings of Western philosophy, and up until today, one important area of philosophical research has been dedicated to questions about the nature of philosophical investigation itself. This field of study—commonly referred to as 'metaphilosophy'[2]—deals with questions about what philosophy is, what its purposes are, and how it should be done. Throughout history, there has been a notable divide between

[2] Morris Lazerowitz (1940) is usually considered to have coined this term, see Reese (1990, p. 28).

two ways of understanding the metaphilosophical project—as *descriptive* or *prescriptive*—which concern the ways in which metaphilosophy approaches its objects and goals. While prescriptive metaphilosophy tells us what philosophy *ought to be*, its descriptive counterpart tells us what philosophy *is*.[3]

An increasing number of contemporary metaphilosophers subscribe to the view that metaphilosophy is to be understood as a *descriptive* project.[4] Their metaphilosophies typically study which concepts, principles, and methods different philosophical schools or traditions have been employing, and for what purposes.[5] Just as there is something to be said about *what* the sciences do, *how* they do what they do, and *why* they do what they do, there is something to be said about what *philosophy* does, how philosophy does what it does, and why it does what it does. As Pettersson notes, "the distinctive quality in the attitude of descriptive metaphilosophy is that it is not judgmental about what actually is good or bad philosophy. Instead, the practitioners of descriptive metaphilosophy remain as neutral spectators outside philosophical disagreements and focus on describing philosophy as it really functions—or has functioned during its history—warts and all" (Pettersson, 2019, p. 133).

Before the increased emphasis on metaphilosophy as a descriptive project, however, the study of the nature of philosophy was mostly conceived of as a prescriptive project. That is, although philosophers such as Hume and Spinoza did study and describe the nature of other philosophical programmes than their own, they also clearly took sides. Most metaphilosophical projects in the past two thousand years have in fact made judgments about what distinguishes good and bad philosophy. For a long time, the main role of metaphilosophical contributions

[3] Glock (2008, p.3); (2013, p.35–6).

[4] This is how I understand the tenor of Overgaard, Gilbert, & Burwood (2013), Rescher (2014), and most recently Pettersson (2019).

[5] One possible starting point of the discipline is the founding of the journal *Metaphilosophy* in 1970. Other possible origins are connected to Lazerowitz's *Studies in Metaphilosophy* (1964), as well as Rorty's *Linguistic Turn: Recent Essays in Philosophical Method* (1967). For discussion, see Petterson (2019, pp. 113-16).

was to take a stand for or against different conceptions and methods of philosophy. Many of these contributions also aimed at the explicit development of "recipes" for what philosophy ought to be, ought to do, and how it ought to proceed. As we will see, Kant, Maimon, and Schelling's metaphilosophies also fall under this broad prescriptive category of metaphilosophical conceptions. All of them are interested in theories and methods for establishing the right kind of philosophy, and all of them think that this can only be achieved by applying one specific method, which takes up the same status and role as *the* scientific method in mathematics and natural science.

Although I see the appeal of applying these categories to distinguish between methodological differences in metaphilosophy, I shall propose that we accept another distinction in its place: (i) metaphilosophy that has *metaphilosophy as its goal*, and (ii) metaphilosophy that has *philosophy as its goal*.[6] The first type of metaphilosophy largely overlaps with what has been described under the category of descriptive metaphilosophy: it aims at a neutral stance from which to study different varieties of philosophical theories and methodological approaches, in order to describe their similarities and differences. Their goal is to produce philosophical arguments to support metaphilosophical theses. The second type, on the other hand, engages in metaphilosophical inquiry with a different goal. These inquiries typically produce metaphilosophical arguments to support philosophical theses. Indeed, many philosophers (including the ones mentioned when discussing prescriptive metaphilosophy) engage in metaphilosophical discussions because they claim to have good reasons for doing the kind of philosophy they do. In this case, metaphilosophy can serve to license specific philosophical positions, theories, and methodologies.

