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Grounding the World

The Dissemination of Occasionalism in Early Modern Germany

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SUMMARY

This PhD dissertation analyses the role that occasionalism plays in projects of philosophical grounding in early modern natural philosophy. Occasionalism is the doctrine that in its strongest and most universal form maintains that only God has causal power, and that finite beings—typically, both minds and bodies—are purely passive. The main historical and conceptual focus is on the dissemination of occasionalism in early modern Germany. Besides enquiring into the connection between occasionalism and grounding, this dissertation provides an account of why occasionalism—en vogue in continental philosophy in the second half of the seventeenth century—slowly faded into oblivion in eighteenth-century German philosophy. This dissertation argues that this shift occurred because occasionalism began to look increasingly outdated in light of the growing importance afforded to causal, rather than metaphysical, explanations.

The first chapter of this dissertation can be taken as a kind of prelude to German occasionalism, in that it studies the more well-known case of Géraud de Cordemoy (1626–1684). Cordemoy was one of the major French early modern occasionalists and highly influential in the later German debate. This chapter makes the case that Cordemoy employed occasionalism as a foundation for his ambitious project of deconstructing and reconstructing the human world. Cordemoy reduces states to towns, then to families and, ultimately, to the individual citizen. Metaphysically speaking citizens *qua* human beings are composed of simple, indivisible minds and functionally organised matter. Matter, in turn, depends on the arrangement of atoms, or 'bodies' as Cordemoy calls them—simple, indivisible, unified material particles. Following this deconstruction of human reality, occasionalism grounds its reconstruction: Cordemoy uses occasionalism to explain the interaction and connection between bodies, between bodies (and matter) and minds, between distinct minds, and (perhaps) even the mind's own thoughts. Language is the cement of social and political reality, and occasionalism explains the causal dynamics that ground language. Besides a more philosophical motivation, I will show that Cordemoy's occasionalism is also politically motivated in that it is intended to support the absolutist reign of Louis XIV. Occasionalism disempowers human beings as causal agents, and thereby supports their disempowerment as political agents under the reign of an absolutist ruler.

The second chapter makes the transition to the German context by focusing on the case of Johann Christoph Sturm (1635–1703). In a manner characteristic of his eclectic approach to philosophy, Sturm seeks to reconcile Aristotelian scholasticism and the new Cartesian philosophy. Overall, he identifies three elements as key to a successful natural philosophy: (Cartesian) mechanism, occasionalism, and finality. Sturm first reinterprets the scholastic matter-form dichotomy by reducing forms (labelled 'passive') to mere modifications of matter: since matter is purely passive, so are its modifications. The material world, in its persistent existence as well as its changes over time, requires a sufficient ground. Sturm shows that this sufficient ground can only be God, who preserves the world and effects its changes by means of local motion. In establishing occasionalism, Sturm avails himself

not only of (what I call) his *argument from spatio-temporal grounding*, but also the arguments of his French occasionalist predecessors, such as, Cordemoy. In contrast to Descartes, Sturm then argues that everything in the world (knowingly or unknowingly) acts—or, rather, is acted on—for certain ends. Ultimately, we will see how Sturm's theoretical physics is applied to a more practical test case, the explanation of life.

The third chapter focuses on the initial endorsement of occasionalism by Christian Wolff (1679–1754) in his *Disquisitio philosophica de loquela* (1703), alongside the doubts about occasionalism raised by Leibniz in his correspondence with Wolff, and the reason for the mature Wolff's eventual dismissal of occasionalism. The young Wolff had made an occasionalist account of language his own in an early academic disputation—an account that shows strong similarities to Cordemoy's *Discours physique de la parole*. When Wolff sent Leibniz a copy of this dissertation, the latter referred Wolff to some of his own critical discussions of occasionalism in an attempt to drive Wolff away from it. With Leibniz's doubts in mind, doubts that would bear on Wolff's own philosophical development, the latter was led to dismiss occasionalism. For the mature Wolff, occasionalism did not sit well with a truly scientific account of nature. That is because—according to Wolff—occasionalism was not only overly reliant on the deficient science and physics of Cartesianism, but also because it severed the vital link between efficient cause, force, and sufficient reason. By stripping natural entities of inherent forces to act, occasionalism could only adduce God as the efficient cause, that is, the sufficient reason, for change in nature. Wolff regarded this as a violation of the principle of sufficient reason, and as a violation of a naturalised, scientific account of nature. Therefore, the mature Wolff rejected occasionalism mainly for epistemological reasons.

The fourth and final chapter examines the downfall of occasionalism in eighteenth-century Germany by drawing on a set of seven influential philosophers. As Wolffianism was the dominant academic camp at the time, these are all of more or less subject to Wolffian influences. They are: Georg Bernhard Bilfinger (1693–1750), Philipp Thümmig (1697–1728), Johann Christoph Gottsched (1700–1766), Martin Knutzen (1713–1751), Alexander Gottlieb Baumgarten (1714–1762), Gottfried Ploucquet (1716–1790), and (the pre-Critical) Immanuel Kant (1724–1804). In all but the early Ploucquet we find a critical attitude towards, and a marginalisation of, occasionalism. In the eyes of these philosophers, occasionalism fails to provide a naturalised, immanent and hence truly philosophical account of nature. By privileging causal explanation over metaphysical explanation, occasionalism is dismissed as explanatorily insufficient. Besides these more internal reasons, I show that the sceptical attitude vis-à-vis metaphysical speculation outside the universities might also have contributed to the downfall of occasionalism.

INTRODUCTION

1. General Remarks

Occasionalism is the doctrine that in its most forceful and universal form maintains that only God has causal power and that finite beings, typically both minds and bodies, are purely passive. The name 'occasionalism' derives from passive secondary or natural causes called 'occasional causes' that are taken to prompt God as the first cause to act. While Leibniz and other early modern philosophers labelled this doctrine 'the system of occasional causes,' Kant and Schelling later spoke of 'occasionalism' (Specht 2017). Occasionalism most likely originated in the context of medieval Arabic theology, and it celebrated a very successful comeback among (mostly but not exclusively) Cartesian early modern Christian philosophers, the most famous of whom is perhaps Nicolas Malebranche.[1] Despite the fact that occasionalist philosophies occurred here and there in Latin-Christian Western philosophy, occasionalism was considered at best a deviant position from the point of view of the Roman-Catholic Church.[2] This should not be taken to rule out that strong theological intuitions (in particular, stressing God's omnipotence) led some philosophers to endorse occasionalism. As we will see shortly, early modern occasionalists had various reasons to adopt this position. What is more, they were *not* dedicated to the *single* enterprise of solving in an *ad hoc* fashion the alleged mind-body problem rooted in Descartes' substance dualism as suggested by older textbook accounts of historians of philosophy.

The main focus of this dissertation will be on the dissemination of occasionalism in early modern German philosophy. In more straightforwardly philosophical terms, we will be concerned with the role of occasionalism and grounding in natural philosophy, which has not received enough attention. We will encounter occasionalism as a means of causally grounding nature and human reality.[3] For the occasionalist philosophers studied in this dissertation, providing a sufficient ground for nature and the changes it undergoes (as well a sufficient ground for human beings' mental and physical existence) is a pressing issue. Confronted with the radical independence of finite substances from one another, with a material world that came to be seen as ever more passive and inert in light of the new mechanical philosophy, and growing ever more sceptical of the kind of finite active principles (occult qualities,

1 For an excellent account of the history of occasionalism from its Arabic roots to its early modern recurrence, see Perler and Rudolph 2000.

2 While I disagree with Platt (2020, 3 (n9)) that occasionalism was condemned by the Parisian bishop Étienne Tempier in 1277, I agree with Platt that Pope Clement VI condemned some form of occasionalism (albeit one with a strong epistemological gloss) directed at Nicholas of Autrecourt in 1347. In addition, Thomas Aquinas, certainly one of the figureheads and main authorities of the Roman-Catholic Church argued against occasionalism in book three, chapter 69 of his *Summa contra gentiles* (1259–1265) (Aquinas 1975, 226-235). An analysis of Aquinas' counterarguments against occasionalism can be found in Perler and Rudolph 2000, ch. 4 (esp. 131-145). Articles 11–14, and 16 of the 1347 Condemnation target Autrecourt's (epistemological) occasionalism, see Autrecourt 1988, 78-81.

3 I take causal grounding to be a species of grounding as its genus. Other forms of grounding may include epistemological, logical or spatio-temporal grounding.

faculties, virtues, hylarchic principles or plastic natures) postulated by their philosophical predecessors, these occasionalist thinkers sought the ground for the world and the changes it undergoes in the infinite being, i.e., God. Only by appealing to God would every doubt about sufficiency of causal grounding vanish. God's omni-benevolence, omniscience, and omnipotence guarantee the continuous existence of the world, ground the connectedness of its parts, and effect the changes we observe. A thorough explanation of the world includes an account of the case of human beings. However, the *conditio humana* is peculiar in a number of respects. Christian philosophers take human beings to be created in God's image. They enjoy a special proximity to God. Orthodox belief has it that human beings possess an immortal rational soul somehow united with their body. Human beings are oftentimes taken to be unique in that they are genuine language-users, whereas parrots and other animals or material objects, say, a cave reflecting sounds, are not. Again, for our occasionalist philosophers, providing a sufficient ground for human existence—bearing in mind the radical independence of finite substances, the inertness of the material world, and the rejection of finite (inter-)active mental principles—led them straight to God. The radical independence of finite substances means that the existence of no finite substances entails the existence of another finite substance—let alone the interaction between finite substances. The inertness of the material world rules out active material principles that might be invoked to explain inter-substantial causation. Furthermore, body-body causation itself is ruled out. The rejection of finite (inter-)active mental principles in turn means that no being other than the infinite (mental) being, i.e., God can account for inter-substantial causation. No world soul, no arché, no plastic nature or entelechy exists that could render intelligible the motions of bodies or the occurrence of thoughts in minds. Our existence is then taken to be immediately dependent on God. On the occasion of my volition to move my arm, it is He who moves it. On the occasion of a needle pricking my body, it is He who causes me pain.[4]

While occasionalism can be seen as a successful theory of causal grounding in the philosophies of Géraud de Cordemoy—whose case will serve as a prelude to the German context—Johann Christoph Sturm, and the young Wolff, it was soon disregarded by most eighteenth-century German philosophers, because of its acclaimed explanatory-epistemological insufficiency. The roots of this dismissal will be shown to lie in the mature Wolff's critique of occasionalism as an unsuitable scientific theory of natural philosophy. The seeds of this critique can, in turn, be found in Leibniz. The temporal horizon of this dissertation will span slightly more than one hundred years, from 1666 until 1770. That is to say, the publication of Cordemoy's first writing on occasionalism, the *Six Discourses*

4 While mind-body, and body-mind occasionalism are endorsed by all the authors studied in this dissertation, some occasionalist thinkers only adopted physical occasionalism, or only one direction of the mind-body, body-mind scheme—in this case, mostly body-mind occasionalism. La Forge would be a case in point. Intramental occasionalism, i.e., occasionalism as applied to the mind's own thinking is usually regarded with some kind of scepticism. While (perhaps) Cordemoy, Geulincx, Malebranche, and the young Wolff endorse it, La Forge, Sturm and Ploucquet refrain from accepting it. Intramental occasionalism, which will not be at the heart of this dissertation, can, hence, be seen as a kind of *non plus ultra*.

(1666), will serve as a starting point, and Kant's (pre-Critical) dismissal of occasionalism in his *Inaugural Dissertation* (1770) as an endpoint.

The dissemination of occasionalism in early modern Germany has been almost entirely neglected.[5] This is probably due to the idea that the figurehead of early modern German philosophy is Gottfried Wilhelm Leibniz (1646–1716), and that (certainly the mature) Leibniz was a staunch opponent of occasionalism. Leibniz standing in as a *pars pro toto* would then seem to make the study of early modern German occasionalism a futile enterprise. But far from it. This dissertation will show that occasionalism flourished among German philosophers. This means we should re-think Leibniz's role in the story of German occasionalism. In fact, thinking of Leibniz as a persistent *adversary* of occasionalism—as a contemporary, respondent, interlocutor, and scholar of occasionalism—serves to frame and tighten the historical narrative of this dissertation.

2. *Incipit Historia* – Leibniz and Occasionalism

The philosophical history of early modern occasionalism and its reception in Germany, to wit, the Holy Roman Empire of the German Nation, could hardly be written without considering the case of Leibniz. However, from the perspective of the occasionalist authors studied in this dissertation, Leibniz almost always found himself 'on the wrong side of history'—except perhaps in his youth. He was among the most continuous, assertive, and no doubt philosophically astute critics of occasionalism. What makes Leibniz a particularly fascinating thinker, here, is his double role as a participant or actor as well as a scholar in debates about occasionalism. Likewise, Leibniz seems to have been constantly surrounded by occasionalist authors; men he would admire, learn from, and cherish but ultimately challenge. Leibniz's historical importance concerning occasionalism notwithstanding, his critique in combination with a certain fashion of treating later seventeenth- and eighteenth-century German philosophers (except Kant) as either mere followers of his philosophy or else as uninteresting has also worked against historical-philosophical research on the dissemination of occasionalism in Germany.

Bracketing his own teacher Erhard Weigel, Leibniz's engagement with Géraud de Cordemoy, Johann Christoph Sturm and the young Christian Wolff are most relevant for our purposes. After Leibniz's death, the debate on causation, which he had, if not started, then at least shaped like hardly any other, would continue. Taking the cue from Leibniz, but also (and in important ways) from Wolff, eighteenth-century authors such as Georg Bernhard Bilfinger, Philipp Thümmig, Johann Christoph Gottsched, Martin Knutzen, Alexander Gottlieb Baumgarten, Gottfried Ploucquet and the pre-Critical Immanuel Kant would continue to argue about which causal theory was preferable, and in so doing would (by and large) take a dismissive standpoint vis-à-vis occasionalism as we will find later.

5 As we will see shortly, the recent works of Sangiacomo, and Specht are notable exceptions.

Having completed his Bachelor's degree in philosophy at the University of Leipzig in December 1662, Leibniz decided to spend the following summer semester of 1663 at the University of Jena.[6] Here, under the auspices of Erhard Weigel (1625–1699), Leibniz may have come into contact with (the German accounts of) occasionalism for the first time.[7] Having obtained his Master's and doctoral degree in 1664 and 1666, respectively, Leibniz moved to the University of Altdorf to conclude his parallel studies in jurisprudence with the doctoral title. Here, again, he could have easily run into a later esteemed correspondent and supporter of occasionalism who also shared with Leibniz the status of disciple of Weigel: Johann Christoph Sturm (1635–1703). During Leibniz's stay at Altdorf University, where Sturm was later hired in 1669 as professor of physics and mathematics, Sturm was living in the area working as a priest.[8] Even after his student years had come to an end, Leibniz remained close to Sturm when he was working as secretary for the alchemical society of Nuremberg in 1666 and 1667. Further, Leibniz had earlier received an offer for a professorship at Altdorf University, but refused (Antognazza 2009, 66). He could have easily become a future colleague of Sturm.

Despite his later critique of occasionalism, the young Leibniz might not have been far away from endorsing occasionalism himself. Two of Leibniz's letters to his former mentor in Leipzig, Jakob Thomasius (1622–1684), bear witness to this (Antognazza 2009, 104). In a letter from 6 October 1668, Leibniz—attempting to prove to Thomasius the merits of a new–old natural philosophy reconciling Aristotelian and mechanical conceptions (see also ibid., 104)—comes to discuss the origin of motion. Showing striking similarities to the positions of Cordemoy, Sturm and the young Wolff, Leibniz claims that "the motion of matter comes from an intelligence, i.e., God" (AII.1, N.9, p. 18).[9] Leibniz further explains that:

> since body is nothing other than matter and shape [*figura*] and the cause of motion can indeed neither be understood from matter nor from shape [*figura*]: it is necessary that the cause of motion is outside the body. And since beyond body nothing is conceivable except a thinking being [*ens cogitans*], or a mind [*mentem*], mind will be the cause of motion. The mind [that is] the principal of the universe is God (AII.1, N.9, p. 19).[10]

In a letter from 20/30 April 1669 to the same Thomasius (A II.1, N.11), Leibniz shows himself to be a supporter of the new mechanical philosophy, or else, a mechanical reinterpretation of Aristotelian philosophy not unlike the one we find in Sturm's *magnum opus*, the *Physica Electiva* (1697). In this

6 The biographical details of this section are taken from Antognazza's (2009) intellectual biography of Leibniz. An informative chronological table of Leibniz's life can be found here on pages xvii to xxvii.

7 The occasionalist leanings of Weigel are discussed in Specht's (2019) commentary to Wolff's *Disquisitio philosophica de loquela*, 102-104. For Weigel's occasionalist stance in his *Philosophia mathematica* (1693), see Behme 2013, 62-66.

8 An account of Sturm's life can be found in the appendix to the second chapter of this dissertation.

9 "Motus materiae ab intelligentia est, id est, Deo" (AII.1, N.9, p. 18).

10 "Cum enim corpus nihil aliud sit, quam materia et figura, et vero nec ex materia nec figura intelligi possit caussa [sic] motus: necesse est, caussam motus esse extra corpus. Cumque extra corpus nihil sit cogitabile, praeter ens cogitans, seu mentem, erit mens caussa motus. Mens autem universi rectrix est Deus" (AII.1, N.9, p. 19).

letter to Thomasius, too, Leibniz confirms that "matter *per se* is free from motion. The principle of every motion [is a] Mind […]" (AII.1, N.11, p. 31).[11] Whether Leibniz talked this over with Sturm or not, he would not have found much to criticise in the philosophical works of Cartesian occasionalists like Cordemoy, or the new–old occasionalist physics of Sturm (had the latter already been published). Rather, as Leibniz confesses in his *New System of Nature* of 1695, in this phase of his philosophical career, "I was charmed by their [i.e., the "modern authors"] beautiful ways of explaining nature mechanically, and I rightly despised the method of those who use forms or faculties, from which one can learn nothing" (AG, 139).

When Leibniz left for his Paris sojourn—he arrived at the end of March 1672 and stayed until October 1676 (his stay was interrupted only by a visit to London in early 1673)—he met in person fully-fledged occasionalist authors such as Géraud de Cordemoy (1626–1684) and Nicolas Malebranche (1638–1715). A survey of Leibniz's philosophical essays and correspondence shows that throughout the entirety of his career, Cordemoy, Malebranche and (later) Sturm left their mark in various respects. These authors would provide a counterpoint for the development of Leibniz's own philosophy and a source of intellectual inspiration throughout Leibniz's career (Prost 1907, 253, and 258f). As early as March or April 1675, Leibniz started corresponding with Malebranche—an occasional epistolary exchange that would only end in January 1712 (see Robinet 1955). Also, somewhere around the end of 1675 or the beginning of 1676, Leibniz read Cordemoy's *Lettre ecrite à un scavant religieux de la Compagnie de Jesus* in which the latter defended the compatibility of Descartes' philosophy with the first chapter of the book of Genesis and tackled the problem of accounting for living beings (Antognazza 2019, 167).[12] In the 1670s, that is, "probably in December 1678," Leibniz made notes on Malebranche's *Conversations chrétiennes* which Elisabeth of Bohemia (1618–1680) had recommended to Leibniz (Antognazza 2019, 213). However, by the end of the 1670s, Leibniz had not yet taken a decisive stance against occasionalism—perhaps because he was still in the process of deliberating on his settled opinion. In a letter from September 1679 to his former mentor Weigel, Leibniz even acknowledges that it is "not so much our mind acting [*agere*] on things than God on its [the mind's] volition" (AII.1, N.212, p. 747).[13]

Leibniz surprisingly never challenged occasionalism in his correspondence with Malebranche, and even shows some sympathy for Malebranche's position. In a letter from 13 January 1679, for instance, Leibniz tells Malebranche that "I am completely of your opinion [*sentiment*] concerning the

11 "Materia per se motus expers est. Motus omnis principium, Mens […]" (AII.1, N.11, p. 31).

12 Leibniz made a note stating that "Cordemoy has made a letter to a learned friar in order to show that the philosophy of Descartes is from the first chapter of Genesis. This treatise does not carry the name of the author" (A VI.3, N.32, pp. 379f). "Cordemoy a fait une lettre à un sçavant religieux pour faire voir que la philosophie [de] des Cartes est du premier chapitre de la Genese. Ce traité ne porte pas le nom de l'auteur." For Cordemoy's *Letter*, see chapter 1 of this dissertation.

13 "Arbitor enim non tam mentem nostram in res agere quam Deum ad ejus voluntatem" (AII.1, N.212, p. 747). This letter is also referred to by Lodge in his (1998) article.

impossibility there is of conceiving that a substance which only has extension without thought could act on a substance which only has thought without extension" (Robinet 1955, 104).[14]

Leibniz attacked occasionalism later in the 1680s and 1690s.[15] This was most likely the result of his intense study of Malebranche's *Treatise of Nature and Grace*, the *Search after Truth* and Malebranche's heated discussion with Arnauld.[16] In 1694-1695, Leibniz also briefly corresponded (indirectly) with Johann Christoph Sturm (see Palaia 1990). Slightly later in his *De ipsa natura* (1698), he would openly criticise the occasionalism defended by his earlier would-be colleague Sturm in the latter's *Physica electiva* (1697).[17]

Shortly after, finding out that a promising young German doctor of philosophy—no one else but Christian Wolff (1679–1754)—defended an occasionalist position in his *Philosophical Enquiry into Speech* (*Disquisitio philosophica de Loquela*), Leibniz made an (ultimately, successful) effort to change the young scholar's conviction 'for the better,' (at least, that is what we might imagine him thinking).[18] Henceforth, Leibniz was concerned with refuting occasionalism until the end of his life.[19]

What then roused Leibniz's interest in occasionalism? And why did he dismiss it, thereby strongly influencing the negative reception of occasionalism by his contemporaries, and historians alike? In a nutshell, occasionalism helped Leibniz to develop his own philosophy, in particular, his account of causation and substance. Moreover, while occasionalism, according to Leibniz, made progress in clarifying both of these notions, it ultimately fell short of drawing the right consequences; consequences which are necessary, in order to arrive at a correct account of the world or nature, or so Leibniz would think. Let us address each of these points in turn.

According to Leibniz, occasionalism deserves credit for overcoming the unintelligible and metaphysically obscure notion of causation that he ascribes to the scholastics, to wit, an ontological transfer or physical influx model.[20] Taking late scholastic authors like Francisco Suárez at their word, Leibniz charges them with positing the 'flow' or transfer of being (*esse*) from the cause to the effect.

14 "[j]e suis tout à fait dans vostre sentiment touchant l'impossibilité qu'il y a de concevoir qu'une substance qui n'a rien que l'étendue sans pensée, puisse agir sur une substance qui n'a rien que la pensée sans étendue." While this remark of Leibniz does not straightforwardly imply occasionalism, it could be argued that it points in an occasionalist direction in that most likely God would have to bridge the gap between mental and extended substances.

15 That is, in his correspondence with (*inter alia*) Antoine Arnauld (1612–1684) and Pierre Bayle (1647–1706); in works unpublished during Leibniz's lifetime, such as the *Discourse on Metaphysics* (1686), and the *Primary Truths* (probably 1689), as well as in published works, such as the *Specimen Dynamicum* (1695), the *New System of the Nature and Communication of Substances, and of the Union of the Soul and Body* (1695), and the *De ipsa natura* (1698).