Now, whatever stance is driving one's metaphilosophical reflections, it remains philosophy *about* philosophy. But to say this is not to conceive of metaphilosophy as a second-order inquiry that "look[s] down on philosophy from above, or beyond" (Williamson, 2007, p. ix), but rather as a branch of first-order philosophy which engages with philosophy as its object of study. As Heidgger pointedly remarked, all metaphilo-

[6] I am indebted to Markus Wild for making me aware of this point.

sophical projects must grapple with a particular circumstance intrinsic to this endeavour:

> When we ask, "*What is philosophy?*" then we are speaking *about* philosophy. By asking in this way we are obviously taking a stand above and, therefore, outside of philosophy. But the aim of our question is to enter into philosophy, to tarry in it, to conduct ourselves in its manner, that is, to "philosophize". The path of our discussion must, therefore, not only have a clear direction, but *this direction must at the same time give us the guarantee that we are moving within philosophy* and not outside of it and around it. Heidegger (1956, p. 21) [emphasis added].

This problem lies at the heart of the metaphilosophical inquiries that will concern me in this work. When philosophy turns to studying its own nature, it might at first seems as if it takes an 'outside' perspective on its object of study. Yet, the very activity that is employed to study this object, the manner in which we conduct ourselves during this investigation, can only be called philosophising. If metaphilosophy is to be first-order philosophy about philosophy, however, then it gets harder to see how one can take a truly descriptive stance toward their object of study. It seems that metaphilosophical inquiry "cannot and should not be philosophically neutral", that it is always "just more philosophy, turned on philosophy itself" (Williamson, 2007, p. 6-7). On an uncharitable reading, it looks as if metaphilosophy, whatever its goal, might turn out to be biased and circular after all.[7]

Let me explain this in some more detail. Suppose, for example, that a metaphilosophical inquiry has as its goal to determine the nature of philosophical method. To do so, it must philosophise about philosophy. That is, it must operate in a certain manner in order to investigate its object of study—philosophical method—and determine its nature. I exclude here *non-philosophical* methods that are employed for the aim of

[7] Petterson discusses two forms of circularity that endanger the metaphilosophical project: that of (i) *circulus in defiendo*, and that of (ii) *circulus in demonstrando*. (i) is not problematic because "this circle of self-understanding is exactly what metaphilosophy is about"; the circularity only arises if philosophy and metaphilosophy are understood as two autonomous and clearly distinct projects that require separate definitions (2019, p. 119). Circularity of kind (ii) is more serious, and identical with the one I describe above, as it arises from the fact that "in metaphilosophy's case the subject matter and the phenomenon studying it *are by definition the same* (ibid., p. 120 [emphasis added]).

producing metaphilosophy from this discussion, e.g., historical, sociological, or anthropological methods. But then what is the nature of the method by which this metaphilosophical inquiry proceeds? Following Williamson's credo, for example, it would have to be the philosophical method at issue. After all, it is philosophy of philosophy (Williamson, 2007, p.ix). But then, by investigating in this way, aren't we already partial? Have we not already implicitly decided on a method that we take to be appropriate for philosophical inquiry, namely the one by virtue of which we proceed to examine philosophy? Even worse, have we not already presupposed the nature and legitimacy of the very thing we set out to investigate?

Take another example. If I am trying to explicate and argue for the validity of conceptual analysis, and my methodological tool for doing so is nothing other than conceptual analysis, am I not already presupposing what I am trying to demonstrate? We can illustrate this by drawing a contrast with a project similar to metaphilosophy: in philosophy of science, for example, the method of investigation is clearly differentiated from the scientific practice under scrutiny. In contrast, in metaphilosophy (i.e., philosophy of philosophy), what is being studied and what is studying it are by definition identical. How can there be philosophy of philosophy, then, that studies the nature, methods, and role of philosophy in a principled, but non-circular, way? If we were to define yet another distinct science that studies the nature and method of metaphilosophy, i.e., metametaphilosophy, we would end up in an infinite regress. But simply failing to reflect on the very thing by which philosophy is investigated exposes metaphilosophy to the charge of arbitrariness.[8]

It seems, then, as if metaphilosophies, so understood, cannot justify the validity of their own methods, since they cannot provide further arguments for their methods of argumentation without either accepting their own partiality or becoming circular.[9] Metaphilosophies which

[8] See Petterson (2019, pp. 119-121).