16 Antognazza (2019, 261) points out that Leibniz busied himself with reading these works.

17 See chapter 2 of this dissertation.

18 See chapter 3, section 1.2 of this dissertation.

19 See the (1710) *Theodicée* , and the *Conversations between Philarète and Ariste* (written in 1712, revised in 1715).

20 For Leibniz's identification of the scholastics as influxionists, see O'Neill 1993. Freddoso (1991, 583 n27), however, points out that "[t]hough Suarez freely uses terms like 'influx' and 'flow' to describe the causal influence of an agent on a patient, the scholastics generally deny that *transeunt* action involves the transfer of some entity from the agent to the patient."

Against the background of a Cartesian substance-mode ontology that Leibniz makes his own, however, nothing can reasonably be thought to 'migrate' from the cause to the effect. Anything that could be thought to 'migrate' would need to be either a substance or a mode, but neither could be the case. Therefore, as Leibniz points out in the *New System*, occasionalism is correct in noticing that "there is no real influence of one created substance on another" (AG, 143).[21] Leibniz also admits that occasionalism is right about stressing God's role as the continuous conserver of the universe (AG 125, 143). Yet, God's act of conservation must not be understood as a continuous causal intervention into finite beings' actions, but instead should be understood as maintaining their existence. Moreover, reflecting on Cartesian mechanism, of which the occasionalist authors studied here avail themselves, prompted in Leibniz the idea that despite its explanatory merits, a mechanical view of the corporeal world with no metaphysical principle of action or unity grounding bodies is ultimately insufficient for accounting for natural phenomena. Cordemoy receives praise for realising that "every substance in itself cannot be divided" (A VI.4, N. 346, p. 1798), that is, for realising that substances are unities essentially.[22] However, Leibniz goes on to criticise Cordemoy because "something else is given in corporeal substance except extension from which certainly the notion itself of substance originates, which cannot be given through extension alone" (ibid., p. 1799).[23] Thinking about the mechanist conception of Cartesian authors, and about Cordemoy's metaphysical argumentation for atoms as true corporeal unities helped Leibniz to develop his ultimately monadic-idealist conception of the universe, according to which the only true substances are immaterial beings, so called 'monads,' essentially characterised by an inherent force to act immanently. To conclude, the philosophical ideas advanced by occasionalist authors served Leibniz as a philosophical ladder that he would later throw away.[24]

When Leibniz's own philosophy took shape, so did his critical attitude towards occasionalism.[25] Accordingly, when Leibniz formed his own conceptions of causation and substance, he objected to the respective occasionalist accounts thereof. With regard to causation, Leibniz famously blames occasionalism for making use of "what is called a *Deus ex machina*" (AG, 143), and having recourse to perpetual miracles.[26] The quintessence of this objection is that, according to Leibniz, occasionalism

21 He had expressed the same praise in his slightly earlier *Specimen Dynamicum* (AG, 125).

22 "unaquaeque substantia in semet ipsam dividi non potest" (A VI.4, N. 346, p. 1798). The quote is from Leibniz's note-taking on Cordemoy's *Six Discourses*, entitled "Ex Cordemoii tractatu *De Corporis et mentis distinctione*."

23 "aliud in corporea substantia dari praeter extensionem a quo scilicet ipsa substantiae notio oriatur, quam sola extensio dare non potest" (A VI.4, N. 346, p. 1799). Similar considerations can be found in Leibniz's letter to Arnauld from 28 November/8 December 1686 (AG, 80f), and the *New System* (AG, 142).

24 The allusion, here, is to Wittgenstein's *Tractatus Logico-Philosophicus*, proposition 6.54.

25 Accounts of Leibniz's critique of occasionalism include first and foremost Rutherford 1993, but also Woolhouse 1988, and, more recently, Lodge 2015.

26 While the quotation is from the *New System*, these two charges can be found throughout Leibniz's mature philosophy: They appear in the one or the other form in (at least) the *Discourse on Metaphysics* (1686) (§33), the correspondence with Arnauld, i.e., the letter from 30 April 1687, the *Primary Truths* (1689), the *Specimen dynamicum* (1695), the correpondence with De Beauval, i.e., the letter from February 1696 (AG, 147-149), the *De ipsa natura* (1698), the *Theodicée* (1710) (part I, §61), and the *Conversations of Philarète and Ariste* (1712/1715) (AG, 257-268).

makes the whole of the workings of nature immediately dependent on God's causal intervention. By doing away with active finite natural beings, everything in nature is brought about by God. Every natural process "exceeds the power of created things" (Woolhouse and Francks 1997, 82), since they have none.[27] Following Leibniz, occasionalism provides an account of the world according to which its nomological connections are grounded in God's top-down actions rather than being grounded in the bottom-up actions of natural agents essentially endowed with a force to act. In Leibniz's own words, "God performs a miracle when he does something that surpasses the forces he has given to creatures and conserves in them" (AG, 83). In light of this, Leibniz goes so far as to ask whether the nomological connections in occasionalism are truly nomological connections at all. In the absence of natural agents endowed with a force to act, it seems to him that "anything could equally well be said to follow from anything else" (AG, 158).[28] Ultimately then, occasionalism is "foreign to correct reasoning in philosophy" (AG, 130), as it fails to realise that natural events have to be grounded in natural agents.[29] With regard to substances, Leibniz objects that in the absence of an intrinsic active principle characterising every being as such, the occasionalist faces the challenge of explaining how substances can be individuated, endure through time and maintain their independence from one another. For Leibniz, a substance without an intrinsic essential force is not a substance at all. This would mean that, according to Leibniz, occasionalism faces the threat of collapsing into Spinozism.[30]

If occasionalism turned out to be a dead end for Leibniz, this can, of course, not be said from the perspective of the occasionalist authors who will be discussed in this dissertation. Rather, they had their sufficient reasons for adopting occasionalism, reasons that cannot be said to be any less philosophical than Leibniz's own reasons for rejecting it. What were these reasons? Why did authors, such as Cordemoy, Sturm, the early Wolff, and the early Ploucquet endorse occasionalism? What motivated their endorsement? What arguments did they provide in its favour? What role did occasionalism play in their respective natural philosophies? Going further, why did occasionalism receive an increasingly bad press in the eighteenth-century German intellectual environment? Why did occasionalism disappear as a sound option from the philosophical discussion of causation? It is the aim of this dissertation to answer these questions.

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27 The quotation is from "A letter from M. Leibniz to the Editor [of the *Histoire des Ouvrages des Savants*], Containing an Explanation of the Difficulties which M. Bayle Found with the New System of the Union of the Soul and Body" published in the *Histoire des Ouvrages des Savants* in July 1698. This letter is translated and edited by Woolhouse and Francks in their (1997) edition of Leibniz's *New System*.

28 Freddoso (1988, 103), however, points to a strong occasionalist rejoinder, in that for the occasionalist, "constant divine intentions provide the stability and regularity in the universe that Aristotelians [like Leibniz in this respect] attribute to the natures of corporeal substances. So instead of invoking causal dispositions, tendencies and inclinations rooted in the natures of corporeal substances, the occasionalist appeals to God's abiding intention to act in certain fixed ways."

29 A more thorough analysis of Leibniz's objection against occasionalism as invoking a 'Deus ex machina' and perpetual miracles can be found in chapter 3, section 1.2 of this dissertation. In chapter 4, we will see how—amplified through Wolff (see here esp. chapter 3, section 4)—this critique gains traction in the eighteenth-century debate about occasionalism.

30 This line of criticism can be found in the *De ipsa natura* (AG, 159f, 163-166).

3. The *Status quaestionis* – A Meta-Historical and Meta-Philosophical Map

Where a philosophical tradition has fossilised, lacking a new generation to preserve and continue it, historical-philosophical research begins. The branch of the history of philosophy dealing with early modern occasionalism is still relatively new. However, especially since the 1970s or 1980s, there is a growing amount of literature dedicated to it. In light of the increasing research output on the topic, it will be helpful to provide the reader with a kind of meta-historical and meta-philosophical map laying out the various strands of research. Rather than merely summarising the main claims of scholarship on occasionalism, I will map out which topics scholars have been interested in, how they have been approached, and which new conceptual tools have been introduced to help clarify and facilitate the discussion.[31] I will start by looking at the history of historical-philosophical research on occasionalism, that is to say, what place and motivation historians of philosophy have assigned to the emergence of occasionalism in the history of philosophy (3.1). I will then discuss conceptual tools that have been used to help clarify discussions of occasionalism (3.2). Here, I will cover (A) the distinction between occasionalism and occasional causation; (B) the distinction between partial and global occasionalism, and, accordingly, arguments establishing the former or the latter; (C) the connection between occasionalism and the laws of nature; (D) how best to understand occasionalism itself, i.e., either in interventionist or minimalist terms; and, finally, (E) situating occasionalism in discussions about cause (*causa*) and reason (*ratio*).

3.1 The History of Historical-Philosophical Research on Occasionalism

The history of the history of occasionalist philosophy roughly begins in the first half of the nineteenth century with French scholars such as Jean-Philibert Damiron (1846) and Francisque Bouillier (1854). While Damiron discusses occasionalist authors such as La Forge, Cordemoy, Geulincx, and Malebranche as part of a study on seventeenth-century French philosophy from Descartes to Fénelon, Bouillier discusses the same set of authors as part of a study on Cartesian philosophy specifically[32] Slightly later, occasionalism appears in German textbooks on the history of philosophy, such as Kuno Fischer's *Geschichte der neueren Philosophie* (1867) and Eugen Dühring's *Kritische Geschichte der Philosophie von ihren Anfängen bis zur Gegenwart* (1869). Here, the outlook on occasionalism is negative in that it is portrayed as a naïve and even "bizarre" system (Dühring 1869, 272). Notably, Fischer simply adopts the critique of occasionalism as invoking a *Deus ex machina* reaching back to

31 This meta-historical and meta-philosophical map is not meant to exhaust the entirety of academic literature on occasionalism, but to provide a useful overview.

32 Damiron (1846, vol. 2) treats of La Forge in book IV, ch. ii; of Cordemoy and Geulincx in chapters iv and v (of book IV), respectively. He dedicates the entirety of book VI to Malebranche. Bouillier (1854) discusses Geulincx in the first volume, ch. xiv; La Forge and Cordemoy in ch. xxiv of the same volume. He dedicates chapters i to vii of the second volume to Malebranche.

Leibniz. Despite this dismissive treatment, however, a number of dissertations dedicated to occasionalism itself, a set of, or one single 'non-canonical' occasionalist figure(s) appeared in the German academic system (e.g., Pfleiderer 1882; Seyfarth 1887; Stein 1888; Stein 1889; Müller 1891; Kayserling 1896; Schött 1899). Working on 'non-canonical' occasionalist authors is, thus, not a characteristic mark of contemporary twentieth- or twenty-first-century scholarship.[33] While the authors of these dissertations are concerned with the same kind of questions about priority and the scope of occasionalism as we are, they generally portray occasionalism as resulting from Cartesianism as much as a solution to the mind-body problem—albeit *not* an *ad hoc* solution. This presentation of occasionalism in turn might be inherited from some of the Leibnizian-Wolffian authors of the eighteenth century (see chapter 4). Finally, occasionalism is oftentimes seen by these authors as a transitory phenomenon, and occasionalist philosophers *qua* 'non-canonical' are reduced to "the second or third rank" of the history of philosophy (Pfleiderer 1882, 4).

The understanding of occasionalism as a solution to the mind-body problem has outlived the nineteenth century. As late as 1957, we find George Boas claiming that "Cordemoy undertook to iron out some of the difficulties in his master's [Descartes'] solution of the mind-body problem" (Boas 1957, 103). Even in 1985, Radner still defended the 'classical view' that occasionalism was designed to solve the Cartesian interaction problem between the mind as immaterial, thinking substance and the body as material, extended substance.[34] In the meantime, however, Lennon in his ground-breaking (1974) article had explicitly challenged this reading, as did Loeb (1981, ch. v) soon after. As a consequence, the last forty years have brought forth increasingly diverse, charitable, and more historically accurate research on occasionalism. Nadler (2011 [1997], 25), for instance, emphasised that for Cordemoy as well as Malebranche the interactions of bodies are as hard to conceive as the interactions of minds and bodies. Along similar lines as Lennon (1974), Nadler, hence, showed that the mind-body problem did not have priority over a more global interaction problem.[35] Schmaltz (2017a, 166) deserves credit for underscoring that occasionalism is not an entirely unified tradition, but rather that "[a]s in the case of Cartesianism itself, we must speak not of a single Cartesian occasionalism but rather of various Cartesian occasionalisms." Similarly, Nadler had accentuated before that there are "different kinds of arguments for occasionalism" as much as "different degrees of occasionalism" (2011, 4 and 5, respectively). That is to say that while some philosophers like Malebranche, Geulincx, and (perhaps) Cordemoy subscribed to occasionalism across the board, i.e., for all causal dimensions

33 Contemporary authors seem almost completely unaware of the works here mentioned. An exception is Nadler (2011) referencing Seyfarth 1887, and Stein 1888. Platt is aware of Müller (1891).

34 In his entry on occasionalism in the *Stanford Encyclopedia of Philosophy*, Lee, too, believes that "[o]ccasionalism and pre-established harmony emerged as alternatives to the model of [Cartesian] interactionism" (2008/2020, 16). The same goes for Perler's and Bender's introduction to their collective volume on *Causation and Cognition in Early Modern Philosophy* (2020, 5f). To me, this is seems to be an underestimation of the diverse motivations that have led philosophers to adopt occasionalism (see below).

35 In a relatively recent article, Roux (2018), however, argues that the difficulty of mind-body interaction played a significant role in motivating a more global contemplation concerning the issue of inter-substantial causation in both La Forge and Cordemoy.

—body-body; body-mind; mind-body; the mind itself—others, such as La Forge and Arnauld preferred to limit their occasionalism to one or more of these causal dimensions (see also Schmaltz 2017a, ch. 4). What should be noted here, however, is the absence in academic literature of a study of the peculiar case of *intermental* occasionalism, i.e., occasionalism in the case of two distinct minds, where at least one of them is disembodied. Cordemoy discusses this possibility in his *Discours physique de la Parole* (1668), as does Wolff in his *Disquisitio philosophica de loquela* (1703).

In showing the various motivations for adopting occasionalism, Scribano (2011, 2013, 2018) deserves credit for bringing to light the impact of the medical tradition on occasionalist thinkers. Scribano (2011) reveals the Galenic roots of the *Quod nescis* principle (of vital importance for Guelincx) as well as how strengthening the power of the body as independent from the soul prepared mind-body occasionalism (2013). In one of her latest pieces, Scribano (2018) examines Malebranche's occasionalism as a response to the alleged idolatry or 'divinisation of nature' inherent, or so Malebranche would think, in early modern vitalist thinkers such as Fernel and De Castro.[36] Sangiacomo not only pursued work on so-called 'non-canonical figures,' such as La Forge (2014), but pushed the boundaries of research on occasionalism. On the one hand, he studied occasionalism from the point of view of opposition to late-scholastic authors, in particular Malebranche's opposition to Suárez (2017).[37] On the other hand, he shed light on philosophers whose occasionalism was much understudied: the most eminent case, here, are Sangiacomo's studies on Sturm (2018a, 2020). Further, Sangiacomo (2019b) reflected on the impact of Malebranche on the pre-Critical Kant's theory of causation. Downing (2005) contemplated the relation between (Cartesian) mechanism and occasionalism arguing that the former "requires" the latter (ibid., 223).[38] Platt (2010, 2017), in turn, has challenged the assumption that Cartesianism leads to occasionalism. Rather, "occasionalism supports Cartesianism" (Platt 2017, 155). Finally, scholars have become increasingly interested in the roots of occasionalism and its development over time. The most comprehensive study on occasionalism from its original Arabic-Islamic, theological context *via* the criticism to which it was subjected by medieval and late-scholastic thinkers to its early modern revival is by Perler and Rudolph (2000). Fakhry (1958) is one of the main sources concerning Arabic occasionalism, and its critique in the hands of Maimonides and Aquinas. Essays on Arabic occasionalism can also be found in Muhtaroglu (2017) and Favaretti et al. (2018). O'Neill (2013) has contributed to investigating the

36 Much earlier Freddoso in his (1988, 97) pointed out that the motivation for occasionalism in Malebranche is "the sweeping and startling conviction that the attribution of *any* power at all (especially an *active* power) to *any* corporeal substance is not only unnecessary but blasphemous, not only philosophically confused but downright idolatrous." Emphasis in original. Freddoso has not focused on the immediate targets of Malebranche's critique though.

37 From a different angle, Ott (2008b), too, discusses the relation between occasionalism and scholasticism. However, Ott emphasises more the continuity between the two in that, according to Ott, both scholastic and occasionalist accounts of causation, in particular that of Malebranche, rely on the notion that causes are directed at their effects. That is to say that causation thus requires intentionality. Ott's view has recently been criticised by Platt (2020, 317-324).

38 If this were so, however, then philosophers such as Régis should be expected to be occasionalists, too. However, Sangiacomo (2018b) has shown that Regis does not opt for occasionalism (or concurrentism).

origin of occasional causes tracing them back to Stoic antecedent and Galenic procatarctic causes. Reaching out beyond the seventeenth century, Specht (1985) pioneered discussion of the reception of occasionalism in German (early-)Enlightenment authors, in particular, Sturm, Wolff, and Ploucquet. Not only have occasionalism and its roots been analysed, but also its critics: Freddoso (1988) has attended to the medieval and late-scholastic critique of occasionalism. Rutherford (1993) has focused on the case of Leibniz. Ott (2008a) has analysed the case of Regis, and Schmaltz (2008) has dealt with the case of Fontenelle.

In closing, I wish to point out that discussions concerning occasionalism are ongoing. The collective volume by Favaretti et al. (2018), and Platt's most recent monograph (2020) are cases in point. The former sheds new light on the manifold motivations that led early modern philosophers to endorse occasionalism. In the introduction, Favaretti, Priarolo, and Scribano point out that although occasionalism has often been seen as (at best) unorthodox, it really is "a genuine philosophical offspring of monotheism" (2018, 7). Furthermore, they emphasise that occasionalism has been regarded by its supporters as a response to the 'pagan' philosophy of Aristotelian-scholasticism and Renaissance vitalism. This is because occasionalism takes God to be the only true cause and hence the only object worthy of veneration while the Aristotelians and Renaissance vitalists are said to have reduced God's glory by adducing active causal powers or faculties as residing in finite natural entities. Overall, the articles contained in the four parts of this collected volume present new readings of the so called 'No Necessary Connection' argument (NNC) and the 'Conservation is but Continuous Creation' argument (CCC). They discuss the relation between occasionalism and the laws of nature; the relation of occasionalism to the mind-body problem; and Malebranche's theological motivation and application of occasionalism.[39]

Platt (2020), too, focuses on the motivations that led Cartesian philosophers to reject or endorse occasionalism. He presents a concurrentist reading of the philosophies of Descartes (chs. 2 and 3), and Clauberg (ch. 4), and argues for a partial occasionalism (confined to the physical realm) in the case of La Forge (ch. 6). Geulincx, Cordemoy and Malebranche emerge as thoroughgoing occasionalists, although Platt notes a lack of argumentation in the case of Cordemoy (chs. 5, 7, and 8, respectively). Platt agrees with earlier readings of Lennon, Loeb and Nadler that Cartesian occasionalism is not an *ad hoc* solution to the mind-body problem (2020, 4). However, Platt is critical of the rational reconstructions of arguments in favour of occasionalism that these and other scholars have offered. He argues that these reconstructions tend to misrepresent the main motivation for these Cartesian thinkers to adopt occasionalism (*inter alia*, ibid., 169, 362). Platt's main aim is to show that La Forge, Geulincx, Cordemoy and Malebranche "found occasionalism plausible, because they saw it as furthering (in various ways) what they took to be the philosophical aims of the Cartesian philosophy,

39 A summary of Favaretti et al.'s *Occasionalism. From Metaphysics to Science* (2018) is given by Henkel (2019).

broadly construed" (ibid., 9). Overall, "[o]ccasionalism was thus the result […] of creative and original attempts to advance the Cartesian research program" (ibid. 11).

3.2 Conceptual Tools

(A) Besides more multi-faceted and thorough historical research on occasionalism, a number of more fine-grained conceptual tools and distinctions have been introduced into the debate over the past decades. Certainly, among the most powerful is Nadler's (2011 [1994]) distinction between occasional causation and occasionalism. While both occasional causation and occasionalism reject what Nadler (2011, 32) calls "transeunt or influx causation" where "something literally passes from cause to effect," occasional causation in contrast to occasionalism allows for the causal efficacy of finite substances (ibid., 35). In occasional causation "one thing, *A*, occasions or elicits another thing, *B* to cause *e*," i.e., the effect (Nadler 2011, 33). For example, if, as Descartes adduces in his *Notae in programma quoddam* (CSM I, 304) when explaining his conception of innate ideas in the mind, the mind produces certain ideas *on the occasion* of certain movements in the body, the mind remains the efficient cause of its own ideas.[40] Occasionalism, however, abolishes any causal efficacy of finite substances. Not only are secondary or natural causes inefficacious, but God as the *causa prima* is "the only true (efficient) causal agent" (Nadler 2011, 34). Or, in classical terms, God is not only the *causa prima* but also *sola causa* (*efficiens*). Nadler explains that "[t]he relationship between occasional causation and occasionalism is that between *genus* and *species*. Occasionalism represents one species or variety of occasional causation, namely that species in which the proximate and efficient cause whose operation (through efficient causation) is elicited by the occasional cause is God" (Nadler 2011, 35). This distinction is extremely useful because it allows us to separate and study independently authors denying influx causation while allowing for active finite substances without confusing them with more staunch defenders of the inefficacy of secondary causes *tout court*, that is to say, occasionalists. Philosophers such as Descartes (to some extent), Clauberg, and Cavendish can be shown to be 'occasional-causationalists' as we might call them, but not occasionalists, like Cordemoy, Malebranche, Sturm or the young Wolff.

(B) Radner (1993), Nadler (2011), and Lee (2008/2020) draw a helpful distinction concerning partial occasionalism on the one hand, and "complete" (Radner 1993, 351), "thoroughgoing" (Nadler 2011, 9) or "full-blown" (Lee 2008/2020, 1) occasionalism on the other hand.[41] Radner (1993, 351) captures the distinction as follows:

40 Descartes was not the first one to avail himself of occasional causation. In his recent article, Perler (2020, 33) has shown that "[w]hen we pay attention to [the] striking parallel in the argumentative strategy of Suárez [i.e., his theory of cognition] and Descartes [i.e. his discussion of the origin of sense-perception in the *Notae in programma quoddam*], we can see that the model of occasional causation is not a seventeenth-century invention. Nor is it the product of a distinctively Cartesian theory. It was already worked out in a late Aristotelian context in which the causal relation between material and immaterial items became more and more problematic."

41 It is interesting to see that the distinction between "one-sided" and "whole" occasionalism—in these terms—was anticipated already by Müller (1891, 11).

> Occasionalism may be either partial or complete in the extent to which causal efficacy is denied to creatures. In partial occasionalism, at least some created substances have the power to modify themselves or other things. Some modes are produced by creatures; the rest are produced directly by God on the occasion of certain creatures being in certain states. A complete occasionalist denies that created substances have any causal efficacy whatever. In complete occasionalism, no creature has the power to bring about any mode into existence, either in itself or in another thing.