[9] One further option would consist in the adoption of a pragmatic explanation. A metaphilosophy of this kind takes a successful practice as its starting point and then proceeds to extract the norms implicit to it. Still, even with such explanations, we can press the following point: what makes a practice successful? And where do we get those criteria from?

aim at the advancement of, say, a particular way of doing philosophy, do seem to have an advantage in this matter. It is inherent to such projects that they will legitimise the kind of philosophy they encompass, of the one they judge to be "good" or valid. One, if not *the*, central task of this type of metaphilosophy lies exactly in simultaneously describing what good philosophy is while *doing good philosophy*. In this case, metaphilosophy can either take up some known conception of philosophy and defend it, or it can articulate its own conception of good philosophy and simultaneously argue for its validity. Nevertheless, this second type of metaphilosophy will have to accept the partiality and/or circularity of its argumentation.[10]

Returning to Kant: Kant's metaphilosophical theses initiate a research programme which underwent several variations throughout Early Post-Kantianism. His first thesis consists in the declaration that there simply exists no metaphysical conception which would deserve the label 'scientific'. For this reason, he sets out to develop a new philosophy, i.e., a metaphilosophy, that will be equipped to determine what a scientific metaphysics must look like. This is the project of the *Critique of Pure Reason*. What qualifies the resulting research programme is that it commits to the view that metaphysics, to become a proper science, must become metaphilosophy first, and that this metaphilosophy must acquire a methodology that is specifically suited to the specific nature of its task.

0.2 A philosophy designed to be metaphilosophy-first

Kant writes the first *Critique* with a specific purpose in mind: "to promise [...] to metaphysics the secure course of a science" (KrV, Bxviii-xix).

[10] Certainly, there are various ways to deal with this problem, for example by first admitting that metaphilosophy is circular but then insisting that not all circles must be bad or vicious circles. We can argue that if we put our explanandum "in its rightful place in a big enough tent of related concepts [...], then we will succeed in shedding light—from within—on [the notion at issue]" (Della Rocca, 2020, p. 107). See Della Rocca (2020, pp. 107-111, 138) for criticism (that would certainly have been much appreciated by Maimon and Schelling) of this strategy.

His investigation is built upon three central premises. First, Kant submits that science is both possible and actual, its instances being logic, mathematics, and physics.[11] Second, he determines that, in contrast, metaphysics does not yet qualify as a science. Hence, philosophical science is not actual, and philosophy must begin by investigating whether it is possible for it to be a science at all. In more detail, Kant's diagnosis consists in the insight that

> *[m]etaphysics*—a wholly isolated speculative cognition of reason that elevates itself entirely above all instruction from experience, and that through mere concepts (not, like mathematics, through the application of concepts to intuition), where reason thus is supposed to be its own pupil—has up to now *not been so favored* by fate *as to have been able to enter upon the secure course of a science,* [...]. [T]here is no doubt that up to now *the procedure of metaphysics* has been a mere groping, and what is the worst, a groping among mere concepts. (KrV, Bxv)

Kant's 'groping' metaphor indicates, thirdly, what Kant identifies as the reason for metaphysics' failure to become a proper science: metaphysics does not yet have a rigorous (read: scientific) procedure. His point is not, as some have claimed,[12] that all metaphysics is impossible, and hence must be replaced with epistemology, but that the nature and limits of metaphysical cognition must be investigated to determine the ways in which the procedure of metaphysics must be transformed in order to attain the qualities of scientific cognition.[13] By establishing what metaphysical cognition can (and should) consist in, that is, what its conditions of possibility are, it can be shown that metaphysics *is* possible

[11] Kant articulates his conception of what he takes to be a science proper most explicitly in the *Metaphysical Foundations of Natural Science* (2004b), i.e., (MNS, AA 04, 467-470).

[12] Kant is by means the "all-crushing destroyer of Metaphysics" (Mendelssohn 1785, pp. 91, 93) he is sometimes made out to be in, e.g., Ameriks (1992). Kant does not argue for the impossibility of metaphysics; he argues for the impossibility of *special* metaphysics, but not of *general* metaphysics, which philosophy ought to produce according to the right procedure, i.e., through experimental but rational cognition from concepts.

[13] For a long time, and particularly amongst many of his contemporaries, Kant's metaphilosophy has been perceived as leading the way to an 'elimination of metaphysics' (see e.g., Carnap (1932)). Or, as Hegel notes, "what was hitherto called "metaphysics" has been, so to speak, extirpated root and branch, and has vanished from the ranks of the sciences." (2010 [1813]: 7).

as science. Namely, if it adheres to a procedure that remains within the limits of its epistemic possibilities, then metaphysics is possible as a kind of general metaphysics, and can even assume some of the former tasks of earlier metaphysical systems.[14]

What is often overlooked or downplayed is his insistence that, to do so, the *Critique* must take the form of "propaedeutic philosophy".[15] Rather than just devising a new philosophy that has the right properties to qualify as science, Kant argues for the necessity of a propaedeutic philosophy that is distinct from metaphysics:

> Now the philosophy of pure reason is either *propaedeutic* (preparation), which investigates the faculty of reason in regard to all pure *a priori* cognition, and is called *critique*, or, second, the system of pure reason (science), the whole (true as well as apparent) philosophical cognition from pure reason in systematic interconnection, and is called *metaphysics*. (KrV, A841/B869)

Kant distinguishes between the critical project as propaedeutic philosophy and the metaphysical project as science. Metaphysics is described as a particular kind of cognition, i.e., "*a priori* cognition from pure reason in systematic interconnection" (KrV, A841/B869). Kant holds that the study of metaphysics, as well as the study of some other sciences, must entail the study of a specific kind of cognitive activity, e.g., metaphysical cognition. He further believes that the cognitive activity of metaphysics can only enter the secure path of a science when it is investigated through another philosophical discipline, namely that of so-called "propaedeutic" philosophy.

According to Kant, the task of propaedeutic philosophy is to "investigate [...] the faculty of reason in regard to all pure *a priori* cognition, and is called *critique*" (KrV, A841/B869).[16] More precisely, propaedeutic philosophy must investigate the conditions of possibility of all a priori cognition in order to be able to determine the conditions of scientific metaphysics. We will see that, by contending that propaedeutic philo-

[14] See De Boer (2015).

[15] Two interesting contributions in this respect are Serck-Hannsen (2015) and Ferrarin (2015); both discuss the implications of understanding the *Critique* as propaedeutic.

[16] In chapter 1, we will see that Kant sets up this distinction with a less definite difference in mind than I present it to be here.

sophy defines the structure of intentionality as such (i.e., the general structure of what human thought and perception can be about), propaedeutic philosophy also defines the scope and limit of any other science. In offering a "treatise of method" (Bxxii), the *Critique* employs a set of procedures for establishing the cognitive structure fundamental to any rational inquiry and representation of what there is. The correct procedure for scientific metaphysics can only be determined on the grounds of an a priori critique of pure reason. As I claim in the first chapter, the *Critique of Pure Reason* thereby advances a scientific programme that puts metaphilosophy in the place of first philosophy; it is *metaphilosophy-first*.[17]

The first *Critique* and its project of a propaedeutic philosophy in fact only concerns one part of Kant's metaphilosophy, while others can be found elsewhere.[18] When talking about Kant's "general metaphilosophy", we should have his full conception of philosophy in mind, i.e., his concept of "cosmic philosophy"[19] [*Weltbegriff der Philosophie*] (KrV, A838/B866), which conceives of philosophy as "the science of the

[17] Thus, although I focus on epistemological readings of Kant's philosophy, I do not think that his project should be characterized as an epistemology-first project. Its primary objective is not to provide a theory of knowledge and justification, but to show how metaphysics is possible as science. Certainly, determining whether theoretical philosophy can count as science (and if so, under which conditions) *requires* a theory of knowledge and justification, but it also includes a theory of representation and of object constitution.