So, while some thinkers endorsed occasionalism only to account for the interactions in certain causal dimensions, such as body-body or body-mind (in this direction), others endorsed occasionalism across the board, that is to say, for all causal dimensions possible within the typically adopted substance-dualist framework, including intramental occasionalism (see Nadler 2011, 5). While philosophers such as La Forge, and Sturm (chapter 2 of this dissertation) qualify as partial occasionalists, philosophers such as Geulincx, (probably) Cordemoy (chapter 1 of this dissertation), Malebranche, and the young Wolff (chapter 3 of this dissertation) qualify as 'complete,' 'thoroughgoing,' 'full-blown' or 'whole-sale' (my term) occasionalists.

Similarly, Lee in his (2008/2020) entry on occasionalism in the *Stanford Encyclopedia of Philosophy* established another equally useful conceptual distinction, one between "local" and "global" arguments for occasionalism. While local arguments for occasionalism establish occasionalism for one causal dimension, global arguments for occasionalism establish occasionalism across the board. Local arguments for occasionalism include the argument from the passive nature of bodies (PN), and the one from lack of knowledge, or no knowledge (NK). PN—suitably qualified, I must add[42]—serves to establish body-body occasionalism, in that, bodies *qua* merely extended beings are understood as purely passive, and are, hence, excluded as efficient causes. They require another kind of cause to bring about changes of motion and rest upon collisions. NK serves to establish mind-body occasionalism by reasoning that causation or true agency requires knowledge, and that this (oftentimes very intricate) knowledge cannot be had by finite substances. The most prominent example is Geulincx' *Quod nescis* principle holding that 'You do not bring about what you do not know how it happens'.[43] Global arguments for occasionalism include the 'No necessary connection' argument' (NNC) and the argument that 'Conservation is but continuous creation' (CCC). At the heart of NNC we find the conviction that causation has to be (logically) necessary. This is to say that when positing an efficient cause, it is inconceivable that this cause does not produce its effect. It seems relatively clear that so strong a constraint eliminates any entity but God as a true cause. God is the only cause in virtue of His omnipotence. It would be logically inconsistent to conceive of God's omnipotence as

42 It needs to be shown that God and not other finite immaterial principles such as a world soul, plastic natures or a hylarchic principle is the true efficient cause of the origin and alteration of (states of) motion in the natural world.

43 *Quod nescis quomodo fiat, id non facis*.

being insufficient to bring about the effect He wants to produce. CCC states that God's conservation of the world needs to be understood in terms of a continuous creation in that God not only wills the world to continue to exist but He wills this to happen in very concrete ways. God not only conserves finite entities' existence generally speaking, but their concrete spatio-temporal existence in particular. To illustrate: God not only conserves this table's existence but also its being *here* rather than *there*, and its being *now* rather than *earlier* or *later.* Ruling out causal overdetermination, this means that when I, for instance, seem to be moving the table, it is really God who does so. God's continuous creation is, however, not confined to spatio-temporal properties but all modes of minds as much as bodies. Hence, when I, for instance, dwell upon a certain thought, it is God rather than my mind maintaining the presence of this very thought.[44]

(C) Moreover, in thinking about occasionalism, Ott (2009) drew attention to two opposite understandings of laws of nature in early modern philosophy. On the one hand, there are "top-down" analyses of laws of nature. According to these analyses, laws of nature "are not fixed by the natures of the objects they govern; both their status and their content depend not on created beings but on God" (Ott 2009, 5f). On the other hand, there are "bottom-up" analyses of laws of nature. According to these analyses, "the course of nature is fixed by the properties of created beings" (Ott 2009, 6). While the top-down approach to laws of nature seems more characteristic of occasionalism, the bottom-up approach to laws of nature seems more characteristic of Aristotelian conceptions of natural philosophy. Certainly, for someone like Malebranche—adopting a top-down approach to laws of nature—they are nothing but the general volitions of God Himself. That is, the laws of nature, for Malebranche, "supervene on God's ubiquitous activity" (Ott 2009, 9). Adams (2013, 75f) similarly pointed out that "[t]he obvious alternative to a scholastic Aristotelian grounding of causal relations in substantial and accidental forms inhering in objects, was to seek the grounding of the being and efficacy of laws of nature where Malebranche sought it, in the mathematically omniscient intellect and all-powerful will of God."

(D) Immediately connected to the topic of laws of nature is the question of how to actually understand the working dynamics of occasionalism itself. While Nadler and Ott have taken Leibniz's characterisation of occasionalism to be essentially correct in that God needs to be understood as *constantly* intervening in nature, or differently put, acting constantly by means of *particular* volitions, Jolley, McCracken, and Clarke have argued for the correctness of Arnauld's characterisation of occasionalism in that God needs to be understood as acting by a means of a minimum of simple *most general* volitions. Leibniz's reading can be thought of as 'interventionist,' while Arnauld's has been

44 Extended discussion of these arguments and problems concerning how they need be understood can be found in Lee 2008/2020, sect. 3.

called ‘minimalist’ (see Jolley 2019, 127f).[45] Both of these interpretations have certain merits and come at certain costs.

(E) Finally, some authors have situated occasionalism in debates about *causa* or causation and *ratio* or explanation (Bardout 2002, 2005; Carraud 2002, ch. iv). For instance, Bardout (2005) has argued that the division one finds in occasionalism between the efficient cause (God) and occasional causes mirrors the distinction between *causa*, and *ratio*. While God is responsible for all true causation in the world, occasional causes explain how natural processes themselves can be understood. By extension, we find here a divide between causation and causal explanation. The efficient cause is what actually brings about events in nature, such as my perception of cold which I experience when I take my frozen ready-made pizza out of the freezer. However, the occasional cause, here, the frozen pizza’s coldness (and ultimately its microphysical mechanical properties) explains how it comes about that I perceive cold rather than warmth. Hence, although occasional causes do not act (as they are causally inefficacious), they serve a clear function, that is, to render the world intelligible. We will see later that the intelligibility of the natural world provided by occasionalism is itself challenged (chapter 4). What is more, by beginning to shift the focus from metaphysical causation to causal explanation, occasionalism might ironically have contributed to its own demise. In positing efficient causes in nature and claiming that nature has to be made intelligible in naturalised, immanent terms, Leibniz, Wolff and their followers turned the very criterion of intelligibility of which occasionalism prided itself against occasionalism. When eighteenth-century philosophers of Leibnizian-Wolffian origin maintained that causal explanation has to adduce efficient, but natural causes, occasionalism was simply outmanoeuvred.

4. My Contribution to Current Research

This dissertation focuses on the role of occasionalism in projects of grounding in natural philosophy, while earlier research has focused more on the arguments of occasionalism itself, and its relationship to Cartesianism. In so doing, this dissertation shows that occasionalism played a fundamental role in metaphysical system-building, and in comprehensive cosmological rather than purely psychological philosophical projects. It will be shown that this ambitious approach to metaphysical system-building and its emphasis on metaphysical causation (based on God as the first and only efficient cause) led later generations of philosophers to abandon occasionalism. In providing an account of the demise of occasionalism in the eighteenth-century German causation debate, this dissertation fills a lacuna in existing research on the topic.

Moreover, this dissertation investigates the occasionalisms of several philosophers who have received very little attention; in particular, Johann Christoph Sturm, the early Christian Wolff, and the early Gottfried Ploucquet. In the case of Ploucquet, this dissertation (to the best of my knowledge) provides

45 To the list of defenders of a minimalist interpretation of occasionalism, we can add Adams (2013). For these two ways of understanding occasionalism, see also Adams 2013, 71-77.

the first English-speaking account of his occasionalism and its motivation. Cordemoy cannot be considered as an understudied author anymore. However, in arguing for a (partly) political motivation of Cordemoy's occasionalism, I explore uncharted territory. In addition, my account of Cordemoy's political project is (to the best of my knowledge) among the first in English-speaking scholarship.

In alignment with the more historical strand of research (2.1), I am interested in the dissemination and adoption of occasionalism in a relatively well-defined historical-intellectual setting, that is, the academic milieu of the Holy Roman Empire of the German Nation from the second half of the seventeenth until the first half of the eighteenth century. Unlike France, England and the Netherlands, philosophy in seventeenth- and eighteenth-century Germany was still by and large shaped in the universities. At the same time, this dissertation does justice to the fact that the early modern revival of occasionalism began (by and large) elsewhere, that is, in the French Cartesian circles of the 1660s. In this respect, the study of Cordemoy in chapter one serves as a prelude to the case of German occasionalism. While research on the German reception of occasionalism has been pioneered mainly by Specht, Sangiacomo, and Favaretti, my contribution consists in subjecting a carefully chosen set of understudied German authors to close scrutiny. I analyse the philosophical positions concerning occasionalism of Johann Christoph Sturm, Christian Wolff, and a set of influential German philosophers from the first half of the eighteenth century, namely, Georg Bernhard Bilfinger, Ludwig Philipp Thümmig, Johann Christoph Gottsched, Martin Knutzen, Alexander Gottlieb Baumgarten, Gottfried Ploucquet, and Immanuel Kant. The case of the young Wolff, as much as the overall eighteenth-century reception of occasionalism have not been studied in detail before. In other cases, authors have been studied in either a relatively limited or a rather general way. While studies on Cordemoy have oftentimes been relatively restricted in scope, and have therefore missed out on the bigger picture, studies on Sturm and Ploucquet have oftentimes provided rather general sketches.

I am focusing on the role occasionalism plays in the realm of natural philosophy (chapters one to three), but also on why occasionalism was dismissed based on considerations in natural philosophy (chapter four). Overall, I aim at uncovering the foundational role occasionalism played in the natural philosophies of its supporters. In so doing, I am interested in shedding light on the individual motivations of philosophers for endorsing occasionalism, too. Hence, in the case of Cordemoy we will see that occasionalism is not only essential to his ambitious project of deconstruction and reconstruction of the human world, but also serves a political goal, that is, to support the absolutist reign of Louis XIV. In the case of Sturm, we will discover that occasionalism grounds his eclectic natural philosophy and reconciles a by and large Cartesian mechanical approach to philosophy with the endorsement of finality, i.e., the adoption of final causes in nature. In the case of the young Wolff, we will find that occasionalism bridges the gap between the mental and the physical applied to the problem of speech although Wolff realises the global or universal applicability of occasionalism as such. In the case of the only other eighteenth-century German occasionalist here studied, that is,

Ploucquet, we will encounter occasionalism in combination with the Malebranchean doctrine of the vision in God as an answer to the problem of the origin of sense-perception.

In alignment with the more philosophical strand of research, I reconstruct and critically examine the arguments set forth to establish occasionalism (2.2 A, B). A more particular emphasis will be placed on the case of physical occasionalism—though without loosing sight of a more global perspective. Throughout the dissertation, it will become clear that my reading of occasionalism coincides with the minimalist or Arnauldian reading of occasionalism (2.2 D). I consider this reading historically more adequate. It squares better with what the occasionalist authors studied here actually say.

5. Methodological Considerations

This dissertation utilises different yet compatible methodological approaches, in order to deliver a charitable, and historically and philosophically accurate interpretation of the occasionalisms of Cordemoy, Sturm, and the young Wolff as well as the rejection of occasionalism by the mature Wolff, and the eighteenth-century German philosophers following him. Insofar as I speak of 'occasionalisms'—a term I borrow from Schmaltz (see above)—I wish to highlight the individual motivations for and variations of occasionalism. None of the occasionalist philosophers studied in this dissertation merely repeats what has been said by his predecessors—all of them are *Selbstdenker* (independent thinkers).

Contextualisation. The individual philosophical projects in which occasionalism figures will be contextualised by taking into consideration the respective philosophical, intellectual, and historical setting in which they were developed. The question of philosophical influences and sources unless immediately connected to the endorsement of occasionalism will not occupy centre stage, but it will figure in the background. To the first two chapters on Cordemoy and Sturm are appended a list of influences and sources. To every chapter is appended a biographical sketch of the protagonists of the respective chapter. This is to inform the reader about the philosophers with which they will be dealing —particularly, since some of them are hardly known to anyone but absolute specialists.

Close reading. The texts worked with in this dissertation have been approached by means of close reading. They have been carefully scrutinised, read and re-read. No text ever speaks for itself, but I am convinced that some readings enjoy greater textual support than others.

Broad textual basis. In order to restore the philosophical projects of the occasionalist authors or their opponents of whom we treat here, a broad textual basis has been used. In the case of Cordemoy, this means that in contrast to the predominant scholarship, I have considered everyone of Cordemoy's works except his *Histoire de France*. In considering not only his more strictly philosophical works, but also his political treatises, it becomes clear that Cordemoy's occasionalism is motivated partly by his political views, as well as his project of philosophical grounding. In the case of Sturm, this means that all of his physics textbooks, and some dissertations have been considered. In the case of Wolff, I have

based my interpretation on both his *German series* of textbooks, as well as the *Latin series*. In addition, I have availed myself of some of his dissertations, and his correspondence with Leibniz. In the case of the last chapter on the eighteenth-century German causation debate, I have relied by and large on the main works of the philosophers to be studied, but in the case of Gottfried Ploucquet I have consulted all five of his textbooks on metaphysics and logic, in order to determine when he abandoned his commitment to occasionalism. Overall, this broad textual basis adds to a more complete, nuanced picture of our authors' philosophy, and adds to the clarification of their views.

Argumentative reconstruction. Seeking to uncover in what way the authors of this dissertation tried to convince their contemporary and future readers of the soundness of occasionalism, I extract the philosophical argumentation in favour of occasionalism. This includes showing how an argument works; on which background assumptions it is based; and assessing whether—in light of its time and the historical-philosophical conditions—it is reasonable and convincing. The argumentative reconstructions in this dissertation are not conducted by means of formal logic, but in a more discursive-dialectical manner.

Canon enrichment. I am convinced that our philosophical past was much richer and much more diverse than most of the historiographers and philosophers working in the field have led us to believe. While the selection of occasionalist authors and participants in the eighteenth-century causation debate results quite naturally from the historical-geographical focus of this dissertation, to wit, the dissemination of early modern occasionalism in Germany, at the same time most of these authors are understudied, and unjustly so. The enrichment of the philosophical canon is a positive side-effect of this dissertation.[46]

Translations. Most of the texts, and philosophical works we will be dealing with are untranslated. All translations unless otherwise noted are my own. Due to the sometimes limited accessibility of the original works even in times of digitisation, and for the sake of transparency, the original passages in French, Latin, and German are given in the footnotes—unless a standard translation, such as Fugate's and Hymer's translation of Baumgarten, exists. Verbatim references to secondary literature are translated as well, especially with an eye to readability. As they can be easily retrieved, and for the sake of saving space, however, they are not given in the original in this dissertation. In cases where the original turn of phrase could not be kept in translation, or in cases where we encounter important technical terms, these are given in square brackets. My goal has been to interpret the quotes as little as possible in translating them. My translations seek to be minimally invasive. The original sentence structures and punctuation are usually kept, unless they disrupt the readability of these sentences in which case they have been broken apart. In all cases, however, this is noted in the respective footnotes.

46 I am aware that the enrichment of the philosophical canon produced here is not in terms of under-represented, suppressed or discriminated groups, but rather in terms of so called 'minor figures'. Alas, all of them are white men from Western Europe.

6. Structure of the Dissertation

This dissertation consists of four chapters, and a conclusion.

Chapter One is dedicated to the occasionalism of Géraud de Cordemoy (1626–1684). We will see that occasionalism plays an essential role in his ambitious project of deconstructing and reconstructing the human world. Cordemoy shows that the state is constituted by towns, families and eventually individual citizens. *Qua* human beings these individual citizens are inextricably composed of mind and a macroscopic 'body,' the latter of which is nothing over and above matter functionally united. Matter in turn is composed of true material substances, that is atoms. These are called 'bodies' in the metaphysically strict sense. Minds and atoms are the only true metaphysical unities, and therefore constitute the ultimate building blocks of the universe. Cordemoy then turns to reconstructing the world by explaining how bodies interact and form matter of various sorts. Cordemoy argues *more geometrico* that God is the only truly efficient cause of the origin and transfer of motion between bodies. Employing occasionalism once more, he then accounts for the interactions of minds with what we are accustomed to call 'our own bodies'. This will be particularly important to make intelligible the phenomenon of speech and language more generally. Cordemoy considers language vital for human beings in order to form social and political collective entities, such as families, towns and eventually states, the latter of which Cordemoy can only conceive of as governed by an enlightened king of absolute power. From this it becomes clear that Cordemoy's foundational philosophical project has strong political implications: supporting the rule of the Sun-king Louis XIV, of whom Cordemoy was a subject.

Chapter Two treats of the occasionalism of Johann-Christoph Sturm (1635–1703). We will discover that for him occasionalism is one of the best hypotheses of an eclectic natural philosophy. Eclecticism selects what is deemed good and true in any of the past or present natural philosophies of which Sturm is aware. His three key elements of natural philosophy are (Cartesian) mechanism, occasionalism, and finality, i.e., the adoption of final causes. Mechanism reduces the world to passive matter, its modifications, which Sturm calls 'passive forms,' and motion (as extrinsic to the thing moved). Occasionalism maintains that God must be the sole efficient mover of the physical world. Neither matter (*qua* passive), nor other finite minds (embodied or disembodied) nor any other alleged finite mental principle are causally efficacious. Sturm's occasionalism partially follows the argumentation of French Cartesian authors such as Cordemoy and Malebranche but also develops a new line of argumentation, i.e., what I call the *argument from spatio-temporal grounding*. In opposition to someone like Descartes, Sturm endorses final causation. However, similar to late Aristotelian-scholastic philosophers, such as Suárez, Sturm takes final causes to be extrinsic to anything but rational agents. While everything in nature acts—more accurately speaking, is acted upon—towards certain ends, only rational agents are aware of these ends. Sturm applies mechanism and finality grounded by occasionalism to one of the most intricate issues of early modern natural philosophy: life.

Chapter Three focuses on the occasionalism of Christian Wolff (1679–1754) in his early philosophy but also on the reasons for the later Wolff's change of heart. In Wolff's early *Philosophical Enquiry into Speech* (1703), occasionalism was used to account for speech in human beings, that is, making one's own thoughts known to another person by means of physical signs. In their epistolary exchange, Leibniz convinced Wolff to be more sceptical of occasionalism. As Wolff's scientific method and his philosophical project of sufficiently grounding the world grew, he came to explicitly reject occasionalism. In particular, Wolff objects that by endorsing mechanism, and the idea of passive matter, occasionalism falls short of providing distinct and genetic definitions in physics. In stripping natural finite beings of an intrinsic force to act, occasionalism severs the essential nexus between sufficient reasons, efficient causes and forces. The principle of sufficient reason understood (by and large) in terms of efficient causation is thwarted in the absence of intrinsic forces enabling finite beings to act. Among the various objections levelled against occasionalism the most pressing one is that it violates the principle of sufficient reason, and therefore renders nature unintelligible. According to the mature Wolff, occasionalism ultimately fails to live up to the standards of a reasonable, scientific natural philosophy.

Chapter Four enquires into the reception of occasionalism in the eighteenth-century German causation debate and seeks reasons for its marginalisation. In order to do so, seven German academic philosophers are called to the fore, and their positions concerning occasionalism are analysed. These are Georg Bernhard Bilfinger (1693–1750), Philipp Thümmig (1697–1728), Johann Christoph Gottsched (1700–1766), Martin Knutzen (1713–1751), Alexander Gottlieb Baumgarten (1714–1762), Gottfried Ploucquet (1716–1790), and (the pre-Critical) Immanuel Kant (1724–1804). All these authors accept one of the two standard theories of causation: either pre-established harmony or physical influx. All of them apart from the early Ploucquet reject occasionalism. The intrinsic reason for this is that, for these thinkers, occasionalism conflicts with a natural philosophy in immanent, non-transcendental, or, differently put, in naturalised terms. The more external reasons are the increasing pressure from outside the university system, i.e., the belief of members of scientific academies and extra-academic thinkers that speculative reasoning, of which occasionalism seems particularly guilty, exceeds human intellective faculties, and is thus unlikely ever to solve certain philosophical problems.

The conclusion condenses the results of this dissertation.

CHAPTER 1

THE NATURAL PLACE OF GÉRAUD DE CORDEMOY'S OCCASIONALISM. A PROJECT OF DECONSTRUCTION AND RECONSTRUCTION

I thought too that in order to discover
what opinions they [the most sensible of his countrymen] *really held*
I had to attend to what they did rather than what they said.
(Descartes, *Discours de la Methode*, CSM I, 122).

Introduction

One of the first early modern occasionalists, and a very influential one in his time is Géraud de Cordemoy (1626–1684). While he can be seen as a follower of Descartes in several respects, particularly with regard to his mechanical natural philosophy, Cordemoy certainly did not follow Descartes' every word. Instead, he corrected, and advanced Descartes' philosophy as he saw fit. The most noteworthy aspects of Cordemoy's independence from Descartes are his mechanical atomism and his occasionalism. Despite his originality, and his prominence during his own days, Cordemoy has been almost forgotten for a long while by historians of philosophy. It is only relatively recently that Cordemoy's work has received more attention. The focus, however, has been relatively narrow. It mainly revolves around Cordemoy's arguments for his wholesale occasionalism. Cordemoy's political-historical, and his more strictly speaking philosophical works have been studied separately.[47] By drawing a connection between these works, however, a new view of Cordemoy's philosophical project emerges.

What I will show is that Cordemoy's occasionalism falls into a much more ambitious and far-reaching project than has usually been taken to be the case. It is a project of comprehensive philosophical grounding of human reality. The project consists of the deconstruction of human reality in three stages: (I) the analysis of society into its individual members, i.e., human beings. (II) The dissection of the human being into its composing parts, that is, mind and macrophysical 'body,' i.e., matter organised in a functional unity. (III) The decomposition of matter into atoms, i.e., bodies in a more rigid and technical sense. This part of deconstruction is then followed by a complementary but more demanding part of reconstruction or grounding of human reality equally consisting of three stages: (Ia) Combining substantial particles or atoms (what Cordemoy calls 'bodies') to form matter. (Ib) Explaining the realm of physics in purely mechanical terms, that is, in terms of local motion and the arrangement of

47 An exception to this is Jean-François Battail's (1973) *L'avocat philosophe Géraud de Cordemoy (1626–1684)*.

differently shaped particles. (IIa) Showing how the mind and the macrophysical 'body' 'interact' in humans as the only beings composed of both. (IIb) Showing how human beings as embodied minds interact with their fellow conspecifics by means of language. (III) Explaining how human beings come together to form families, towns, and eventually states. In this two-fold project (i.e., deconstruction and reconstruction), occasionalism provides the necessary causal glue to put things back together after a rigorous process of deconstruction. No dimension of 'interaction' between any kind of substance, mind or body, works without it. Cordemoy's project provides the setting for his occasionalism. Ultimately, he launches this project to support absolutism and stable, peaceful political conditions which he thinks can only be had through the rule an absolutist king. Therefore, Cordemoy's philosophical project and his endorsement of occasionalism are at least partially politically motivated. The causal disempowerment of human beings effected by occasionalism prepares the ground for a political disempowerment of citizens *qua* political 'agents'. Indeed, while, according to occasionalism, causal power is concentrated in God, according to absolutism, political power is concentrated in the heavenly invested absolute ruler.

My reconstruction of Cordemoy's undertaking is a logical, not a chronological one. Except the *Le Discernement du Corps et de l'Ame en six discours pour servir à l'éclaircissement de la physique* (DCA), the *Lettre Ecrite a un Scavant Religieux de la Compagnie de Jesus* (*Letter*), and the *Discours physique de la Parole* (DPP), all of his other treatises were published posthumously in 1691 and 1704. Their composition is hard to date. Nonetheless, it is mainly in these posthumously published works where the project, logically speaking, begins. In fact, the role that occasionalism really plays becomes manifest by what Cordemoy does, and not so much by what he says. His project is spread out across all his works not just the straightforwardly 'philosophical' ones. This includes his political and historical or historiographical writings.