[18] There is certainly also a lot to be said about the transition from the A to the B Edition. Kant shifts from a focus on the question of why our representations have objective validity to a focus on the possibility of synthetic a priori judgments. Förster has offered convincing arguments to suggest that this shift also happens for metaphilosophical reasons (2012, p. 46f.). Kant notes in his now-famous letter to Kästner in August of 1790: "[T]he efforts I have heretofore made are in no way meant (as they may appear to be) to attack the Leibniz-Wolffian philosophy (for I find the latter neglected in recent times). My aim is rather to pursue the same track *according to a rigorous procedure* and, by means of it, *to reach the same goal*, but only *via a detour that*, it appears to me, *those great men seem to have regarded as superfluous: the union of theoretical and practical philosophy*. This intention of mine will become clearer when, if I live long enough, I complete the reconstruction of metaphysics in a coherent system." (AA 11, 186 [emphasis added]).

[19] See Ferrarin (2015) for a thorough study on Kant's concept of "cosmic philosophy".

relation of all cognition to the essential ends of human reason" (KrV, A839/B867), including its concern with moral philosophy, "the entire vocation of human beings" (ibid.). His complete metaphilosophy includes not only thoughts on how metaphysics can become a science, but also concerns with morality, religion, and anthropology. What interests me in this work, then, is in fact Kant's meta-metaphysics, and not his general metaphilosophy.[20] For purposes of simplicity, however, I will keep referring to this project as Kant's metaphilosophical project.

As mentioned above, Kant's conception of propaedeutic philosophy as a philosophical discipline, which must "transform the accepted procedure of metaphysics" into proper science, is inextricably connected to the project of finding the appropriate methodology for doing so. What's more, he seems to hold that an execution of his propaedeutic project depends on his success at finding the right method of philosophising in the mode of metaphilosophy. As becomes evident in the B Preface, and elsewhere, Kant was very aware that in order establish metaphysics as science, he not only needed to determine its own conditions of possibility, but also a designated procedure through which such a self-investigation would be possible at all. The *Critique* is not only a work *on* philosophical method, but also a work *of* a particular philosophical method. This is where we get to argumentative core of this book. I shall argue that, from his quest to establish a philosophy that responds to the requirements of metaphilosophy-first, Kant gives rise to a family of research programmes which are explicitly concerned with finding a *philosophical methodology* that is appropriate to this task.

Looking at the B Preface again, it is quite easy to see that, firstly, Kant does offer a particular methodological approach by virtue of which he aims to execute the propaedeutic project, and secondly, that this methodological approach—in part explicitly, in part implicitly—contains the specific resources which are required for executing the type of investigation that is pursued in metaphilosophy which has philosophy as its

[20] Note that this must not imply that I am committing to a metaphysical reading of Kant, as we find for example in Heidegger (1990). In fact, I will interpret Kant more along the lines of so-called epistemological readings (e.g., Cohen (1885)), since this is how he was interpreted by Maimon and Schelling, and this is the conception that their programmes are responding to.

goal. I contend that Kant thereby initiated a specific research program in metaphilosophy which specifically connects the problem of scientificity in theoretical philosophy with the problem of metaphilosophical methodology. Recognising this metaphilosophical programme offers a new interpretative approach to many strands of Early Post-Kantian philosophy. Beginning with Reinhold's method of reflection, Maimon's method of fictions, through to Jacobi, Fichte, and Schelling's methods of philosophical construction, and maybe ending with Hegel's development of the speculative method, the philosophical discussion of this period is rife with methodological proposals of this nature. Under my hypothesis, these conceptions of philosophical method should be classified under the proposed description of metaphilosophy-first, which sets out to determine the possibility of theoretical (and practical) philosophy, thus providing a rationale for their continuous appearance in Early Post-Kantianism.[21]

0.3 Scientific tools for metaphilosophy: finding the right procedure

In this book, I include three in-depth studies of such methodological programmes: Kant's propaedeutic method, Solomon Maimon's method of fictions, and Friedrich Schelling's method of nature- construction. I shall argue that Kant's idea of a propaedeutic method is adopted and advanced by Maimon and Schelling, whose metaphilosophies can thus be seen as versions of the former's research programme; they can be seen as ways of conceiving of philosophical procedures that validate their own legitimacy through the course of their application, all while investigating the possibility of that activity which they are themselves instances of, i.e., theoretical philosophy. Regarding the previous discussion of the particular problems which metaphilosophical projects of this type will have to face, Kant, Maimon, and Schelling's procedures reflect different

[21] There exists a variety of studies on individual authors and their thoughts on philosophical method, but almost no systematic work on the metaphilosophical debate throughout German idealism. Exceptions are Ende (1973) and Taureck (1979), on the method of construction in German idealism, as well as more recently Franks (2005), on the notion of "philosophical systems".

strategies for how to respond to the charges of partiality and circularity. It is part and parcel of their metaphilosophical procedures that these adhere to a scientific standard themselves.

To understand what links these three metaphilosophies more specifically, our theoretical lens must transcend the purely philosophical context (if there is such a thing). Michael Friedman (1992) famously argued that Kant's philosophical project was deeply committed to finding a philosophy adequate to the sciences of his day. He interprets the first *Critique* as a crucial part of Kant's attempt to articulate the metaphysical foundations of all sciences. I shall argue that this concern with the mathematical and natural sciences of his day not only plays an important role when it comes to Kant's metaphilosophical project, but also in Maimon and Schelling's. What unites their methodological approaches, beside their specific metaphilosophical goals and tasks, is that each of these philosophers saw his method as standing *in continuity with* some, or many, methods of the natural sciences. While Kant's conception of propaedeutic method links to experimentation in the natural sciences, and in particular to experimental chemistry, Maimon's method of fictions draws on theories of differential calculus as they were applied to experimental physics and other areas of science at the time. Schelling, finally, derives much of his conception of nature-construction from these two contexts but also, and more importantly, from the contexts of new experimental sciences such as magnetism, galvanism, and electricity. For the remainder of the introduction, I want to elucidate some general scientific concepts or procedures which had an important influence on the development and progress of those sciences which influenced Kant, Maimon and Schelling's methodological conceptions.

One of the major motivations for Kant's first *Critique* was to articulate a conceptual framework that makes explicit the concepts and principles that were used by the science of his time to describe, predict, and explain nature. As indicated in earlier sections, Kant believed that, by accounting for the possibility of the a priori cogntion of objects in general, his proposal would not only explain the possibility of metaphysics, but also the possibility of all other sciences. The achievement of this goal was deeply intertwined with Kant's conceptualisation of a historical event which is usually referred to as "the mathematisation of

nature". An important reason for the rapid development and progress of the natural sciences, as well as the spread of new sciences around the 17th and 18th century, was the successful application of mathematics to nature, and the practices of experimentation and idealisation that came with it.[22] One influential expression of this "mathematisation thesis" can, for example, be found in Galileo's statement that "[the book of nature] is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to comprehend a single word of it" (Galileo, 1957, p. 3). Taking up the intellectual heritage of Archimedes, scientists after Galileo began to "mathematise" physics. That is, they committed to the assumption that the relationships between physical magnitudes can be expressed as mathematical relations. Mathematics was thereby elevated from the status of an "abstract science exploring the relation of numbers", as the guiding assumption had by then become that "in these relations lies a model of physical reality" (Hall, 1960, p. 80).

Scientists such as Galileo, and later Newton, held that mathematical equations can be used to express the necessary and universal connections between physical objects and properties, e.g., to describe the motion of bodies. Depending on its formulation, the mathematisation thesis includes one or two separate assumptions. First, the assumption just discussed, namely that mathematical objects represent physical phenomena. Second, it could moreover include the additional assumption that mathematical representations are appropriate means for the representation of nature because physical objects *are* mathematical objects. Many of the natural philosophers who influenced Kant's views on science argued for realist accounts that explained nature *in terms of* mathematics, thus proposing that nature is inherently mathematical (e.g., Galileo, Newton, Leibniz).[23] This viewpoint goes against the Aristotelian framework of science, which took mathematical properties to be accidental in nature, and the study of planetary motion to be concerned with celestial, i.e., non-physical, phenomena. The new astronomers, with Kepler lead-

[22] For an overview of the mathematical revolution in natural philosophy, see Mahoney (1998, pp. 702-55).