Notwithstanding the fact that occasionalism, in general, and Cordemoy as a proponent of this theory, in particular, have attracted intensified academic attention, Cordemoy's occasionalism has almost entirely been reduced to discussions of the 4th and 5th Discourse of his DCA, sometimes taking into consideration bits of his *Traitez de Metaphysique* (TdM), and seldom consulting his DPP. This has led to a rather narrow understanding of Cordemoy's arguments for occasionalism. Let me adduce three instances of recent academic research on Cordemoy in this respect:

(1) Steven Nadler in his two most recent contributions on Cordemoy (2005 [2011]) and (2015) examines the question of whether or not Cordemoy can be considered a 'thoroughgoing' occasionalist.[48] Nadler then analyses Cordemoy's arguments for occasionalism concerning each dimension of causal interaction within a substance-dualist ontology, that is, body to body, body to mind, mind to body, and intramental causation, i.e., the production of one's own ideas within one's own mind (Nadler 2011, 148-164). Nadler concludes that Cordemoy counts as a thoroughgoing

48 See the introduction of this dissertation, section 3.2 B.

occasionalist. However, he takes issue with Cordemoy's lack of argumentation concerning the matter of intramental causation (ibid., 154-156). Nadler undeniably adds to our understanding of Cordemoy's occasionalism. However, he does not go beyond Cordemoy's more strictly speaking philosophical works. His focus remains on the DCA, the DPP and the TdM.[49] Hence, he does not consider Cordemoy's greater project.

(2) Tad Schmaltz in his *Early Modern Cartesianisms* (2017a), in which he provides an overview of the reception and transformation of Descartes' thought among his disciples and scholars (ibid., 11), dedicates a whole chapter (i.e., the fourth) to occasionalism, and a few pages to Cordemoy. Schmaltz then shows that Cordemoy's occasionalism covers the first three of the aforementioned dimensions of causal interaction. In contrast to Nadler, Schmaltz remains hesitant as to whether one should really treat Cordemoy as a thoroughgoing occasionalist. He concedes that Cordemoy's occasionalism is "more complete" (ibid, 205) than that of Antoine Arnauld or Louis de la Forge. However, Schmaltz sees a lack of argumentation in Cordemoy for the claim that God is the cause of all that is real, which would have given Cordemoy an argumentative basis to rule out intramental causation. In the same vein, Schmaltz thinks that Cordemoy has not sufficiently proven the compatibility of our freedom with the thesis that God is the real cause for everything there is. What would be needed, or so Schmaltz thinks, is an argument showing that "the mind cannot initiate, and thus sustain, changes in its own states by means of an act of its will" as is analogically true in the case of bodies. "The case for a complete occasionalism remains to be made", concludes Schmaltz (both quotes: ibid, 204). While his exposition of the different styles of Cartesianisms, the protagonists working on the basis of Descartes' philosophy, and the themes present in the decades after Descartes' death is insightful and proceeds diligently, Schmaltz, similarly disregards Cordemoy's more comprehensive philosophical project.

(3) Andrew Platt in his *Cordemoy and the Motives for Cartesian Occasionalism* (2017; see also Platt 2020, ch. 7, esp. section 7.4) argues against Lennon's (1974) paper, which claimed that occasionalism followed from the non-transference of modes argument (NT), and the argument that conservation is but continuous creation (CCC) (see Platt 2017, 140). In general, Platt then tries to substantiate the claim that "Cartesians adopted occasionalism in response to a variety of broad, systematic considerations, and not in response to any one line of reasoning" (ibid, 141) (also Platt 2010, 1, 8, 262f). This is, of course, in line with Schmaltz's (2017a) remark that "when we consider the French Cartesians, we find no more unity among them than in the case of the Dutch disciples of Descartes. […] [W]e can admit that there were in fact various different forms of Cartesianism in the early modern period" (Schmaltz 2017a, 4f; see also Bardout 2002, 150). After having reconstructed Cordemoy's arguments for body-body and mind-body occasionalism, Platt attempts to establish that for Cordemoy "occasionalism supports Cartesianism, not the other way around"(Platt 2017, 155). To be precise, Platt

49 One might also want to mention Cordemoy's *Lettre ecrite à un Scavant religieux de la Compagnie de Jesus* as pertaining to his philosophical works. Nadler does not consider this work in his reconstruction of Cordemoy.

thinks that Cordemoy's thesis that body-body causation is as obscure (or as comprehensible) as mind-body causation serves the purpose of showing that the nature of body is not better known than the nature of the mind; and thus indirectly buttresses Descartes' claim that the nature of the mind is better known than the nature of body.[50] Ultimately, Platt is convinced that "[o]ccasionalism thus provides Cordemoy with a way to defend the epistemology of Descartes's *Meditations*" (Platt 2017, 154).[51] Doubtlessly, Platt goes some way to unravel Cordemoy's broader motivation for occasionalism. Indeed, Platt's presentation and discussion of Cordemoy's motives for the adoption of occasionalism are interesting and merit further discussion. However, I doubt that one could actually substantiate the hypothesis that Cordemoy's occasionalism serves to defend the epistemology of Descartes' *Meditations*. On the contrary, Cordemoy seems to have had a somewhat different conception of the mind than Descartes.[52] More relevant for our purposes is that Platt focuses exclusively on a limited set of Cordemoy's works, i.e., the more strictly speaking 'philosophical' ones, and does not take note of Cordemoy's more ambitious project.[53]

In my presentation of Cordemoy's philosophical project and the natural place of his occasionalism, I will proceed as follows: I will first delineate Cordemoy's project and his arguments in favour of occasionalism (sections 1 and 2). Cordemoy's deconstruction of the world will be studied first (section 1), and its reconstruction thereafter (section 2). I will then discuss a potential caveat to Cordemoy's project, that is, the threat of eliminativism arising from his atomism (section 3). In ontology, eliminativism is the view that only simple fundamental entities have (ontological) reality. If eliminativism were right and only the most fundamental entities possessed ontological reality, then Cordemoy would not be entitled to proceed with the synthetic part of his project reconstructing the world from its most fundamental particles. Here, I will show that Cordemoy has the conceptual resources to offer a solid response. Furthermore, despite the fact that Cordemoy is a mechanist, he makes a genuine difference between living and non-living beings. That is to say, the former are organic bodies while the latter are not. I will then shed light on the political dimension of Cordemoy's

50 In his *Objections to the Meditations*, Gassendi had criticised Descartes for failing to demonstrate this (Platt 2017, 153ff; see also Platt 2010, 5f, 261-263).

51 Platt also suggests a theological motivation for Cordemoy to adopt occasionalism in addition to the epistemological motivation just outlined. On this reading, Cordemoy chose occasionalism to stress God's omnipotence, His omnipresence and the compatibility of Cartesianism with orthodox theology (Platt 2010, 260, 263). This idea is absent in Platt (2017). Platt repeats all of the motivations he ascribes to Cordemoy in his most recent work, *One True Cause. Causal Powers, Divine Concurrence and the Seventeenth-Century Revival of Occasionalism* (2020, 269, 297-301, 365f).

52 The subtitle of 6th Disc. in the DCA, for instance, states that the mind's *existence* (*pace* Descartes' 'the *nature* of the mind' in the 2nd Meditation) is better known than that of the body. See Ablondi 2005a, 99f. Also, for Cordemoy (at least in the DPP), the will seems to be the essential property of the mind: "the mind is a substance with which the power to determine itself agrees [*convient*] so naturally that it would cease to be a mind, if it ceased to will"(DPP, 196) "l'esprit est une substance, à qui le pouvoir de se déterminer de soy-mesme convient si naturellement, qu'il cesseroit d'estre Esprit, s'il cessoit de vouloir." See Ablondi 2005a, 110; Battail 1973, 173. Furthermore, Cordemoy raises doubts in how far the substance of the mind can be known: "God does not make us conceive the substance of our minds themselves, nor how they will, that is to say, how they determine themselves" (DPP, 191). "Dieu ne nous fasse pas concevoir la substance de nos Esprits mesmes, ny comment ils veulent c'est à dire, comment ils se determinent."

53 Platt (2020), too, only looks at Cordemoy's DCA, and very briefly at the TdM.

project (section 4), to wit, to make a case for the absolutism of Louis XIV. A brief summary (section 5) will conclude this chapter.

1. Deconstruction

Cordemoy's philosophical project is a mirror-symmetric enquiry into the whole of human reality from the state down to the citizen, from human beings to minds, bodies and atoms. It is best illustrated by a parabola (see figure 1). On the one hand, Cordemoy dissects reality. On the other hand, he restores it to its former place. This analytic-synthetic procedure improves our understanding of the world.

Cordemoy first analyses the state down to citizens *qua* human beings, and the latter *qua* mind-body (ultimately: atoms) composites. He then synthesises humans from their constitutive parts, shows how far they can be said to be special—they are living, thinking, and language-using beings—and provides an intelligible story of how states are formed by means of uniting social groups. The importance of Cordemoy's occasionalism lies in the central role it plays in this project. As a comprehensive causal theory, occasionalism allows him to ground reality and account for the interaction of minds and bodies.

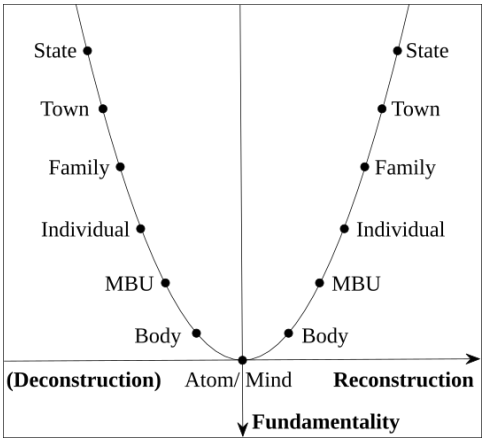

Figure 1) Cordemoy's mirror-symmetric philosophical project
MBU stands for the mind-body union of the human case. This parabolic function illustrating Cordemoy's project has the following properties: $y \rightarrow 0 \triangleq$ increase in fundamentality; $x \leq 0 \triangleq$ deconstruction; $x \geq 0 \triangleq$ reconstruction; $|x| \triangleq$ complexity. It follows from this that atoms and minds are the most fundamental entities.

1.1 From the State to the Individual

In his posthumously published *Des Moyens de rendre un Etat heureux*, Cordemoy deconstructs the state into its constitutive elements: Towns, which in turn are formed by families. The latter are made up by their particular members and run by their chief (*chef*), the family father. In like manner, towns are run by governors ruling families. The state, or kingdom, is run by a king ruling towns and

provinces. Due to their composite structure, states can be analysed down to their most fundamental element, the citizen.[54]

Therefore, the logical starting point of Cordemoy's project is the level of the state, or kingdom, and the idea that:

> A state is for several towns what a town is for several families, and what a family is for each person which composes it: so perfectly that to see only in principle what can make a state perfectly happy, one needs to see what makes a family happy (*Des Moyens*, 206).[55]

Cordemoy seems to be thinking in two directions. On the one hand, state, town and family are complex entities. They depend upon their constitutive elements, that is, towns, families, and family members, respectively. This means that to understand the state one needs to descend at least to the smallest constitutive complex entity, i.e., the family and the interplay between its members. However, since the family member *qua* human being is a complex entity itself, strictly speaking one needs to pursue the project of deconstruction even further. On the other hand, the state, the town and the family are principles of unity. This will be relevant when we come to the project of reconstruction.

Let us look first at the deconstruction of the state into families, which are to be understood as the smallest complex *social* entities. Cordemoy, interestingly, conceives the family in terms of what we might call a state *en miniature*. That is to say, the chief of the family—the father or the oldest male member of the family—organises the areas of responsibility within the family imitating the division of the state's *ressorts*.[56] To wit, one or some of the chief's children will take care of agriculture and the family's servants working in this domain. Others will be responsible for commerce, for the interior, for 'foreign affairs,' for education, for mediating conflicts, and for defending the family's possessions,

54 Cordemoy might have been somewhat inspired by Aristotle's *Politics*, which he might have come across during his study of law. In the *Politics* we find the same idea that "when several families are united, and the association aims at something more than the supply of the daily needs, the first society to be formed is the village. […] When several villages are united in a single complete community, large enough to be nearly or quite self-sufficing, the state comes into existence" (Book I, 1252b1, p. 1987). As we will see, Cordemoy, however, does not expressly subscribe to Aristotle's holism, i.e., the idea that "the state is by nature clearly prior to the family and to the individual, since the whole is of necessity prior to the part" (*Politics*, Book I, 1253a1, p. 1988). Furthermore, Cordemoy clearly deviates from Aristotle in that the only form of government Cordemoy discusses is monarchy, thereby suppressing aristocracy and polity (let alone tyranny, oligarchy, and democracy as corrupted forms of government) introduced in Book III of the *Politics*.

55 "Un Etat est à plusieurs villes, ce qu'une ville est à plusieurs familles, & ce qu'une famille est à chacune des personnes qui la composent: si bien que pour voir jusques dans le principe, ce qui peut rendre un Etat parfaitement heureux, il faut voir ce qui rend une famille heureuse" (*Des Moyens*, 206). Cordemoy's historical/historiographical as well as political works (alongside his TdM) are collected in his *Divers Traitez de Métaphysique, d'Histoire et de Politique* (1691). The works contained in the *Divers Traitez* are: the TdM, the *Observations sur l'Histoire d'Herodote* (*l'Histoire d'Herodote*), the *Ce qu'on doit observer en écrivant l'Histoire*, the *De la Necessité de l'Histoire* (*Necessité de l'Histoire*), the *De la Reformation d'un Etat* (*Reformation d'un Etat*), the *Des Moyens de rendre un Etat heureux* (*Des Moyens*), the *Maximes tirées des Faits de l'Histoire de Charles IX* (*Maximes*) and the *Discours au Roy sur la Mort de la Reine*. Citing these, I will give the abbreviated title of the work for the sake of clarity, that is, the one here indicated in brackets. Page numbers, however, refer to the *Divers Traitez*.

56 Cordemoy never spells out whom he takes to be the chief (*chef*) of the family. Given the *zeitgeist* and the fact that the king is the head of his own family (*Des Moyens*, 214), this seems to be a safe bet.

respectively (*Des Moyens*, 210-212). In any case, the chief remains in charge. He delegates tasks to family members, but his power remains undivided (*Des Moyens*, 207, 210). In this and in his duty to render the family happy (*Des Moyens*, 207) as well as in the fact that everyone is held accountable by him, his position mirrors the absolute rule of the king.[57] Cordemoy does not make claims about the ontogeny of the state. The link between how states and families are run is a logical one, but it seems plausible to think that states ultimately owe their *ressort* structure to the way tasks are distributed in families and not vice versa.

Having dissected the state into its ultimate constituents—humans as socio-political actors—Cordemoy attempts to provide a metaphysical dissection of human beings *qua* metaphysically composite beings.

At the beginning of his *Le Discernement du Corps et de l'Ame en six Discours pour servir à l'Éclaircissement de la Physique* (DCA), his first monograph published in 1666, he rushes to outline the composite nature of us humans. We are made up of a mind and a body. Setting aside the mind, which Cordemoy, in line with Descartes, takes to be indivisible, he then focuses on the distinction between 'body' in the metaphysically strict sense, and 'matter,' ontologically grounding the latter in the former (DCA, Disc. 1).[58]

Cordemoy takes it as a given that the individual citizens *qua* humans are complex entities, composed of a mind and a macrophysical body (see the preface of the DCA), and it is in this respect that they differ from animals *qua* purely natural machines (*Lettre*, 33, 35, 44f, 48). Substance dualism, the existence of only two types of substances, mind and body, itself is axiomatic (DCA 4, ax. 3). Nonetheless, the study of the mind and the body, Cordemoy laments, has not received enough attention. It is true that the ultimate duty of each citizen is "the service one can render to one's country or to one's family in considerable ways, or in some particular profession" (DCA, 58), and indeed, philosophy is not—at least not entirely—an end in itself, but a means to further the well-being of the state. While this would justify directing one's attention to one's professional life instead of dedicating oneself to the study of mind, body, and their union, some professionals, such as clergymen and physicians should do so (DCA, 56). However, even for statesmen, private men, and orators this is at least, as he puts it, "very convenient" (ibid.). Studying the mind, the body and their union allows one "to help those who listen to discern and even pursue what is always the best course – whether it be in negotiations, public action, or deliberation" (DCA, 57). Furthermore, studying the mind-body union enables one to make better sense of oneself: "He [the one who engages in such endeavours] recalls his former errors, he knows the causes of them, and he knows how things fared" (ibid). One can also make better sense of one's fellow citizens *qua* humans, since men are equal and "all men are subject to the same passions and to the same mistakes" (ibid). To properly communicate what one has found out

57 For the accountability of the family members, see *Des Moyens*, 211f. For the parallelism between the head of the family and the king, see *Des Moyens*, 210-212 and 216-222.

58 Cordemoy qualifies the mind as indivisible in DCA, 103. For the indivisibility of the mind in Descartes, see, e.g., CSM Vol. 2, 59.

about the mind and the body, one needs eloquence, which consists in "knowledge of the means that are required to instruct and affect others" (ibid).[59]

Cordemoy motivates his study of the mind, the body and their union by showing its fruitfulness, that is, how it both directly and indirectly benefits society. One knows oneself better, and one learns how to better understand others. Scrutinising the nature of human beings enables one to teach others so that they rise to the same level of knowledge. For some, such as the physician, a proper understanding of the composite nature of the human being is necessary to do their job, that is, restore their patients to health.

1.2 Body and Matter: The Realm of Physics

What we call our body is functionally organised matter. Matter, in turn, can be deconstructed into its constitutive elements, i.e., atoms. Macrophysical entities—both natural, living, and artificial machines—are grounded in substantial, extended particles, their different shapes and states of motion. Once this deconstruction is accomplished, Cordemoy will be entitled to embark on his project of reconstruction within the realm of physics. But first things first.

Unlike Descartes, but more in line with Gassendi, Cordemoy distinguishes body and matter (Clarke 1989, 21, 79f). Conceptual analysis, i.e., "what ought to be understood by body" (DCA, 60), shows for Cordemoy that the term 'body' strictly speaking means 'extended substance': "Bodies are extended substances" (DCA, 60).[60] Bodies *qua* substances are indivisible, or else they would not be substances.[61] This is because Cordemoy, following Descartes, thinks that a substance *qua* substance "subsists independently of" any other substance (DCA, 62). To make proper sense of this, let us look into Descartes' *Principles of Philosophy*, which Cordemoy was very familiar with, and see how Descartes conceptualises the notion of substance.[62] Descartes defines it as follows: "By *substance* we can understand nothing other than a thing which exists in such a way as to depend on no other thing for its existence" (CSM I, 210; emphasis in original). In opposition to Descartes, for Cordemoy this notion of substance implies that substances are indivisible. If bodies were divisible, then they could have parts on which they would depend—or so it seems plausible to think. But since substances are characterised by their ontological independence, bodies that relied on their parts could not be substances. According to Cordemoy, the concepts of 'substance' and 'divisibility' are mutually exclusive. Either a thing is a substance or it is divisible, but never both: "[T]hat matter is a substance and that a substance can be divided [are] two things that are the most contrary to what is known about them by the natural light" (DCA, 63). Following Cordemoy, then, atomic bodies *qua* material

59 I will come back to Cordemoy's analysis of speech in section 2.3 below.

60 For Cordemoy's method of conceptual analysis, see Scheib 1997, 132f.

61 For the indivisibility of substance *qua* substance, see Ablondi 2005a, 25f, 42f, 53; 2005b, sect. 2; Rodis-Lewis 1993, 417; Nadler 2015, 20. Scheib's 1997 doctoral dissertation, especially part III.3.2, revolves around the origins and details of Cordemoy's notion of substance.

62 Looking at Cordemoy's DCA, his familiarity with Descartes' *Principles* is relatively obvious. On page 6 of his *Letter* to Cossart, Cordemoy explicitly mentions Descartes' "*Principes*".

extended substances are the fundamental building blocks of the material universe. Bodies do have a shape (DCA, 60), but "the shapes of bodies are exceedingly diverse" (DCA, 68). They are impenetrable (DCA, 60), imperceptible (DCA, 61), in motion or rest, and in a certain (relatively defined) place (DCA, 60). Finally, Cordemoy also ascribes oneness to bodies, in the sense that "each body is only *one and the same* substance" (DCA, 60; my emphasis): "Thus, any single body is never a quantity, although it may be part of a quantity, just as unity is not a number, although it constitutes part of number" (DCA, 67).[63]

Matter, in turn, "is a collection of bodies" (DCA, 60). It is constituted by bodies, i.e., atoms, and divisible but not infinitely so (DCA, 61), i.e., only down to the level of fundamental particles (atoms). Matter is extended, but its extension is contingent upon the extension of bodies (DCA, 62). Along the same lines, matter has shape but that shape depends on the quantity—"[t]he more or fewer" (DCA, 66)—of same or differently shaped bodies (DCA, 68). In contrast to bodies, matter is perceivable, and it is precisely sense-perception as much as lack of reflection that are responsible for our conflating body and matter as well as their respective properties (DCA, 62).

The realm of macrophysical objects can hence be analysed into its constitutive fundamental microphysical particles. Cordemoy is convinced of a reductionist physics in that "we can explain the greatest changes that happen in matter through the arrangement, shapes and motion that are found therein" (DCA, 76).[64] He admits that this also goes for what we call our own 'body'. In a metaphysically strict sense, "what we call our body is, in effect, an aggregate of a hundred million bodies; in a word, it is matter" (DCA, 65).

All this means that the physical world can be (re-)constructed from atoms, their shapes and states of motion or rest. Once the distinction between body and matter is in place, Cordemoy has reached the *apex* of his project. From now on it is all reconstruction (see also figure 1 above). We ascend from the microphysical to the macrophysical, from the individual to the social realm.

2. Reconstruction

2.1 The Realm of Matter and Body-Body Occasionalism

Cordemoy starts his project of reconstruction by putting bodies together to form "a *portion of matter*" (DCA, 61; emphasis in original). Matter, depending on how its constitutive parts (bodies) relate to one another, or how they align, comes in three states: as heap, fluid, or mass (ibid.). As a composite entity, matter is subject to a wider range of possible changes than bodies (i.e., atoms). All changes pertaining to matter can be explained in terms of local (mechanical) motion (DCA, 70; see also Ablondi 2005a, 90; Prost 1907, 49). Cordemoy distinguishes change in quantity, i.e., increase (*accroissement*) or

63 For unity as one of the essential attributes of body, see also Prost 1907, 47. For an account of the critique of Cordemoy's atomism by his contemporaries, see Prost 1907, ch. viii (156-187).

64 See also DCA, 77, 81. For the dependence of the properties of macrophysical objects on the properties of microphysical objects in Cordemoy, see Scheib 1997, 77, 80f, 83, 86.

decrease (*decroissement*), change in quality, i.e., alterations (*alterations*), and changes in form, i.e., generation (*generation*) or corruption (*corruption*) (DCA, 70).[65] All of these derive, of course, from scholastic philosophy, and ultimately Aristotle, but are re-interpreted in a Cartesian manner here. Discussing the change of quantity first, Cordemoy has it that *increase* just means adding bodies to an existent bit of matter, while *decrease* just means separating (or subtracting) bodies from an existent bit of matter (DCA, 71). Change of quality is negatively determined as that which is neither a change in quantity nor a change in form (DCA, 73). It is positively determined as "a change such that the body to which it occurs can now affect some of our senses in ways different from the ways in which it previously affected them" (DCA, 74). A change in quality, hence, relates to our sense-perception. We sense or experience the body undergoing this change as different from how it struck us before though still recognizing it as the same body (DCA, 74). Finally, a change in form happens "[w]hen its [a thing's] change is such that nothing that the thing previously possessed is perceived in it any longer [and] we are certain that it is no longer the same thing" (DCA, 74). When the scholastics explained a change in form in terms of a change in the substantial form of a thing, Cordemoy shows that this was in fact the result of analytic carelessness, that is, a failure to follow a long causal chain of events that constitute a thing's alleged 'formal change' step by step. Instead, he argues, the scholastics tended to directly link the first and the last element of such a chain (DCA, 79). When, say, wheat spikes are made into bread through a long chain of manipulations, the inattentive and careless observer might conceive of this in terms of a change of form, but in doing so she would be just deluding herself (DCA, 75f, 81f).

While all changes of matter are due to local motion, the first three discourses of the DCA deliberately bracket the discussion of the origin and cause of motion in the world. Instead, Cordemoy completes his revisionist, reductive, mechanist physics by showing that both artificial bodies, such as a clock, and natural living bodies, such as the human body (but also animals as beast-machines, of course) "can be explained by the [local] motion and shape of [their] parts" (DCA, 81).[66] One need not resort to

65 Cordemoy understands form as "that particular constitution of parts that makes up its [a body's] whole nature and that distinguishes it from other bodies" (DCA, 73). Hence, it is clear that his understanding of form is purely mechanical, and shows no traces of the Aristotelian-scholastic understanding of form as an incomplete substance, a principle of individuation, and a source of an entity's activity. For form in (late) scholastic philosophy, see Des Chene 1996, ch. 3, and Pasnau 2011, ch. 24.

66 For Cordemoy's physics as revisionist, see Scheib 1997, 173, 195. For an excellent treatment of the Cartesian mechanist philosophy of nature, see Clarke 1989. He notes that "Cartesian natural philosophers in France in the seventeenth century were unanimous in their commitment to a mechanical explanation of natural phenomena" (99). For mechanism in Cordemoy, see Scheib 1997, 15, 61, 91; Battail 1973, 127. For Descartes' mechanism as applied to life-sciences, see also Duchesneau 1998, 47-84 and Grmek 1972, 184-190. For a mechanistic explanation of the body of animals, see *Lettre*, 45. Body, in the less technical sense, designates the functionally organised matter of a (macrophysical) individual, "working together toward the same end" (DCA, 65)—in the case of humans and animals this end is the conservation of the organism. Bodies in this sense display a certain "fitness" (DCA, 65) or what one might call 'intelligent design'. Individuals (*Individus*), for Cordemoy, are such that they cannot be divided without being destroyed ("qui ne pouyans estre diuisez sans estre entiereme(n)t détruits," *Lettre*, 44). See Scheib 1997, 75.

"*form*, *faculty*, *occult virtues*, or *qualities*" (ibid.; emphasis in original), i.e., to the alleged metaphysical obscurity of the schoolmen.

Nature has a nomological structure expressed by the laws of nature.[67] The laws of nature, to wit, the laws of mechanics are the same in both the realm of micro- and macrophysics. They apply indifferently to both atoms and large bits of matter (DCA, 77, 83f). To be sure, the laws of nature, both the laws of mechanics, and psycho-physical laws, do not govern. Their efficacy is a borrowed one. They have power (*puissance*) (DCA, 77)[68] in the sense that they manifest God's causal engagement in the world following certain fixed rules: "[A]fter it [the first Mind] established laws among bodies, following which it moves them in various ways, according to the diversity of their collisions, it also established laws between our souls and our bodies, laws which it never violates" (DCA, 101). One might then think of laws of nature as either describing God's ways, supervening on His actions, or as a user's guide for His ways. Any metaphysical efficacy one wants to ascribe to them, needs to be ascribed to His omnipotence (guided by His omniscience, and perhaps also His omni-benevolence).

In order to give a complete explanation of the corporeal realm and prior to putting the mind and the body back together in the human case, Cordemoy needs to make sense of (the nomological structure of) 'interactions' between bodies, and this makes him look for the "the first cause of motion" (DCA, 93). Cordemoy opts for occasionalism to solve the communication of motion problem. This problem consists in the difficulty of explaining how motion—which in Cartesian ontology qualifies as a mode—can be 'passed on' from one body to another. As we will see below, motion *qua* mode ontologically depends on the mover and cannot simply be given to the thing moved without thereby making it a substance or a real accident. Real accidents—that is, accidents capable of independent existence—were seen as particularly dubious metaphysical entities by mechanist philosophers.[69]

Since Cordemoy's body-body or physical occasionalism is well-discussed[70], I will confine myself to the essentials. What Cordemoy attempts to prove is that bodies are neither able to initiate motion in

67 As far as I can see Cordemoy never provides a formulation of the laws of nature other than that they express physical, and psycho-physical regularities. Given Cordemoy's trust in Descartes, it seems reasonable to assume that Cordemoy agreed with Descartes' laws of nature stated in *Principles*, part II, §§37, 39, and 40 as well as the laws of collision in *Principles*, part II, §§47-52.

68 Addressing someone sceptical about whether small particles maintain their shape and motion during the processes of evaporation and condensation, Cordemoy asks (rhetorically): "If it were true that they [the small particles] no longer follow the laws of other bodies, who or what would have been able to subject them to those a second time? And if they had escaped this power (*puissance*) for even a moment, who or what would have been able to put its yoke back on them?" (DCA, 77).

69 Much of the philosophical significance of real accidents lay in explaining the transformation of wine and bread into the blood and body of Christ during the Eucharist. In this event, the substance of wine was transformed into the blood of Christ, and the substance of bread was transformed into Christ's body. At the same time the distinct qualities of wine and bread (metaphysically speaking, accidents) were supposed to persist in the absence of a substance in which to inhere. They were taken to exist by themselves, i.e., as real accidents.

70 For different reconstructions of Cordemoy's argument against real body-body causation, see Nadler 2011, 148-151; 2015, 26-28; Ablondi 2005a, 56-60, 2005b, sect. 3; Boas 1957, 104f; Balz 1951, 18f; Scheib 1997, 210-213; Battail 1973, 127-129; Clarke 1989, 110f; Schmaltz 2017a, 200-202; Platt 2020, 272-275; Platt 2017, 143-146; Platt 2010, 244-247; Dobre 2010, 197-199, Prost 1907, 64f.

other bodies nor in themselves. Bodies are not first movers. Even more, finite corporeal substances are causally impotent. They do not cause motion in other corporeal substances or thoughts in minds. Their states of motion are mere occasions for the only true causal agent, God, to bring about motions in other bodies or ideas, i.e., sense-perceptions or sensations in minds. In his main argument against real body-body interaction, Cordemoy avails himself of the geometrical method for the sake of its greater clarity (or so he thinks) (DCA, 93). Cordemoy reasons from clear and distinct definitions and self-evident axioms to make his case. In his first axiom[71], Cordemoy assumes that a thing is not the *causa sui* of its inessential properties, that is, those properties without which a thing would continue to be what it is. Since bodies can be conceived irrespective of motion or rest (2nd axiom)[72], motion is inessential to bodies. That being so, they could be set in motion only by other bodies but not by themselves. This apparently leads to an infinite regress. Since a first mover has to have motion *de se*, no body can be a first mover (1st and 2nd conclusion). Given that there are only two kinds of substances —minds and bodies—(3rd axiom)[73], the first mover of bodies can only be a mind (3rd conclusion). Assuming that to move or to cause motion is the same (1st definition), and that moving is an action (4th axiom)[74], Cordemoy stipulates that "[a]n action can be continued only by the agent that began it" (5th axiom) (DCA, 94), and concludes that the mind now moving bodies is the mind that first began to move them (4th conclusion).

This argument establishes that bodies cannot be self-movers and that the realm of bodies needs an external, non-bodily cause to be infused with motion. The same conclusion can be reached by what has been called the 'passive nature of bodies' argument (PN) in the literature on Malebranche (Clarke 1989, 115; Lee 2008, §3.1; Schmaltz 2017a, 211-213). It can be found (in a similar version) in Cordemoy as well (Clarke 1989, 115, Lee 2008/2020, §1.3). Discussing body-body interaction, Cordemoy remarks that "we […] ignore the fact that often these things [to which we ascribe causal efficacy] are *incapable* of producing such effects [that we perceive, like motion in another body]" (DCA, 95; my emphasis). Along the same lines, he says that "a body could not produce the effect that they [the ones deluded by sense-perception] are attributing to it" (DCA, 97). Bodies—*qua* extended substances—are passive (TdM II, § ii). That is to say, neither their principal attribute (extension) nor any modification they undergo suggests (an inherent source of) activity. They are not fit to move another body.

One might want to reply then that although bodies are not first movers and cannot move other bodies, they might still somehow 'communicate' their motion to other bodies, once the created world has been infused with motion by an external cause (a mind). Cordemoy rejects such a reply on two grounds: (1)

71 Ax.1: "A thing does not have from itself that which it might lose without ceasing to be what it is" (DCA, 93).

72 Ax.2: "Every body can lose some of its motion, to the point of not having any at all, without ceasing to be a body" (ibid).

73 Ax.3: "Only two kinds of substances can be conceived, namely, *mind* (or that which thinks) and *body*" (ibid). Emphasis in original.

74 Ax.4: "*To move*, or to cause motion, is an action" (DCA, 94). Emphasis in original.

The fifth axiom of his argument takes for granted that the first cause of motion is the continuous cause of motion (see above). Whatever mind made bodies move at the beginning, continues to move them. (2) Modes *qua* modes cannot be communicated. This has been called the 'non-transference of modes' argument (NT) in the literature focusing on la Forge, and Cordemoy avails himself of it.[75] He points out that "the state of one body can never pass into another" (DCA, 95) and that "the motion of each body is, in itself, only a mode of being, and since a mode is inseparable from a body, it cannot in any way pass into the other" (DCA, 107). Let me make the latter clearer. Descartes and later Cartesian thinkers work with a substance-mode ontology. Substance and mode as ontological categories are exhaustive and mutually exclusive. Everything is either a substance or a mode, and nothing is a substance *and* a mode. While substances—infinite (God) or finite (minds or bodies)—exist independently of any other substance, and are ontologically self-sufficient, modes are modifications *of* something on whose being they depend. Motion is a mode of body, and as such depends on body *qua* substance. Someone taking motion to be a mode to be communicated between two bodies is then shown to be mistaken about what the term mode really means. That person would be guilty of thinking that a mode could be detached from the substance it modifies. She would be guilty of believing that for a short time a mode could exist *per se*, and then be, 'absorbed' by another substance. Independent of the underlying misconception of the whole concept of 'mode,' this would either make motion a substance (as Régis seems to do later in the period) or to turn it into what the scholastics called 'real accidents,' which the Cartesians (and other so-called *novatores*) abhorred.[76]

Finally, Cordemoy avails himself of the classical strategy shared by almost all occasionalist thinkers to undermine real causal relations between bodies, which is to question the value of sense-perception and experience as a guide to finding genuine causal relations in the world. Causation, for Cordemoy, cannot be observed, i.e., sense perception is not telling to track causal relations. Only reason is a reliable means to understand what (or better: who) causes motion and ideas in a substance on the occasion of motions or ideas in another substance (DCA, 95, 101). As Clarke (1989, 190) observes, this sits well with the Cartesian hypothetical method in the natural sciences: "the causal relationship between hypothesised causes and observed effects cannot be observed, but must be identified by 'reasoning'."[77]

Having ruled out bodies as the causes of motion in other bodies, Cordemoy then positively establishes that their collisions are only occasions for God to move one body when it is being pushed by another one following the laws of mechanics: "I have shown [in DCA 4] that a body never passes (*donner*) its

75 See Nadler 2011, 150; Ablondi 2005a, 58, 98; Platt 2020, 275-277; Platt 2010, 244, 247-251. For the case of la Forge, see Sangiacomo 2014

76 For the case of Régis, see Sangiacomo 2016, 10 (n10). Alternatively, there is no transfer of motion at all, but mere production and destruction of (modes of) motion. This is Hobbes' approach as discussed by La Forge (Sangiacomo 2014, 68 (n13)).

77 See also Lennon 1974, 33. For the hypothetical method introduced by the Cartesians into natural philosophy, see Clarke (1989), ch. 5 et passim.

movement onto a body, but only that their encounter is an occasion for the divine power, which moved the one, to apply itself to the other" (DPP, 194f).[78]

The macrophysical realm is built from the microphysical level, bits of matter are causally connected by means of occasionalism. Cordemoy then moves on to reconstruct human beings constituted by mind and what we call 'our body' by explaining their 'interaction' by means of occasionalism as well.

2.2 *Ecce Homo* and Mind-Body Occasionalism

For Cordemoy, our human double nature is indubitable and distinguishes us from beasts:

> in addition to this individual or organic body which makes him [man] nourish himself and move like the beasts, he has received another thing which my translator [M. de Compiègne[79]] calls mind [*mentem*], and which I call spirit or thought [*esprit ou pensée*] (*Lettre*, 44f) (see also *Lettre*, 46-48).[80]

On top of those reasons dictated by faith and Scripture, which I am not looking into, positing a soul is an explanatory matter for Cordemoy. As long as we can explain a thing's working, be it a clock or a beast, by way of mechanism, reason mandates that one—and here Cordemoy applies Ockham's razor—"should not multiply beings without necessity"(*Lettre*, 29) (also DCA, 82).[81] In the case of a clock or a beast, positing a soul is explanatorily redundant. All the necessary explanatory work is done by mechanism. In the case of humans, positing a soul is explanatorily justifiable to account for thinking (in the widest sense) and language.

Nonetheless, putting the mind and the body together is a tricky matter, since "these are two totally different things" (DCA, 109) as Cordemoy realises again by way of conceptual analysis.[82] The mind, on the one hand, is characterised by thought or the having of ideas, perception (attention and memory), intelligence, imagination, (freedom of) judgement, doubt, error, (freedom of) will, and a few basic

78 "[J]'ay montre [in DCA 4,] qu'un Corps ne donne jamais le mouvement à un Corps, mais seulement, que leur rencontre est une occasion à la Puissance divine, qui mouvoit l'un, de s'appliquer à l'autre" (DPP, 194f).

79 Cordemoy not knowing Hebrew had M. de Compiègne, a friend of his, translate a number of passages from the original Hebrew Bible to compare it with the—he thinks—(sometimes) mistaken translation of the Vulgate.

80 "avec cét Individu, ou corps organique qui le fait nourrir & mouvoir comme les Bêtes, il [l'homme] a receu une autre chose que mon Interprete [M. de Compiègne] appelle *Mentem*, & que j'appelle Esprit, ou Pensée" (*Lettre*, 44f). One might be surprised to find that Cordemoy's physiology revolves around the notion of organic body which might be thought to have emerged only in the centuries to come. However, Toepfer in his *Historisches Wörterbuch der Biologie* (2011) shows that Galen already used the notion of organ in—I think—much the same way as we do now, that is, he used it *inter alia* for bodily organs such as the liver, the spleen, the kidneys etc. (Toepfer 2011, 747). In addition, Toepfer (2011, 748) notes that "[s]ince the 17th century the concept of organ appears regularly in medicinal encyclopediae." Scribano in her (2011) has convincingly shown that works of Galen—she mentions the *De foetuum formatione*—have only been translated into Latin in the sixteenth century, and have then been widely received *inter alia by* French physicians. One such French physician inspiring Cordemoy might have been his Cartesian fellow Louis de la Forge.

81 "Elle [la raison] persuade à tous qu'il ne faut point multiplier les Estres sans necessité" (*Lettre*, 29).

82 That is to say, Cordemoy attempts to understand "what is meant by these words 'body' and 'soul'" (DCA, 108).

emotions such as love, hate, joy, sadness, desire and fear (DCA, 111-114). On the other hand, while the (macrophysical) body shares none of these characteristics, it is defined by its shape, motion, different organs (in the case of a living body), nourishment, movement of the whole body, wakefulness, sleep, breathing during sleep, drowsiness, 'violent illness,' and death (DCA, 114-118). Sensations of hunger and thirst, of pain, the passions and those sensations connected to the five senses, finally, arise only because of the unity of the mind and the body (DCA, 125-142). While the body alone (bracketing God) could bring about all the physiological, mechanical and behavioural signs of, say, hunger, since these are all physical in nature, it could never make it such that these are accompanied by a sensation, a certain feel—what we nowadays call *qualia*. All of these are of a mental nature.

According to Cordemoy, the mind-body union consists in, and is known through the perfect correspondence of mental states and bodily states:

> It is certain […] that the union of a body and a soul consists only in the fact that there is such a necessary relationship between certain thoughts of this soul and certain motions of this body that they necessarily follow each other (DCA, 126).[83]

To be precise, what actually corresponds with one another are mental states and brain states (DCA, part 6.3, especially 137, 141f; DPP, 136, 146). I take it that following Descartes' physiology as outlined in both the *Traité de l'Homme*, and the *Passions de l'Ame*, Cordemoy thinks that the brain is the 'seat of the soul,' or else that the brain is the organ most intimately connected with the soul. Needless to say, brain states are physical states, and all physical states are states of motion. Interestingly, moving to brain states rather than bodily states more generally as corresponding to mental states allows Cordemoy to make sense of dreams and cases of false perception, delusion, or hallucination. In these cases, things or events are perceived without the presence of an external object occasioning the perception (*Lettre*, 16f).[84] The underlying brain states still obtain though, even if they are not occasioned by an external object.

Occasionalism explains the 'interaction' between the mind and the body, and their intimate union (DCA, 103). It is God who brings about mental states on the occasion of the corresponding brain states and vice versa. It is also God who upholds mind-body correspondence: "God makes their union last" (DPP, 136).[85] It is, however, not the discrepancy between the mind and the body that drives Cordemoy's mind-body and body-mind occasionalism. He often affirms that interaction between the

83 See also DCA, 104, 130-134; DPP, 120f. Also Scheib 1997, 220; Battail 1973, 139, (especially) 159, 163, 167. Scheib (1997, 225-236) notices strong similarities between Cordemoy's mind-body correspondence and Clauberg's *foedus corporis & animi* (pact of the body and the mind) theory in that they both attenuate Descartes' notion of a (substantial or fundamental) mind-body union.

84 Strictly speaking, Cordemoy only speaks of dreams, and false perception, but assuming that delusions and hallucinations are merely certain kinds of false perceptions, it is clear that Cordemoy could just as easily explain the latter as the former by recourse to the underlying brain states occasioning God to bring about these states of mind.

85 "Dieu fait durer leur union [celle du Corps et de l'ame]" (DPP, 136).

mind and the body is no more difficult to grasp than body-body interaction. In other words, body-body interaction is as difficult to comprehend as the interaction between the mind and the body (DCA, 106f) (Nadler 2011, 25).[86] In Cordemoy, physical occasionalism precedes psycho-physical occasionalism. He argues for physical occasionalism first, and then extends it to the mind-body case. Occasionalism is, hence, not an *ad hoc* solution to the mind-body problem, but a conscious choice to account for a global communication problem between substances. Any communication between (any kind of) substances is equally hard to understand. This is because in the Cartesian world there is nothing that explains interactions between substances. In virtue of the fact that they are essentially characterised as existing independently of one another, substances are, in a way, worlds apart—to use an expression employed by Leibniz. In addition, neither the principal attribute of extended substances (extension) nor the principal attribute of thinking substances (thought) could account for the nomological structure of the world. Neither extension nor thought explain why cases of collision or body-mind interaction behave in regular ways, and how substances could engage with one another.

Let us now turn to Cordemoy's argument for mind-body occasionalism. Looking at body-mind interaction first, it is surprising to see that although Cordemoy continuously asserts occasionalism in this domain (DPP, 187, 195; DCA, especially 125-142; *Lettre*, 16f), he offers little by way of argument to support it properly.[87] However, one might reasonably assume that the case for body-mind occasionalism has already been made based on what Cordemoy has put forth when discussing the body-body case together with some considerations based on the radical ontological difference between the body and the mind.[88] Setting aside the first mover argument, the argument from the passive nature of bodies (PN) as well as the non-transference of modes argument (NT) remain valid for establishing body-mind occasionalism. Bodies are passive, not able to bring about any change in another substance.[89] Also, even if they could, it would be hard to conceive how a mode of extension could be transferred to a mind while remaining a mode. And even if that could happen and transient causation

86 Specht (1966, 144) traces this line of thought back to Clauberg.

87 Indeed, body-mind occasionalism in Cordemoy is not much discussed in academic scholarship. See, however, Platt 2010, 256-258 for an explicit discussion thereof. Platt shares my state of surprise vis-à-vis Cordemoy's thin argumentation on the matter, but he goes further than I do. While I think that it is surprising that Cordemoy does not say that much about body-mind occasionalism, Platt takes this as sufficient to call into question whether Cordemoy can truly be called a body-mind occasionalist. He considers it possible to ascribe body-mind occasional causation rather than occasionalism to Cordemoy. If this were the case, the mind would be able to actively bring about ideas on the occasion of states in the body without a need for God's causal engagement. In his most recent discussion (2020, 283), Platt rehearses a similar line of though pointing out that Cordemoy "does not give any argument for the conclusion that the body does not cause ideas in the mind." See also ibid., 299.

88 Since I am not claiming that the mind-body problem is driving Cordemoy's reasoning, I do not think that the reading I provide would collapse into the old textbook presentation of occasionalism as an *ad hoc* solution to any such problem.

89 Clarke (1989, 70) has a similar idea when he ascribes to the Cartesians the position that "it was the impotence or barrenness of matter which made it appear self-evident that the mechanical processes which take place in sensation could not possibly explain the origin of ideas in the human mind." The difference between me and Clarke here is that he takes the passivity of bodies to establish body-mind occasional causation, but not body-mind occasionalism. For the distinction between occasional causation and occasionalism, see the introduction of this dissertation, section 3.2A.

between two substances were generally possible, it would still be true that bodies are subject to the laws of mechanics, analysable in terms of shape, size, and motion, but minds are not. They are thinking, unextended substances. So even if transient causation were possible, modes of extension would still have to be transformed into modes of thought. But neither bodies nor minds could do the conversion. Leaving the matter here, let us move on to Cordemoy's extensive discussion of mind-body occasionalism.

Cordemoy deliberately overwhelms the reader with a number of mostly empirical, and some more subtle metaphysical arguments to the effect that our mind cannot truly cause any modification whatsoever in our body.[90] Ultimately, our mind's volitions turn out to be only the occasion for God's will to bring about what our mind wanted to happen. The first argument Cordemoy puts forward is that sometimes bodily movements are prior to us willing them (think of reflex actions, for instance), and since an effect cannot precede its cause, we cannot be said to cause these movements (DCA, 97).[91] Secondly, he thinks that "the motion is in the matter that composes our bodies before they are animated, that is, before that which does the willing is united with them" (ibid). This argument either makes implicit use of the principle that a cause is prior to its effect very much like the first argument, or it makes implicit use of an intuitive reluctance against allowing genuine cases of causal overdetermination. If the latter were the case, the argument would show that since the movements of our body are sufficiently determined prior to the soul being united to our body, and since we do not grant genuine cases of causal overdetermination, the realm of the mental is only epiphenomenal to the realm of the physical. A third argument tries to establish the causal impotency of our mind more directly. Oftentimes we see that bodily movements cease to be, although the will wants them to continue, and some physiological processes, for instance, the circulation of the blood, are entirely independent of our will (DCA, 97f). On the other hand, sometimes we perceive our body acting in a way not specified or willed by our mind. For example, both animals and humans have a flight instinct, which somewhat restricts the influence the soul can have on the body:

> I believe that there is no one who has not often felt in himself the effects of this surprise, and who has not experienced [*eprouvé*] how much the will, which the soul [*ame*] has to retain the body in certain places, is thwarted by this natural disposition, which makes it such that all the spirits and the muscles conspire in order to transport it [the body] away

90 The following reconstruction breaks Cordemoy's reasoning down into the smallest self-sufficient parts. The abundance of Cordemoy's arguments against real mind-body causation has most often been reduced to an argument about involuntary motions in the body, i.e., lack of volitional control over the body, and an argument from the Cartesian conservation of the quantity of motion principle. See Ablondi 2005a, 58; 2005b, sect. 3; Nadler 2011, 23f (including n40), 151f; 2015, 29f; Lennon 1974, 32; Boas 1957, 105; Platt 2010, 251-255. For a more nuanced take on the matter, see Battail 1973, 129ff.