[23] For an overview of these developments, see the classics Burtt (1925) and Hall (1963, pp. 36-103), or more recently Gaukroger (2010).

ing the way, advocated for an alternative approach that treats planetary motions as terrestrial, physical phenomena. According to the latter's Platonism, the Copernican hypothesis[24] was re-interpreted as an argument for the inherent mathematical character of nature, and fuelled the mathematical realism of Early Modern scientists. Thus, the programme of mathematising nature would not only take as an assumption the epistemic thesis that mathematical reasoning and equations are useful to make nature's phenomena computationally tractable and predict their course (e.g., Copernicus 1973 [1543][25]), but would sometimes also adopt the ontological thesis that nature's structure is in fact inherently mathematical, and that it is by virtue of its ontology that nature is representable and describable by virtue of mathematics.

In the spirit of Newton's dictum, Kant, too, committed to the view that "with the help of philosophical geometers and geometrical philosophers, instead of the conjectures and probabilities that are blazoned about everywhere, we shall finally achieve a science of nature supported by the highest evidence" (Newton, 1984). Kant aimed at the construction of a philosophical theory that would not only ground *metaphysics* as science, but also the mathematised natural sciences as such. In doing so, he assumed a specifically modern conception of science, whose goal it is to capture the totality of all natural phenomena by establishing the general and necessary laws that govern them. He took these laws to be attained (i) through the language of mathematics, and geometry in particular, (ii) through scientific experimentation that allows this language to make physical arguments, and (iii) through employing deliberate idealisations in scientific descriptions and explanations, which allowed natural phenomena to be amenable to mathematical repres-

[24] Copernicus still adhered to an Aristotelian picture of science, looking at the celestial and the terrestrial as two different domains of being that are governed by distinct laws; see Martens (2000, pp. 26-30).

[25] With regard to the 'mixed sciences', i.e., sciences that both included mathematical computation and empirical physics, such as astronomy and optics, Copernicus defended the view that since these "cannot in any way attain to the true causes, [they] will adopt whatever suppositions enable the motions to be computed correctly from the principles of geometry . . . these hypotheses need not be true or even probable." (1978/1543, p. xvi)

entation.[26] His propaedeutic was then to propose an account of the mind-world-relation that coheres with this scientific framework, in the sense that its facticity informs the way in which Kant models the exact relation between different kinds of cognition and their objects, such as mathematical cognition or empirical cognition.

Now, many studies on Kant's philosophical methodology have focused on his philosophy of mathematics, and especially on his understanding of Euclidean geometry as a language in which one could both state laws of nature and make physical arguments through diagrammatic constructions.[27] However, as I will explain in the first chapter, correctly understood, Kant's conception of Euclidean construction does not play any important role in the development of his metaphilosophical procedure in the *Critique*.[28] In the Doctrine of Method, he argues that philosophical cognition is disanalogous to mathematical

[26] This programme thus integrates so-called 'mathematical', as well as 'experimental' traditions. See Kuhn (1977, pp. 31–65) and Hacking (1975), the latter of whom contrasts the 'high' (i.e., mathematical) sciences with the 'low' (i.e., probabilistic) sciences such as medicine and alchemy, which reason probabilistically rather than conclusively.

[27] For Kant, Euclidean geometry presents a methodological ideal of how a priori cognition of objects is possible, and hence how scientific cognition is possible. On his account, the geometrical method serves as a model for a type of scientific cognition which can define its concepts in a synthetic manner and thus can not only infer but demonstrate their reality. Crucially, he thinks mathematics is capable of something all other sciences lack, namely, of constructing its concepts in pure intuition. On his view, "to construct a concept means to exhibit a priori the intuition corresponding to it" (KrV, A713/B741). In contrast to physicists, geometers can "construct a triangle by exhibiting an object corresponding to this concept, either through mere imagination, in pure intuition, or on paper, in empirical intuition, but in both cases completely *a priori*, without having had to borrow the pattern for it from any experience" (KrV, A713-4/B741-2). What characterises mathematical construction, in a nutshell, is that it has a way of proving its propositions through the immediate construction of the sensible objects which they refer to, generating a priori singular instances, i.e. intuitions, of the concepts constructed, which at the same time exemplifies their universal properties. Mathematical argumentation can proceed progressively, "through a chain of inferences that is always guided by intuition" (KrV, B745), thus ensuring the objective validity of and non-triviality of its propositions.

[28] Rather, these reflections play an important role in his analysis of the nature of synthetic a priori judgments.