91 Cordemoy does not explicitly refer to the priority of the cause over the effect, but it is very much clear that he has to have it in mind for the argument to work.

> from places where some noise takes place, especially if it is so great that every body seems threatened to be destroyed there (DPP, 88f).[92]

Instinctive behaviour is effective to a point of thwarting simultaneous volitions to the contrary. In the case of flight instinct, the agent finds herself inevitably removed from a dangerous site despite her inclination to stay put. A fourth argument shows that the mind's will cannot act on the body due to the fact that this would violate the Cartesian conservation of the quantity of motion law (DCA, 98). If we could increase or diminish the quantity of motion in our body—provided that we as finite minds do not know how much motion has been increased or diminished by other minds—the totality of motion could be increased or diminished contrary to the conservation law. A fifth argument points out that the production and conservation of an action is realised by the same entity, and that since our will oftentimes fails to conserve bodily motions, it cannot produce (or cause) them, either (DCA, 98). Cordemoy's sixth argument is that if the will were the cause of bodily motion, it could accelerate or slow down such motion. The latter is not (always) the case as the example of old age shows, hence the former is not the case, either (DCA, 98). If the will of an old man to walk fast were sufficiently causally potent, then it would succeed in exciting the necessary motion in the old man's body. However, the man's body (due to his age) is somewhat reluctant to execute this volition. Ultimately, the will is not able to break the body's resistance and make the old man move quickly (ibid.). Finally, there is a seventh argument to the effect that causation has to be necessary and that only a *causa sui* can be a real cause (DCA, 100). Here, Cordemoy's line of reasoning seems to be the following: Only a being that is the cause of its own existence, a *causa sui*, is a being which lacks nothing—it is a *causa perfecta*. Since it lacks nothing—being only full positivity—anything it wills to happen happens. A *causa perfecta* is a *causa necessaria*.[93] It cannot fail. On the other hand, beings that are not self-caused are deficient causes, and can therefore be conceived as failing to bring about a certain effect.[94] They are not necessary causes. This argument also serves to rule out the causal potency of finite, created (and hence deficient) disembodied, that is, angelic (or demonic) minds (DCA, 100). Anything except a *causa sui* is dependent on another entity (DCA, 100), and therefore, for Cordemoy, feeble and deficient. It is not a real cause at all.

It must be noted that this last line of reasoning bears similarities to Malebranche's later 'no necessary connection' argument (NNC). In the *Search after Truth* (*Recherche de la Verité*) (VI. 2. 3), Malebranche explained that causes have to be necessary or else they are not causes:

92 "Ie croy qu'il n'y a personne qui n'ait souvent senty en soy-mesme les effets de cette surprise, & qui n'ait éprouvé combien la volonté que l'ame a pour lors de retenir le corps en de certains lieux, est contrariée par cette disposition naturelle, qui fait que tous les esprits & les muscles conspirent à le transporter loin des endroits où il se fait quelque bruit, sur tout quand il est si grand, que tout le corps semble estre menacé d'y estre déstruit" (DPP, 88f). See also DCA, 117.

93 The Latin terminology is my own, and not in Cordemoy.

94 For Cordemoy, the fact that our minds doubt and err would already sufficiently prove their deficiency, that is, their lack of perfection (DCA, 112).

> A true cause as I understand it is one such that the mind perceives a necessary connection between it and its effects. Now the mind perceives a necessary connection only between the will of an infinitely perfect being and its effects. Therefore, it is only God who is the true cause and who truly has the power to move bodies (ibid., LO, 450).

Malebranche's *Search* was strongly influenced by Cordemoy and the latter's seventh argument mentioned earlier might have inspired Malebranche's more developed version (NNC).[95] Cordemoy's argument invokes ontological perfection, and infallibility as criteria a true cause has to fulfil. Finite beings do not satisfy these criteria and therefore only qualify as occasional causes. As in the case of body-body causation, Cordemoy here, too, invokes the insufficiency of sense experience to reveal the true nature of causation: we have to take recourse to reason (DCA, 95), and metaphysical investigations to find that "the action of minds upon bodies should not be found more inconceivable than that of bodies upon bodies" (DCA, 107).[96]

To sum up, neither finite extended nor finite thinking substances are causally efficacious. The volitions of minds to move bodies with which they are united are the occasions for God to bring about the desired movements. The physical states of bodies are the occasions for God to bring about sense-perceptions in minds. Likewise, the collision of one body with another body serves God as an occasion to suitably alter the physical state of the latter on behalf of the former. Hence, occasionalism is employed as a solution to the general communication problem between substances.[97] The communication of one human being with another by means of language is, in turn, a particularly important case of applying occasionalism to a more practical problem. Occasionalism grounds the transformation of an idea into physical signs (words, and sentences), the transfer of physical signs from one person's body to another person's body, as well as the reconversion of physical signs into ideas in the addressee of the communication.

2.3 Language, Society and the State

Having reconstructed the individual human being from mind and body, Cordemoy shows that language is the means of communication and social organisation.[98]

95 For Cordemoy's influence on Malebranche, see Prost 1907, 186f.

96 For sense experience as not being a reliable guide to track causal relationships, see Bardout 2002, 147; Ablondi 2005a, 58; 2005b, sect. 3; Nadler 2011, 150; 2015, 27; Lennon 1974, 33; Boas 1957, 104; Scheib 1997, 209, 213; Battail 1973, 129.

97 For the sake of stringency, I will not discuss the cases of intermental, and intramental occasionalism. Cordemoy addresses them in the DPP, and the TdM, respectively. See, however, n105 for a brief remark on the much overlooked case of *intermental* occasionalism.

98 In his treatise on language—the *Discours physique de la Parole*—Cordemoy also touches upon a number of other topics. These include the problem of other minds; the doctrine of the beast-machine—ruling out animals as genuine language users; but also first and second language acquisition; phonetics; and rhetoric, in particular, the topic of eloquence.

Cordemoy defines language—as would Locke and Hume in turn (Ott 2009, ch. 24.3)[99]—as making one's thoughts known: "To speak, in my opinion, is nothing other than to make known what one thinks to whom is capable of understanding it" (DPP, 21).[100]

Embodied language has two components: (1) thoughts (mental states) that are communicated by means of (2) external signs (physical states).[101] Given that animals lack mental states, and that genuine language-users employ language in ever new, creative ways (Ablondi 2005a, 108f), Cordemoy reasons that animals are not language-users. Language, which cuts across the physical and the mental, follows psycho-physical rather than purely physical laws. These psycho-physical laws are binding as long as the human soul is embodied; that is, bound to matter:

> the soul is obliged—when it is united with a body—to join its thoughts to voices, which can neither be heard nor formed without the organs of the tongue, and the ear; […] the thought of a man who speaks is joined to a movement of the brain, and the movements of the brain [are joined] to those parts which serve the voice; […] this voice, which is nothing but agitated air, strikes the ear, and can—upon moving the brain—excite in the soul of the one who listens the sound of words and the idea of the things which are signified (DPP, 141f).[102]

The model suggested by Cordemoy is the following: As long as minds are embodied, an idea of mind_α in order to be communicated, is converted into the corresponding brain state. This, in turn, provokes the transportation of animal spirits to the muscles responsible for moving the bodily parts which engage in speech. The sound of speech is transported through the air (*qua* sound wave), strikes another person's ear, sets the nerves in the ear of that person in motion, which then set the brain's fibres in motion, i.e., occasion a certain brain state. This brain state is then converted back into an idea of the interlocutor's mind_β, i.e., the same idea had by mind_α. All the 'interactions' between mental states and physical states and vice versa are, of course, only occasions for God (as the only true causal agent) to

99 For the similarity to Locke, see also Ablondi 2005a, 108.

100 "Parler (à mon avis) n'est autre chose que faire connoistre ce que l'on pense, à ce qui est capable de l'entendre" (DPP, 21). Cordemoy gives several other similar definitions, for instance, "To speak, that is, to give signs of one's thought (DPP, 31) (see also DPP, 40, 200). "[P]arler [c'est] donner des signes de sa pensée." Or: "Speech is nothing other than a voice by means of which one signifies what one thinks" (DPP, 122f). "[L]a parole n'est autre chose qu'une voix, par laquelle on signifie ce qu'on pense."

101 "Likewise in language there are two things, namely, the formation of the voice, which could only come from the body, in accordance to everything I have said about it; and the signification or the idea one joins therewith, which could only be due to the soul" (DPP, 122). "De mesme dans la parole il y a deux choses, sçavoir la formation de la voix, qui ne peut venir que du corps, suivant tout ce que j'en ay dit; & la signification ou l'idée qu'on y joint, qui ne peut estre que de la part de l'Ame."

102 "l'ame est obligée, tandis qu'elle est unie au corps, de iondre ses pensées à des voix, qui ne se peuvent ouyr ny former sans les organes de la langue & de l'oreille; […] la pensée d'un homme qui parle est iointe au mouvement de son cerveau, & les mouvemens du cerveau à ceux des parties qui servent à la voix; […] cette voix qui n'est qu'un air agité frappe l'oreille, & peut en émouvant le cerveau exciter en l'ame de celuy qui écoute le son des mots & l'idée des choses qu'ils signifient" (DPP, 141f). See also ibid., 147, 186f, 190. See also Scheib 1997, 191f.

act and bring about the required states. Occasionalism thus accounts for mind-body, body-body and body-mind 'interactions' manifest in language-use.

Setting aside the metaphysics at play, Cordemoy realises and emphasises the socio-political dimension of language. Not only can embodied human beings only share and communicate their thoughts *via* language, that is, gestures, speech, writing (both open and in code) (DPP, 32, 37-40, 125-132), but language is also an institution. That is, the meanings of words are agreed upon; they are subject to convention. Language users agree that certain words signify and express certain thoughts: "these signs [by means of which one communicates one's thoughts] are based on institution" (DPP, 23).[103] And it is language that holds a society together. People without language could not socialise, bond, form groups and the like. As Cordemoy puts it, "these same signs are the sole means of maintaining society between men, which is the greatest of all their goods in this world" (DPP, 31f).[104] Humans, *qua* embodied, would suffer from something like locked-in syndrome had they no capacity to speak or otherwise communicate their thoughts.[105] They would be only for themselves. Hence, language is necessary for humans to come together, form larger social entities and engage in social interactions.

Eloquence, which, for Cordemoy, is the art of instructing (*instruire*) and moving (*émouvoir*) others (DPP, 150-152), has a socio-political dimension, in that "eloquence is a means not only to express what we think, but also to oblige others to think like us" (DPP, 165).[106] More striking for Cordemoy's political agenda is the idea that language is the means which enables the king to implement his projects and it is that which redounds to the king's glory (*gloire*) (DPP, epistle, 2). Therefore, language is not only a means of communication (generally), but a particular kind of communication, namely, political propaganda.

Given that Cordemoy's project is mirror symmetric (see figure 1 above), one should not be surprised to find elements encountered during the process of deconstruction come up again in the process of reconstruction. In section 2.1, I have shown that, for Cordemoy, the nation state depends on an alliance of towns which in turn depend on families. The latter are constituted by the individual family members. Families are run by a chief, and they work like small states, or else, states work like large

103 "ces signes sont d'institution" (DPP, 23). See also DPP, 32-35, 39-41, 61, 125f, 138.

104 "ces mesmes signes [used in language] sont le seul moyen d'entretenir entre les hommes la societé qui est le plus grand de tous leurs biens en ce monde" (DPP, 31f). See also, DPP, 165

105 Interestingly, Cordemoy allows for communication between disembodied minds, or a disembodied and an embodied mind. In these cases, it would suffice for a mind to want to communicate a certain thought for it to be received by another one (DPP, 141-143; 175-178, 182f, 190-192). However, strictly speaking communication between disembodied minds, or a disembodied and an embodied mind only works, because the volitions of these minds to share their thoughts with other minds are occasions for God to bring about the respective thought in the receiving mind: "as soon as a soul wants to make known to another soul what it thinks, this comes about [*arrive*], because God makes it such that following the will of the first the second knows it" (DPP, 194). "dés qu'une Ame veut faire connoistre à une autre Ame ce qu'elle pense, cela arrive, parce que Dieu fait que suivant cette volonté de la premiere, la seconde le connoist." See also DPP, 195. This is the often overlooked case of *intermental* occasionalism. As far as I know, only Prost (1907, 90, 106) ackowledges it.

106 "l'éloquence est un moyen, non seulement d'exprimer ce que nous pensons, mais aussi d'obliger les autres à penser comme nous" (DPP, 165).

families. Although Cordemoy does not explain the matter further, it seems clear that the typical families of the seventeenth century result from marriage between men and women, and procreation. Accordingly, the 'natural state' of a family (*l'état naturel de la famille*) is "that [state] in which it is when it is composed only of the one who is its chief, and those who descended from him" (*Des Moyens*, 206f).[107]

Cordemoy then describes the process of the formation of a state:

> When several similar families as they unite [*se joignant*] come to compose a town, every leader [*chef*] of the family retaining his power within his family will be subjected to the one who will be in charge of the government of the whole town; and every family thus becoming with respect to the town what each individual is with respect to the family, it will be necessary that everyone contributes to the maintenance of [*à maintenir*] the town (*Des Moyens*, 212).[108]

> Eventually, when several towns as they unite [*se joignant*] come to compose a State or Kingdom, every Governor will be subjected to the one who will be in charge of the whole Kingdom: and it will be necessary that every town contributes to the maintenance of [*à maintenir*] this *royal power, which will be absolute* (ibid, 213f; my emphasis).[109]

Since the building blocks of towns are families, and families are run by a chief, towns are run by a chief, as well. That is, towns follow the same hierarchical, patriarchal principle of organisation as families do. The chief of the town, then, is called 'governor' (*Des Moyens*, 213). When towns are joined together to form a state, it, too, is run by a chief. And the only form of government Cordemoy seems inclined to consider is that of a monarchy.[110] Hence, the towns forming a kingdom are governed by a king. And, of course, a monarchy with a monocrat at the top mirrors perfectly the principle of organisation of a family. Finally, as the chief's power within his family is undivided (*Des Moyens*, 207), so is the king's power (*Des Moyens*, 225). He is the absolute ruler of his country.

To sum up, Cordemoy reconstructs the physical realm from atoms forming macroscopic bodies. Humans are composed of minds, and bodies. Occasionalism accounts for the interactions between finite substances. Occasionalism also explains the nomological structure of the world. Human beings

107 "celuy [l'état naturel de la famille] où elle [la famille] est quand elle n'est composée que de celuy qui en est le chef, & de ceux qui sont descendus de luy" (*Des Moyens*, 206f).

108 "Si plusieurs familles semblables se joignant, viennent à composer une ville, chaque chef de famille retenant la puissance dans sa famille, sera soûmis à celuy qui aura le gouvernement de toute la ville; & chaque famille devenant alors, à l'egard de la ville, ce que chaque particulier est à l'égard de la famille, il faudra que chacune contribuë à maintenir la ville" (*Des Moyens*, 212).

109 "Enfin, si plusieurs villes se joignant, viennent à composer un Etat ou Royaume, chaque Gouverneur sera soûmis à celuy qui aura la conduite de tout le Royaume: & il faudra que chaque ville contribuë à maintenir cette puissance royale, qui sera absoluë" (*Des Moyens*, 213f).

110 Indeed, the term 'république' does not even figure in Cordemoy's historical or political works.

come together and socialise by means of language. They form larger social entities, and ultimately states, to wit, kingdoms run by an absolute monarch like Louis XIV.[111]

3. The Threat of Eliminativism

3.1 The Problem

The apex of Cordemoy's mirror symmetric project of deconstruction and reconstruction consists in the demonstration that (seemingly) all macrophysical objects are reducible to fundamental particles and their properties. The laws of mechanics apply invariably to both macro-and microphysical objects. Both artificial and natural beings *qua* material are conceived as machines subject only to the laws of physics. The view that there exist fundamental particles to which composite physical entities are reducible may in itself be unproblematic or even philosophically advantageous. However, against the background of a project that is committed not only to the dissection of everything down to *fundamentalia*[112] but also to the reconstruction of the world, this poses a severe threat: eliminativism. I take eliminativism in the realm of ontology to be the view that only simple fundamental entities are real. All non-fundamental things are—speaking with metaphysical rigour—not real, they do not exist.[113]

Eliminativism threatens Cordemoy's project for two reasons: (1) If all macrophysical objects ontologically depend on their constitutive fundamental particles, and if they are nothing over and above these particles, then why are we entitled to construct human beings out of a mind and a macrophysical living body?[114] Why should metaphysics discuss mind-body union, and account for mind-body correspondence, if what is actually the case is mind-atoms union, and mind-atoms correspondence, respectively?[115] Mind-atoms union would bring about further complications. A critic could wonder how many atoms are united with the mind.[116] 'One' would be a strange answer for one

111 We will return to the political dimension of Cordemoy's project in section 4 of this chapter.

112 The term and the driving idea here are inspired by Karen Bennett's article "By our bootstraps" (2011) dealing with grounding relations.

113 Note that I am not concerned with issues concerning linguistic pragmatics; and that ontology and pragmatics are two very different animals. One can think that it is useful and has meaning to talk about *x*, despite the fact that *x* is not real at the end of the day, or contingent upon *y*. Such talk need not be abandoned, or reduced to talk about *y* instead of *x*.

114 In the discussion to follow, I will use 'body' in the sense of a macrophysical object, and I will—diverging from Cordemoy's terminology in DCA I to III—use 'atom,' or 'fundamental particle' to designate those microphysical objects that constitute ultimate reality. Cordemoy himself never uses either the term 'atom' or the term 'fundamental particle'.

115 Scheib in his (1997) reads Cordemoy in this way, that is, "that God's interventions always have to be interventions upon individual substances, because matter has no other status than that of a corpuscular aggregate. Accordingly, the 'occasions' for the first mover to become active are individual corpuscles. […] Cordemoy [in contrast to Descartes] supposes a multiplicity of individual substances, and therefore assumes a multiplicity of individual events which are the occasions for God to initiate and direct individual processes of motion. Occasionalism, too, has therefore a connection to Cordemoy's theory of individual substances" (ibid, 218).

116 This is indeed a problem that arises from Cordemoy's atomism. Or, globally put, from any matter theory assuming a fundamental level where the process of division comes to an end. Due to the indefinite divisibility of matter, Descartes, in contrast, does not face this issue.

atom surely cannot instantiate all the bodily processes taking place when, for instance, I will my arm to move. 'All atoms' is the other extreme answer. Nonetheless, all atoms—though they are what makes up my body—certainly do not engage in the production of all bodily motions. Movements of my arm and the atoms of which it is constituted are independent from, say, movements of my legs and the atoms of which they are constituted. "Some atoms" might then appear to be the way to go. But this definitely requires further qualification. Be that as it may, not only is determining the atoms that play a role in mind-atoms correspondences a lengthy procedure, but we would also get very complicated causal explanations of mind-body interactions. Determining the occasional causal conditions of the physical realm on the basis of which God brings about a certain mental state would amount to nothing less than defining all the atoms engaged in this process, all their locations, properties including states of motion or rest. God's actions would not be simple, but rather very complicated, and would include a lot of boundary conditions.

(2) The second threat stems from Cordemoy's use of mechanical philosophy, and the levelling effect a uniform mechanical treatment of bodies brings with it. If both artificial and natural bodies are to be understood invariably in terms of mechanics and are both reducible to fundamental non-living particles, and their properties, then what could make living bodies different from non-living bodies? Of course, one could simply bite the bullet, and admit that given that atoms are non-living beings matter is dead matter *tout court*.[117] However, this concession comes at a cost. Not only does it seem very counterintuitive, but also in opposition to the truths of faith and Scripture. After all, Scripture talks about the creation of living beings. For Cordemoy, this price would be too high. A commited Catholic, he should have a more orthodox solution at hand. After all, the pre-eminent motivation for Cordemoy to delve into the problem of accounting for life and differentiating between non-living and living bodies is the fact that the Bible, in the Book of Genesis, chapter 1, day five and six of the Creation, speaks of God's producing marine and terrestrial *living* animals. Setting aside the case of plants, it is on days five and six of the Creation that God created life:

> And God said: Let the waters bring forth abundantly the moving creature that hath life [*Producant aquae reptile* animae viventis], and fowl that may fly above the earth in the open firmament of heaven. […] And the evening and the morning were the fifth day. And God said: Let the earth bring forth the living creature after his kind [*Producat terra animam* viventem *in genere suo*], cattle, and creeping thing, and beast of the earth after his kind: and it was so (King James Bible, Book of Genesis, ch.1).[118]

117 One could, of course, reject the basic assumption that fundamental particles or atoms are non-living. That is to say one could maintain that there exist fundamental particles, but insist that they too are alive in the manner Giordano Bruno did. I am not pursuing this option much further because it is at odds with Cordemoy's premises. The problem of life and the demarcation between the living and the non-living will return in the next chapter on Sturm.

118 "Dixit etiam Deus: Producant aquae reptile animae *viventis*, et volatile super terram sub firmamento caeli. […] Et factum est vespere et mane, dies quintus. Dixit quoque Deus: Producat terra animam *viventem* in genere suo, jumenta, et reptilia, et bestias terrae secundum species suas. Factumque est ita"(Vulgate, Book of

In his *Letter* to the Jesuit Father Cossart, Cordemoy sets out to show how the new mechanist philosophy of Descartes can be reconciled with Scripture, to wit, the first book of Genesis. Cordemoy needs to show why some bodies, those we call 'living' are more than mere aggregates of dead atoms, and what it means to be a living body (like an animal or a human), rather than a non-living body (like a watch). He needs to show why some macrophysical bodies are intimately united, while others are mere aggregates of atoms with no genuine union whatsoever. The threat of eliminativism and of levelling the difference between living and non-living bodies are not mere pseudo-problems for Cordemoy's philosophy. He himself admits that "what we call our body is, in effect, an aggregate of a hundred million bodies; in a word, it is matter" (DCA, 65), which follows from his atomism. However, he immediately realises that he then needs to explain why "we regard this collection of so many bodies as if it were only one body" (ibid). While this passage *prima facie* only touches upon the problem of what makes a body truly one, the problem of unity is, of course, intimately connected to the problem of life. After all, it was clear from early modern philosophy's late-scholastic heritage that part of what makes living bodies alive is that their parts are in an intimate harmonious relation that the mere *partes extra partes* of, say, a heap of stones are not.

Des Chene (2000, chapters 8 and 9) has shown that while late-scholastic authors like Suárez, Arriaga, Toletus and others disagree to some extent about which living beings possessed an integral unity, i.e., were considered indivisible, they agreed on living beings' *functional* unity.[119] In the case of animals for instance, the powers they possess in virtue of being endowed with a vegetative soul (growth, nourishment, reproduction, conservation) and the powers they possess in virtue of being endowed with a sensitive soul (sense-perception, appetites, locomotion) are deeply interconnected. Otherwise, an animal would not be capable of giving adequate behavioural responses in certain circumstances, like sensing food, wanting to feed, approaching the food, eating and digesting as well as growing. None of this would be possible if these two souls, which authors like Suárez and the Conimbricenses took to be only rationally but not really distinct (Des Chene, 162-165), existed side by side, that is to say, independently from one another. Discussing the critical and controversial case of the status of higher animals, Suárez—one of the most celebrated scholastics—holds that "those animals which are the most perfectly constructed are scarcely able to survive when they are cut apart, because their nature is as unified as it can be" (*De Anima*, cited in Des Chene 2000, 188). According to Suárez, then, higher animals possess an integral unity over and above a functional unity. Cutting, say, a horse into two destroys this integral unity. While lower living beings require only a functional unity, more complex living beings also require an integral unity. In any case, however, living beings need more unity than the loosest form of unity *per aggregationem* displayed in, say, a heap of stones.

Genesis, ch.1). My emphasis. I am giving the decisive part of this passage in Latin following the *Vulgate*, which happens to be the source of Cordemoy's reasoning in the *Lettre*, too. I do so to highlight where the philosophical pressure for Cordemoy comes from: Scripture itself talks about animals with *living souls* (*animae viventes*).

119 I take these two terms (integral and functional unity) from Des Chene 2000, 153f.

The nexus between life and unity survives in Descartes' mechanical philosophy (Des Chene 2001, ch. 6). What is more, *malgré lui*, the idea of living beings as functional, intentional unities survives. Descartes attempted to reduce animals as natural machines (like artificial machines) to mere dispositional unities (ibid., 132). As such, only the arrangement of and the linkage between purely material parts working in a certain way would seem to matter. However, the very fact that "the parts of a machine act in concert" brings back the idea of a builder designing the machine with the intention to perform one but not another function (ibid., 131). Intentions and functions have clear teleological connotations. Hence, despite Descartes' best efforts to the contrary, the fitness of machines (which is even more manifest in living than in artificial beings) reveals that they are functional unities. Natural machines, in particular, fulfil certain ends, which "cannot be entirely supplanted by dispositions" concludes Des Chene (ibid., 140). In the same vein, Cordemoy points out that the life of, say, an animal depends on "the arrangement and correspondence of several organs, whose division would prevent the effect [movement and life]" (*Lettre*, 45).[120] That is to say, in contrast to a heap of stones, the division of an organic being destroys its organic living nature, its functional unity, while the division of a heap of stones does not alter the heap in any essential way.

Cordemoy clearly has the aforementioned passage from Scripture and the controversy it entails in mind when he says that: "For I have seen that at the place of the generation of Fish, and other Brutes, where the Vulgate says that the water and the earth have produced living souls [*ames vivantes*], my Translator [*interprete*] says that the earth and the water have produced living individuals [*individus vivans*]; which makes a lot of sense" (*Lettre*, 43).[121] Cordemoy realises that there might be a conflict between Scripture and mechanical philosophy. Furthermore, the *Vulgate* speaks of living souls which are non-entities for a mechanical philosopher like Cordemoy. There exist only rational souls, but no such beings as living souls vivifying plants or animals. *Pace* some late-scholastic authors (e.g., Arriaga, the *Conimbricenses*, Fonseca, Suárez and Toletus)[122] and in line with Scripture, or so he thinks, Cordemoy rejects vegetative souls to explain such processes as growth and nourishment, i.e., the constitutive elements of the life of plants (*Lettre*, 27-29). *Pace* the same authors, and in line with the alleged correct translation of the original Hebrew Bible, Cordemoy rejects (sensitive) animate souls (*ames vivantes*) in beasts (*Lettre*, 33).[123] Cordemoy rejects both vegetative and sensitive souls

120 "[C]ette vie & ce mouvement [des Brutes] dependent de l'arrangement, & de la correspondance de plusieurs organes, dont la diuision empescheroit l'effect" (*Lettre*, 45).

121 "Car j'ay veu, qu'à l'endroit de la generation des Poissons, & des autres Brutes, où la Vulgate dit, que l'eau & la terre ont produit des ames vivantes, mon Traducteur dit, que la terre & l'eau ont produit des individus vivans; ce qui porte un beau sens" (*Lettre*, 43).

122 Des Chene (2000, 87 (n38)) ascribes to Suárez the view that "in a living thing there is a soul corresponding to each degree of life [i.e., vegetable, animal and human life]." The idea that the soul *qua actus* and *qua* substantial form, i.e., *qua forma informans* is what explains the life and powers of certain bodies (those we call living) is shared by other late-scholastic authorities as well, of course. For the tripartite structure of souls (vegetative, sensitive, and intellective) accepted by the aforementioned late-scholastic authors following Aristotle's *De Anima*, see Des Chene 2000, ch. 8.

123 Cordemoy also rejects *ames vivantes* as a translation error in the *Vulgate*. It should have been translated as *individus vivans* (*Lettre*, 43).

because admitting them violates the principle of ontological parsimony (*Lettre*, 29). In addition, he dismisses living souls, because they, *qua* immaterial, violate a purely materialist, reductionist physics, and hence thwart the agenda of mechanising nature. Finally, he thinks that the explanatory net benefit can also be had without postulating them. That is, fundamental particles and their properties suffice to explain what entities such as living souls or substantial forms are supposed to do for the scholastics.[124] However, this reinforces the problem. In addition, it should be noted that the rational souls entailed by Cordemoy's substance dualism are of no avail to solve the issue. Like Descartes, he treats both human beings, and animals as living beings but only human beings as endowed with a rational soul. Hence, the rational soul or the mind is not what gives life to living beings.

In an attempt to diminish at least the doctrinal pressure, Cordemoy tries to show that a proper translation of Scripture only speaks of 'living individuals' rather than 'living souls'. Still, he faces the challenge of showing how living beings can be said to be alive, and truly united in contrast to inanimate beings, like stones and minerals although they are equally composed of atoms with purely geometrical properties. Cordemoy thus has to solve the problem of life in a purely physicalist way.

3.2 The Solution

For Cordemoy, life need not be explained by invoking some kind of soul, since life does not consist in something truly mental, such as sentiment, sensation or sense-perception, but in the ability to move, nourish oneself and preserve one's organic body (*Lettre*, 43-45). If the true cause of motion of bodies and their conservation as well as their creation is sought then this is, of course, God. Stopping at a less fundamental level of explaining why living bodies can be called bodies, that is, why they are unified physical entities, why they are alive and the extent to which they are special and not reducible to a mere aggregate of atoms, one finds that living bodies have "parts, all working together toward the same end, [and] are mutually arranged in a manner so conducive to this end that they cannot be separated from each other without undoing their fitness for it" (DCA, 65). Life is characterised by a teleological unity. One might have expected Cordemoy, *qua* Cartesian, to have rejected this view. After all, Descartes himself ruled out teleology from natural philosophy in his *Principles* (part I, §28). However, Schmaltz in his *Descartes's Critique of Scholastic Teleology* (2017b) shows that there are some remnants of teleology in Descartes at least with regard to sensation or sense-perception:

> [T]here is an intrinsic nature in virtue of which the human body can truly be said to have the end of producing those sensations beneficial to the conservation of the human composite (Schmaltz 2017b, 69).

124 Ultimately, Cordemoy is convinced that vegetation depends only on "the shape [*la figure*] and the movement [of bits of matter]" which are the "entire causes of vegetation" (*Lettre*, 29). "[O]n reconnoist manifestement que la figure & le mouvement peuvent estre les causes entieres de la vegetation." I am not going to focus on the case of plants though.

According to Schmaltz (2017b, 70), "[t]he mind-body union thus constitutes the one exception to the principle in Descartes that bodies can be explained entirely in mechanistic terms, with no appeal to ends or purposes." In contrast to Descartes, however, Cordemoy extends the realm of natural teleology to all living beings. According to Cordemoy, living beings are set up in such a way as to fulfil a set of functions—most importantly the conservation of the organic body—as the *conditio sine qua non* for being alive. But this function must surely be realised mechanically.

To be perfectly clear, the life of, say, an animal, being nothing other than so and so composed material stuff, depends on "the arrangement and correspondence of several organs, whose division would prevent the effect [movement and life]" (*Lettre*, 45).[125] Hence, it is the having of an organic body and the working together of several organs that explains life. But to be sure, this only pushes the issue back a step. We can ask: what makes organs different from other aggregations of fundamental particles, say, a heap of stones?

In contrast to some of our contemporary approaches, Cordemoy cannot say that (some) stones are made of silicon atoms (or compounds with other elements) whereas organs are made of carbon atoms (in compounds with other elements such as oxygen or hydrogen) and that different kinds of atoms determine whether something is alive or dead. There is only one type of atoms for Cordemoy. They may differ geometrically, but Cordemoy never considers the possibility that this would make any difference between living and dead matter. In contemporary chemistry, silicon, carbon etc. are treated as elements. And from a naturalist perspective it seems quite convincing to think that some elements would be suited to forming living beings whereas others would not. And indeed (admittedly less complex) element theories in natural philosophy were subject to vibrant and controversial discussions in the seventeenth century. Aristotelian-scholastic authors subscribed to the existence of four elements: fire, air (both light), water, and earth (both heavy). Paracelsians believed in the existence of three elements: mercury, salt, and sulphur.[126] And Helmontians supported a theory where simple water is the only element.[127] However, Cartesians signing up to a project whose driving idea is the mechanisation of nature do not buy into any of these theories, since they are inconsistent with their agenda. This

125 "[C]ette vie & ce mouvement [des Brutes] dependent de l'arrangement, & de la correspondance de plusieurs organes, dont la diuision empescheroit l'effect" (*Lettre*, 45). This comes very close to what Descartes says about the unity of the body in the *Passions of the Soul*, article 30. I am indebted to Marleen Rozemond for pointing this out to me.

126 I admit that it might be somewhat anachronistic to put Paracelsian elements on a par with elements used in contemporary chemistry, and Grmek (1972, 191) remarks that the former should be regarded as "functional principles." However, *qua* fundamental building blocks (elements) of the universe they were meant to account for life as well (ibid.). The general reducibility of everything to mercury, salt and sulphur has already been called into question by Boyle (in Boas 1954, 159-164; see n127 below). Here, Boyle, however, he does not discuss the case of life in particular.

127 Robert Boyle in his *Reflexions on the Experiments vulgarly alleged to evince the 4 Peripatetique Elements, or ye 3 Chymicall Principles of Mixt Bodies* gives a very nice overview of these theories as well as their advantages—when he believed there to be any—and disadvantages. Boyle's treatise is reprinted in Marie Boas' (1954) "An Early Version of Boyle's *Sceptical Chymist*."

means that Cordemoy could not avail himself of elemental differences between atoms to account for the difference between the living and the dead. What other options were there?

Cordemoy could have embraced a vital principle (vital seeds, etc.) permeating living bodies as vitalism or animism had it, but this would be to either beg the question—what is a vital principle?—or to concede a spiritual, or mental principle in an otherwise purely materialist physics. Cordemoy, however, rejects vital principles in the *Lettre* and the *Six Discours*, since, he thinks, this would mean giving up a mechanist and materialist physics. As I said before, he is thus forced to go in the opposite direction, i.e., to strengthen the role of the body. Emanuela Scribano (2013, 2) has the same idea in mind when she points out:

> Those who pretend that the mind [*l'esprit*] has an absolute power over the body and that the body is inert without the moving force of the mind do not know the true power of a body. Differently put, the more one demonstrates the power of a body, the less one needs the soul [*l'ame*] and its causality.

Cordemoy's only option is to argue that to be alive means to have an organic body performing a certain function (*Lettre*, 43-46). He needs to hold that to be an organ is a structural property emerging from a certain number of fundamental particles, their properties as well as their interactions. To be an organ thus cannot be predicated of a certain fundamental particle in isolation, but only of a certain number of particles that display a certain fitness. There are no organs in a single particle world. Being an organ is an emergent, structural, though still physico-mechanical, property.

Besides the fact that every other option that could conceivably explain life has to be rejected by Cordemoy in order to remain true to his principles, he gives this striking passage which supports the reading I have defended thus far:

> it is highly intelligible that the earth or water have produced living individuals [*individus vivans*][128], that is to say, that they have been adjusted in such a way by the divine hand of the Lord that they have formed organic bodies, which—being fit for [*propres à*] nourishment and movement, in which consists all the life of bodies—have to be called living (*Lettre*, 43f).[129]

That is to say that organic bodies, which we call 'living', arise when matter—Cordemoy following the *Vulgate* speaks of earth and water— is arranged in very particular way. Matter itself is grounded in fundamental particles and their properties. Hence, organic bodies emerge from a certain composition

128 Note that this is what Cordemoy takes to be the correct rendering of the term *living souls* (*ames vivantes*) (*Lettre*, 43).

129 "il est fort intelligible que la terre & l'eau ayent produit des individus vivans, c'est à dire, qu'elles ayent esté ajustées de sorte, par la main puissante du Seigneur, qu'elles ayent formé des corps organiques, qui estans propres à la nourriture & au mouvement, en quoy consiste toute la vie des corps, ont deu estre appellez vivans" (*Lettre*, 43f). I interjected the parentheses to increase the readability of the passage. See also *Lettre*, 33

of fundamental particles and their properties, but not any other. This set-up is part of God's design. He creates the world such that from a certain arrangement of particles life comes about. One might add that he does so because He willed it to be so. The emergence of organic bodies, that is, of bodies able to perform more demanding functions, from certain constellations of fundamental particles and their properties is thus a matter of the efficacy of the divine will. As Grmek (1972, 187) points out, this introduces divine design into natural philosophy:

> If a human or animal organism is interpreted in a Cartesian way, as an automaton, one cannot escape the logical necessity to suppose divine intervention by the First Engineer [in order to account for its complexity]. A complicated machine must be built by some superior intelligence.

The emergence of organic beings from constellations of fundamental particles exceeds the powers of human craftsmanship as much as the human intellect. Natural machines have a designer as much do artificial machines. However, this can only be God. The origin of natural beings lies in the workings of the divine artisan.[130]

According to Cordemoy, the principle of life is the same for both animals and human beings: "man has an organised body like the beasts and […] this body lives in virtue of the same principles which make beasts live" (*Lettre*, 46).[131] Although "in addition to this […] organic body which makes him nourish [himself] and move like the beasts, he [man] has received another thing which my translator [*interprete*] calls *Mentem*, and which I call spirit [*Esprit*] or thought [*Pensée*]" (*Lettre*, 44f; emphasis in original)[132], having a mind or being a thinking thing is not what explains life. Life can be explained mechanically, while thinking, willing, the use of language etc. require a soul.

At least two final questions seem imminent: (1) What degree of complexity is required for an aggregate of atoms to become more than a mere aggregate, that is, more than the sum of its parts? And what kind of interactions between atoms are we talking about? As to the degree of complexity, Cordemoy unfortunately does not make this any more precise. There is no degree of complexity Φ such that when an aggregate of atoms possesses a degree of complexity equal to or greater than Φ it will be a living organism. As to the interactions, it is clear that these can only be mechanical, i.e., atoms of certain shapes in certain arrangements moving and colliding. This is clear from Cordemoy's reductionist mechanist physics outlined above. (2) Why do some aggregates 'turn into' living bodies, while others do not? Insofar as this is not a mere restatement of the first part of question (1), I believe

130 We will see in the next chapter that Johann Christoph Sturm (1635–1703)—aware of Cordemoy's natural philosophy, and in particular his occasionalism—availed himself of a similar strategy to account for the origin of living beings.

131 "l'homme a un corps organisé comme les brutes, & […] ce corps vit par les mesmes principes qui font vivre les brutes" (*Lettre*, 46). See also *Lettre*, 48.

132 "avec cet Individu, ou corps organique qui le [man] fait nourrir & mouvoir comme les Bêtes, il a receu une autre chose que mon Interprete appelle *Mentem*, & que j'appelle Esprit ou Pensée" (*Lettre*, 44f). See also *Lettre*, 46ff.

that for Cordemoy this seems to be a matter of how God acts, i.e., a matter pertaining to the functioning of God's will, which Cordemoy does not analyse any further.

3.3 Conclusion

As a true Cartesian, substance dualism is non-negotiable for Cordemoy. Substance dualism, at least in a Cartesian context, entails property dualism. The existence of two kinds of substances mandates that there can only be two kinds of properties, mental and physical, the latter being mechanical ones. Hence, the property of life has to be either mental or physico-mechanical. Life consists in nourishment, movement, and the preservation of one's (organic) body. Call this *the life-function*.[133] To be alive is nothing over and above performing the life-function. Although the life-function is mechanical, it can only be carried out by a suitably complex and properly composed *natural* machine. A natural machine in contrast to an artificial machine has an organic body. The ontogeny of an organic body has to be accounted for by a weak emergentist story. Organic bodies arise from some but not just any combinations of atoms including their shapes, sizes, and states of motion and rest. Organic bodies *qua* being individuals are such that their "division would prevent the effect" (*Lettre*, 45), and in this sense they are more than the sum of their fundamental particles.[134]

To have an organic body is, for Cordemoy, what we might (contemporarily) think of as having an emergent structural property. Chalmers (2006, 252) defines weak emergence as follows: "weak emergence is the phenomenon wherein complex, interesting high-level function is produced as a result of combining simple low-level mechanisms in simple ways." One might then characterise Cordemoy's solution to the problem of life as a form of weak emergentism. An organic body, which explains the performance of the life-function, arises out of fundamental particles, their properties, and interactions. The former is irreducible to the latter. Yet, the property of life is still a physico-mechanical property.[135] Although it is a complex and structural property, it is not of an entirely different kind. To be entirely different, life would have to consist in something truly mental, but this is ruled out by how Cordemoy conceives it.

Weak emergentism, in contrast to strong emergentism, is usually taken to have a more epistemological connotation in that what emerges is not a completely new property, but a macro-property that is at least in principle predictable (by means of simulation) to arise given all micro-properties, initial conditions and systems-dynamics (Bedau 1997, 377-379, 393-4). This seems true of Cordemoy's emergentism as well, although God as the most perfect artificer and the only omniscient mind is

133 We will return to this notion in the next chapter.

134 Note that being an individual is a necessary, but not a sufficient condition for something to be alive. Following Cordemoy's definition, clocks, too, are individuals in the sense that their "division would prevent the effect" (Lettre, 45), i.e., to tell time. However, they are mere artificial and not natural machines. Hence, they are not alive.

135 For weak emergentism's compatibility with materialism, see Bedau 1997, 395. Indeed, Chalmers (2006, 246, 250) notes that while strong emergentism challenges the completeness of a physicalist world view, weak emergentism can be used to support it.

admittedly the only being able to perform the necessary operations to fully account for the emergence of life.

4. The Political Dimension of Cordemoy's Project

4.1 Dreaming of an Ideal State

Having gone this far, I invite the reader to go a little further, and see how Cordemoy's project ends with a description of his ideal state. This will also substantiate the hypothesis that Cordemoy's metaphysical project has a political dimension. Cordemoy presents his conception of an ideal state in the *De la Reformation d'un Etat* (1668) which has interestingly been labelled "a Platonic and Christian utopia not without traces of Cartesianism" by Jean Touchard (1963, 362) (see also Thuillier 1960, 262).

In fact, the *De la Reformation d'un Etat* is a letter to Cordemoy's close friend Claude Fleury (1640–1723) wherein he narrates a dream he had after having returned home late from an evening of very liberal conversation they had together. In his dream, Cordemoy is travelling with Monsieur Conrart, a common friend of theirs. When they stop their cart due to extreme heat inside it and sit outside in the open under a tree in the shade, they meet the twelve Ambassadors of the Reformed State (*Reformation d'un Etat*, 101f). One of the ambassadors and Monsieur Conrart commence a conversation, which serves as the occasion for this ambassador to expound the structure of the ideal reformed state. The ambassador emphasises that it is the installation of this state model that liberated his country from all sorts of corruption and elevated it beyond other countries (*Reformation d'un Etat*, 107ff).

The ideal state is a hierarchically structured monarchy ruled by an absolute king (115).[136] The three foremost domains of the state—setting aside the church and the academy—are the military, jurisprudence, and finance. Accordingly, the king presides over three councils, a council of war, a council of justice, and a council of finance run by so called 'Officiers generaux' (115). To each province of the kingdom is sent a governor representing the military, a president representing jurisprudence, and an intendant representing the department of finance (115f). To each town of each province is sent a captain representing the military, a magistrate representing jurisprudence, and a treasurer representing the department of finance (119, 128, 142, respectively). In general, the state and its institutions penetrate every dimension of the socio-political life of the country. The state's presence on the local town level, for instance, is both institutionally and physically manifest. Besides its officials, there is a castle in each town to accommodate the captain and his staff (occasionally also the governor), a palace to lodge the magistrate and his staff (occasionally also the president)[137] and a town house (*hôtel*) for the treasurer and his staff (occasionally also for the intendant). The *cursus honorum*

136 Page references in this part—unless indicated otherwise—are all to the *De la Reformation d'un Etat*, in Cordemoy's *Divers Traitez*.

137 As to the realm of justice, there is also an auditorium (*auditoire*) for the magistrate and an auditorium for the judges in each district of a town for the purpose of jurisdiction (153).

in every one of these three domains is both binding and hierarchically ordered, structured according to a quasi-pedantic level of detail, which I will not be getting into. In any case, Cordemoy's ideal state is a centralised absolute monarchy[138] very much like France under Louis XIV, where every part of the state's activity leads back to the almighty king: "*L'état, c'est moi"* (*Louis XIV*) (see figure 2 below).

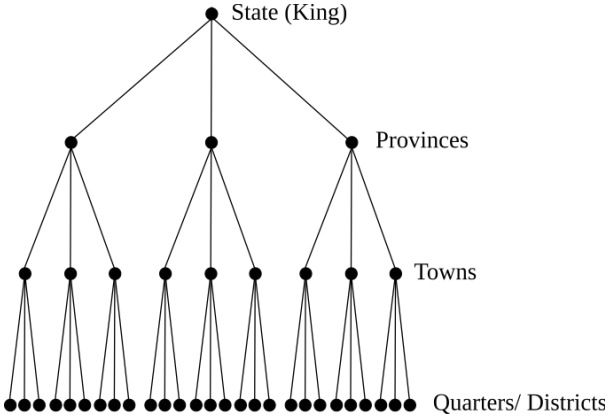

Figure 2 Illustration of the centralisation of the political realm in Cordemoy.[139]

Interestingly, the state's intervention is also present in the realm of the clergy such that the state takes an active role in restructuring religious institutions (148-151). Religion itself is a means of supporting the system, not a means of opposing or fighting it: "religion support the laws" (147).[140] Finally, the ideal state implements the most thoroughgoing and exhaustive humanist education by means of the installation of academies in each town. Education takes place from the age of five onwards until the age of twenty (161) and is a necessary condition for people to enter the military, the realms of jurisprudence or finance, or the church (161f).

Cordemoy envisions an ideal academic curriculum in astounding detail. Each day is structured to the hour and the amount of subjects dealt with during a student's education is comprehensive: religion, history, law, eloquence and rhetoric, dance, arts, music, mathematics, astronomy, arithmetic, mechanics, anatomy, chemistry, horticulture, agriculture, geography, writing in the vernacular and in Latin, language studies, ethics, studying the soul and its passions (what we would call psychology), handling and exercising arms, riding on horseback, swimming, running, fighting. Not all these subject are taught right from the beginning of age five, but by the end of a student's education, they are a most learned, decent citizen (*un honnête bourgeois*, 195) and servant of the state:

138 Thuillier (1960, 258-261) also notes that Cordemoy's ideal state is authoritarian, centralised, hierarchic, dogmatic; its citizens patriotic, obedient, and rational.

139 This illustration is only meant to show how Cordemoy's (ideal) state is structured, not to accurately represent the number of provinces, towns etc. that the state encompasses. Cordemoy never specifies this.

140 "[L]a Religion soûtient les loix […]" (147). With respect to the form of religious belief itself, Cordemoy approves of the idea of returning to the Apostolic Age, i.e., the "pureté des premiers siécles [sic]" (151).

> one needs to raise the children for the well-being of the home country, and not for the pleasure of their families […] the young people are raised under the idea of only serving the public (163).[141]

Cordemoy's educational agenda is surprisingly modern, and proto-enlightened, since children are taught only by appeal to reason (176) which makes them reason-governed adolescents and adults (177). The role reason plays is further exemplified across all the three main domains of society by the fact that (1) soldiers are well-educated, cultivated individuals (123). (2) There is very little legal conflict since every citizen is aware of the laws and respects the institutions of the state (130f). (3) Taxpayers share the conviction that capitation is the best tax system (144f) and that paying taxes is for the best of the state (146f). Finally, Cordemoy's ideal king is an enlightened, reasonable leader working for the well-being of the state (*Necessité de l'Histoire* 97f; *Des Moyens*, 215). However, the ultimate purpose of this system is to create a new type of man: the "honnête bourgeois" (195), a well-educated, well-mannered *conformist* servant of the state.[142] Indeed, every citizen owes loyalty to God, the prince (king), and the country: "a man owes more to God, to his Prince, and his country, than to himself" (175).[143] Both in the academic system (172f) and in normal life the strictest discipline is in place. Capital punishment is institutionalised and is executed for lesser crimes, such as defalcation and usury (155f).[144]

4.2 Supporting the Absolutism of Louis XIV

Cordemoy's philosophical project is mainly metaphysical, but it does have a political dimension, to wit, to support the absolutism of Louis XIV (1638–1715). Cordemoy was not an *active* political advisor to the king[145], as were Richelieu (†1642) to Louis XIII, or Mazarin (†1661), Colbert (†1683) or Louvois (†1691) to Louis XIV. But taking into consideration Cordemoy's origin, his social status, and his ties to the rule of Louis XIV (see *appendix* to chapter 1, α), it is not surprising to find that he is a supporter of the system. Nor is it surprising that Cordemoy's political convictions would drive his grander project to some extent.[146]

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141 "il faut élever les enfans pour le bonheur de la patrie, & non pas pour le plaisir de leurs familles: […] les jeunes gens sont élevez dans la pensée de ne servir que le public" (*Reformation d'un Etat* 163).

142 See also Thuillier, 1960, 262. Battail (1973, 244) also notes the anti-individualism running through Cordemoy's system.

143 "un homme doit plus à Dieu, à son Prince, & à son païs, qu'à soy-mesme" (*Reformation d'un Etat*, 175).

144 Touchard (1963, 362) gives a very apt summary of Cordemoy's utopian draft: "*De la Réformation d'un Etat* is a Platonic and Christian utopia not without traces of Cartesianism: a hero [as] legislator, philosopher-soldiers, virtuous judges, upright tax collectors, artisans separated from [*isolés*] the bourgeois and living in a community, natural and patriotic education in the style of the '*Emile*,' suppression of the venality of offices, establishment of a state, firmly hierarchised and centralised under the responsibility of a sage monarch." Emphasis in original.

145 Though interestingly the posthumous collections of his works of 1691, and 1704 indicate him as such ("conseiller du Roy").

146 Thuillier (1960, 257) points out that Cordemoy's belief in absolutism as a guarantor for political stability might stem from the fact that he lived through twenty years of the Fronde.

Traces of Cordemoy's political beliefs can be found in epistles to the king and prefaces to his philosophical works. In the epistle to the DCA, he presents the king as a superhuman being: "Ever since the moment of its birth [that of the "sacred Person" that is the king] we have believed that it came from Heaven" (DCA, 54). Cordemoy thus thinks that the rule of the king is legitimised by divine investiture, and accordingly, the king is presented as quasi-divine.

Compare:

The King	God
"Your Majesty sees all the glory of your reign to consist in making us perfectly happy" (DCA, 55).[147]	"God created minds in order for them to be happy" (TdM, 145).

The king and God are concerned with the happiness of their citizens and created minds, respectively. To be sure, God's work of creation precedes the king's 'just' rule, but since the king is presented as invested by God to rule his country, his foremost duty is to prepare the ground for the nation and his subjects to thrive. In addition, Cordemoy even goes as far as to say that "[i]t would be a great advantage for all nations if all sovereigns followed Your Majesty's [Louis XIV's] example, or even if Your Majesty reigned over the entire world" (DCA, 55). In the same vein, Cordemoy emphasises the status of Louis XIV in the *Discours au Roy sur la Mort de la Reine* as "the greatest and most worthy King of the earth" (ibid, 288).[148]

Cordemoy emphasises that there is an intimate connection between the king's rule and political stability: "Your Majesty repaired, as if instantaneously, the disorders of thirty years" (DCA, 55). It seems a safe bet to assume that Cordemoy has in mind the Thirty Years War.[149] Consequently, he ascribes to Louis XIV the role of peace-maker and stabiliser of Continental Europe after the war. Indeed, Cordemoy thinks that the state's immediate goals are "justice, prosperity, and tranquillity […], and [to] render the lives of [its] subjects sweeter, more tranquil, and more comfortable" (DCA, 55). It seems clear that, for Cordemoy, only a strong, perspicacious ruler, such as Louis XIV, could bring this about.[150]

147 See also Cordemoy's political works: "The king [is obligated] to do everything that depends on him to render the kingdom happy"(*Des Moyens*, 215). "[Le] Roy [est obligé] à faire tout ce qui dépend de luy, pour rendre le Royaume heureux."

148 "[le] plus grand & [le] plus digne Roy, de la terre" (*Discours au Roy sur la Mort de la Reine*, 288).

149 Cordemoy was born in 1626, a time when the Thirty Years War had been devastating Central Europe, especially the Holy Roman Empire of German Nation, for eight years with another 22 years to come. Louis XIV succeeded Louis XIII in 1643, although taking effective rule only in 1661 after the death of his advisor and quasi-custodian Mazarin. Finally, France was one of the major parties negotiating the Treaty of Münster in 1648 (Pennington 1989, 531f; Hartmann 2015, 31f).

150 Indeed, Jean Touchard in his (1963, 319f) counts 'order and peace' after years of religious and political crisis triggering eruptions of violence in the form of the Wars of Religion and the Fronde as one of the main factors favouring absolutism in France.

Certainly, some of the things Cordemoy says in the dedicatory letters of his philosophical works are mere flattery. Nonetheless, what Cordemoy writes about the glory of Louis XIV's reign, the reference to the Thirty Years War, the wish that he should reign the whole world, and his comments about the just abatement of the 'revolts' of the provinces of Brabant and Henault in the DPP (Epistle, 7f)—that is, the reference to the 1667-1668 War of Devolution—strike me as unnecessary unless they express Cordemoy's true political conviction.[151]

In the *Des Moyens de rendre un Etat heureux*, Cordemoy's support of absolutism is conspicuous: the king is the absolute ruler of the state and his power is undivided. He makes laws, imposes ordinary and extraordinary taxes and duties for the maintenance of the state, its institutions and its infrastructure. He declares war and makes peace. He negotiates treaties (*Des Moyens*, 216-222). The royal power (*puissance royale*) is absolute (*absolue*) (*Des Moyens*, 214): "As for the goods [*biens*] of towns and individuals, he [the king] is the absolute master thereof" (*Des Moyens*, 216).[152] Each individual citizen owes most loyalty to the state, i.e., the kingdom, which means to the king. Loyalty to the town, and family are important, but subordinate to the loyalty one owes to the king (*Des Moyens*, 214).

The only form of government Cordemoy can conceive of is that of an absolutist monarchy. A strong similarity between the king and God is again striking:

The King	God
"One could not lack being unhappy under a prince, were he omni-benevolent, and omniscient, when he is not omnipotent" (*Des Moyens*, 225).[153] "We [the people of the ideal state] have a King so sovereign in the State that in order to bear witness to his power, we are accustomed to say that he only needs to render an account (rendre conte) to God" (*Des Moyens*, 115).[154]	"Since we acknowledge God as omnipotent, it is necessary that we also admit at the same time that he has knowledge [*sapientia*] of all things, that likewise all things are subjected to his power and command [*ditioni, & imperio*]" (Roman Catholic Catechism following the Council of Trent, 1567, p. 25).[155]

151 A similar reference to Louis XIV's 'glorious' campaign, i.e., the (1667-68) War of Devolution, can be found in the *De la Reformation d'un Etat*, 111-113.

152 "Quant aux biens des villes, & des particuliers, il [the King] en est le maître absolu" (*Des Moyens*, 216).

153 "On ne sçauroit manquer d'être malheureux sous un Prince, fût-il tout bon & tout sage, quand il n'est pas tout-puissant" (*Des Moyens*, 225).

154 "Nous [the people of the ideal state] avons un Roy si souverain dans l'Etat, que pour témoigner qu'elle est sa puissance, nous avons coûtume de dire, qu'il ne doit rendre conte qu'à Dieu" (*Reformation d'un Etat* 115).

155 "Nam cum Deum omnipotentem agnoscimus simul etiam fateamur necesse est eum omnium rerum scientiam habere, omnia item eius ditioni, & imperio subjecta esse" (Catechismus ex Decreto Concilii Tridentini ad Parochus. Pii Quinti Pont. Max. iuss editus, Dominicus de Farris: Venice 1567, p. 25). The Catechism of the Council of Trent, or Roman Catechism written in 1566 by Carlos Borromeo, theologian and archbishop, is the Vatican's own catechism. It was written for a professional audience, that is to say the clergy itself (Carter 2011, 29f). While other catechisms were probably more successful in the realisation of the Catholic educational project (such as Auger's or Bellarmine's, Carter 2011, 30-32), I take it to possess the greatest authority. I use it to present the Roman-Catholic conception of God. The cue to look at this catechism is from Carter 2011, ch. 1.

In addition, a king can only be held accountable by God, "to whom alone it is reserved to judge the kings" (*Necessité de l'Histoire*, 75).[156] Unsurprisingly, the king *qua* absolute can make new laws, raise ordinary and extraordinary taxes and duties, declare war, and make peace (*Des Moyens*, 217-222). His rule is by and large unconstrained. Even though Cordemoy's preferred form of government is an absolutist monarchy, he is convinced that the king's first duty is to render his subject's happy (*Des Moyens*, 215; *Reformation d'un Etat*, 109). The safest way for sovereigns to attain glory is "to work incessantly to render their subjects happy" (*Necessité de l'Histoire*, 74).[157] Given that the king has to work for the happiness of his subjects and for the well-being of his kingdom (*le bien du Royaume*) (*Des Moyens*, 216) and always has to give a good example (*Des Moyens*, 215), despotism and arbitrary rule have no place in the state Cordemoy envisions. Along the same lines, Cordemoy points out that:

> Incidentally, one needs to consider that if it is useful for each individual to learn at the right time to make use of its reason, it is of everybody's utility that those who are in charge over others know better than the others how one needs make use of one's reason (*Necessité de l'Histoire*, 97f).[158]

Finally, there are a number of clues that support the conjecture that the ideal state outlined in the *De la Reformation d'un Etat* is very close to France under the absolutist rule of Louis XIV, i.e., that Louis XIV is the 'young prince' who reformed the state.[159] The whole work might then in part be taken as a eulogy on absolutist France.[160]

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156 "à qui [Dieu même] seul il est reservé de juger les Rois" (*Necessité de l'Histoire*, 75).

157 "de travailler incessament à rendre leurs sujets heureux" (*Necessité de l'Histoire*, 74). It is astonishing that Louis XIV arrived at almost the same insight in 1679 (in Touchard 1963, 343): "The interest of the state has to go first. When one has the state in view, one works for oneself. The well-being of the one [the former] creates (faire) the glory of the other [the latter]." Another indication how close Cordemoy's political works are to the *raison d'etat*.

158 "Au reste, il faut considerer que s'il est utile à chaque particulier d'apprendre de bonne heure à se servir de sa raison, il est de l'utilité de tout le monde, que ceux qui doivent commander aux autres, sçachent mieux que les autres, comment il se faut servir de la raison" (*Necessité de l'Histoire*, 97f).

159 Battail (1973, 234) also identifies the 'young prince' with Louis XIV.

160 First of all, it is striking that the system of the ideal state works similar to the one France has (*Reformation d'un Etat*, 115f) and that it is explained by reference to the French system. Secondly, the 'young prince,' the protagonist of Cordemoy's envisioned ideal state, was not even thirty years old when he 'so ingeniously' reformed the country (*Reformation d'un Etat*, 110). By the same token, Louis XIV was not thirty years of age, either, when he took effective rule of the country in 1661. He was still below that age when he launched his successful campaign in the War of Devolution (1667–1668). In addition, the presentation of the 'young prince' as a war hero (a) parallels the eulogy on Louis XIV one finds in the epistle to the DPP. (b) What the ambassador in the *De la Reformation d'un Etat* says about the campaign of the young prince against his neighbouring states, wherein the latter himself appeared on the battlefield (*Reformation d'un Etat*, 112; DPP, epistle, 8) as well as his motivation, perfectly mirror the aforementioned War of Devolution.

The 'young prince's' motivation for the war was to "to put himself in the possession of certain Provinces which the right of a legitimate succession has devolved upon the Queen, his wife" (*Reformation d'un Etat*, 111-113). "se mettre en possession de certaines Provinces, que le droit d'une succession legitime déferoit à la Reine son épouse" (*Reformation d'un Etat*, 111f). Lynn (1999, 105) explains that upon marrying Louis XIV, Marie Thérèse, "daughter of Philip IV of Spain by his first marriage […] renounced her claims to any Spanish inheritance [such as the Franche-Comté; a number of cities in the Spanish Netherlands], she did so contingent upon the payment of a dowry of 500,000 escudos, a figure so high that it was never paid. Thus from an entirely legalistic point of view [which one should not be surprised to see Cordemoy *qua* trained

It seems natural to draw a connection between Cordemoy's metaphysical and his political views, that is, between his occasionalism, and his support of absolutism. On the one hand, occasionalism deprives human beings *qua* finite substances of their causal power. On the other hand, absolutism deprives human beings *qua* citizens under an almighty ruler of their political power. The king as God's representative will then emerge as the link between the metaphysical and the political picture. However, it is also here that Cordemoy's overall philosophical project faces a certain tension. The king seems to occupy a middle place which Cordemoy cannot easily accommodate: *qua* human being, i.e., *qua* finite substance, the king does not possess any causal power whatsoever. *Qua* absolute ruler, the king's political power is absolute. How can absolute political power be had in the absence of causal power? Does not God's ruling of the social world become more indirect if it must be channelled through the king as a mediator between God and the common citizen?

To some extent these problems can be addressed by pointing out that the metaphysical and the political view are really just different *views* of the human world. In addition, God's metaphysical role need not be mirrored by His social role. There might even be a good reason for citizens to believe in human political rule as this might create more stable, peaceful socio-political conditions than those obtaining if everyone believed she or he would only be held accountable by God.

In a way, however, this requires biting the bullet. Addressing the role of the king in deeper metaphysical terms, Cordemoy could have suggested—though he never did—that God 'lends' his causal power more to the king than the common citizen. Hence, while the king is absolutely and truly causally impotent without God's causal power, he might be relatively more powerful once God acts on the king's behalf. This might be because the king's soul-body unity is better disposed to function as an occasion for God's actions than that of the common citizen. This line of arguing gains indirect support from what Cordemoy himself says at the beginning of the DCA, i.e., the dedicatory letter to the king:

> In this work, I examine the different operations of the soul and the body, as well as the secret of their unity. […] Never have these two excellent parts that compose a whole man been so marvellously united as they are in Your Majesty. Never has a hero had so great a soul in so beautiful a body. Moreover, we should not look upon your sacred Person as purely a work of Nature. Ever since the moment of its birth we have believed that it came

lawyer adopt], Marie Thérèse retained any claims she had." For the War of Devolution, see also von Schaumburg 1878, 301f.

Also, the *jeune prince* is described as "a prince like ours [*un Prince comme le nôtre*] (*Reformation d'un Etat*, 199). The birth and life of both the fictional prince and the real prince, Louis XIV, perfectly resemble one another (*Reformation d'un Etat*, 199f). We also know that, although Cordemoy's other smaller tracts are undated and perhaps undatable (Battail 1973, 233), the *Reformation d'un Etat* is written in 1668 (Battail 1973, 233f; Thuillier 1960, 257f; Touchard 1963, 362). We know that the Grand Dauphin, Louis XIV' first born, was at infant age in the 1660s and that all of Louis' sons except Louis Dauphin died at infant age. Hence, we can safely conclude that the Louis XIV—not his son—is the young prince, and that therefore Cordemoy's work is meant to support absolutism.

Battail (1973, 249) arrives at the same conclusion: "The monarchy of the divine right is not only not called into question, but even more, it finds itself philosophically justified and reinforced in its authority."

> from Heaven, and we consider all of its actions to be the continuous consequences of the miracle that first gave it to us (DCA, 54).

Insofar as this not pure flattery, Cordemoy could have argued that in virtue of a better psycho-physiological disposition, the king is relatively more causally powerful than other human beings. God, as it were, established a more easy flow of His causal power to the king than to other human beings. Absolutely speaking, however, the king is a powerless as everyone else.

5. Conclusion

I have suggested a new way of reading Cordemoy's philosophy. According to my reading, Cordemoy is engaged in an ambitious project of explaining the human world by means of deconstruction and reconstruction. Cordemoy dissects the realm of the state into its constitutive elements, citizens, which are in turn metaphysically analysed as composed of minds and organic bodies, the latter emerging from atoms and their mechanical properties. I have shown how Cordemoy then reconstructs the world until he reaches the realm of the political again. Language plays an important part in accounting for socialisation. I have suggested that Cordemoy's project serves the purpose of supporting the absolutism of Louis XIV of whom Cordemoy was a subject.

I have argued that occasionalism is what provides the necessary causal cement to put things back together. Occasionalism accounts for interactions between atoms; minds and organic bodies; disembodied minds; and for the production of a thinking thing's own ideas. It is also supposed to ground the nomological connections between otherwise completely separate substances and it serves to solve a global communication problem, one that is not limited to the mind-body problem.

Furthermore, I have dedicated some space to showing how Cordemoy can overcome a particularly pressing problem threatening his project which is the problem of eliminativism. Given his atomism, and his mechanical treatment of the whole of nature setting aside human beings, Cordemoy might not seem entitled to claim reconstruction of human beings as composed of minds, and organic bodies. Cordemoy needs to show further in how far living beings differ from non-living beings. His solution consists in showing that organic bodies are themselves to be treated as functional unities whose division would prevent them from fulfilling the *life-function*. Being alive means nothing more than conserving one's own organic body, nourishing oneself, growing and reproducing one's own kind. For Cordemoy, being alive is a matter of complexity. It is a weak emergent property. Some bodies are alive in virtue of a certain level of complexity of material-mechanical structure ultimately reliant on atoms with purely mechanical properties and their interaction effected by God as the only true cause in nature. The foundation of natural machines and what accounts for their teleological behaviour is divine design exceeding by far the capacities of finite human artisans. A similar form of Cordemoy's ultimately supernatural solution to the problem of life as much as his occasionalism will recur in a recipient of his philosophy, Johann Christoph Sturm.

CHAPTER 2

OCCASIONALISM, FINAL CAUSES, AND LIFE IN THE NATURAL PHILOSOPHY OF JOHANN CHRISTOPH STURM

Introduction

Separately, mechanism, occasionalism and finality, i.e., the acceptance of final causes, are commonly discussed elements in the history of early modern natural philosophy.[161] However, academic research has yet to show how these three important elements of natural philosophy relate to one another and whether they could in principle be reconciled, and if so, how. What is more, one might wonder whether these elements can be used to explain a particular phenomenon in natural philosophy: life.

Mechanism, occasionalism and finality neither necessitate nor presuppose one another. In fact, they oftentimes seem to be at odds, as seems most clear in the case of mechanism and finality. René Descartes (1596–1650), for example, endorses mechanism, and at the same time is notorious for banishing final causes from natural philosophy (*inter alia* in his *Principles of Philosophy* I, §28; and in the *Fourth Meditation*). On the other hand, Francisco Suárez's (1548–1617) natural philosophy allows for final causes but it is by no means mechanical (Des Chene 1996, ch. 6). Mechanism does not inevitably lead to occasionalism: Pierre-Sylvain Régis (1632–1707) adopts mechanism but his causal theory looks very much like concurrentism rather than occasionalism (Ott 2008a). Samuel Clarke (1675–1729) endorses (partial) occasionalism, but he does not commit himself to mechanism (Sangiacomo 2018c). Occasionalism, finally, does not require introducing final causes into natural philosophy. In the case of Géraud de Cordemoy, however, we have seen how teleology re-enters his system through the back door. Still, Cordemoy adopts occasionalism but never speaks of endorsing final causes. The only kind of cause he explicitly allows for in his physics is the efficient cause.

Accepting some form of finality was widespread among natural philosophers in the seventeenth and eighteenth century: Aristotelian-scholastic thinkers such as Suárez and extra-academic philosophers like Gottfried Wilhelm Leibniz (1646–1716) endorse finality, but neither of them support occasionalism.[162] There are thinkers who accept two of the three elements: Pierre Gassendi (1592–1655) accepts mechanism and teleology (Osler 2010, 158-161); Géraud de Cordemoy (1626–1684) accepts mechanism and occasionalism (e.g., Ablondi 2005a; see also the previous chapter of this

161 I will refer to mechanism, occasionalism and finality as 'elements' insofar as they are building blocks or foundations in (some) systems of natural philosophy. I will later also refer to them as 'hypotheses' in Sturm's system insofar as their epistemic status is concerned. They possess a reasonable degree of plausibility—indeed they are the best theoretical assumptions we have to understand nature, according to Sturm—but they are by no means indubitable truths.

162 Leibniz's critique of occasionalism has been sketched in the introduction to this dissertation.

dissertation); and Samuel Clarke (1675–1729) accepts occasionalism and teleology (Sangiacomo 2018c). No thinker has been identified by academic scholarship who adopts all three features, that is, mechanism, occasionalism and final causes.[163]

Scholars have investigated the relation between mechanism and teleology (e.g., Des Chene 2001; Osler 2001) as well as mechanism and occasionalism (e.g., Downing 2005, ch. 13; Schmaltz 2008). Since occasionalism has oftentimes been seen as following from Cartesianism (e.g., Downing 2005), most scholars seem to have taken the Cartesian rejection of teleology and final causes for granted in the case of occasionalism. Hence, there is a lacuna in scholarly literature when it comes to the relation between teleology and final causes, on the one hand, and occasionalism, on the other hand. Overall, we still lack an analysis of how these three elements can be put together in a coherent system of natural philosophy. I suggest that in Johann Christoph Sturm (1635–1703), we are provided with an illuminating case study of how this can be done. The case of Sturm is of particular interest because he harmonises mechanism, occasionalism, and finality in a systematic way, and employs occasionalism to ground natural philosophy.

For the most part, Sturm has been neglected by scholars of early modern philosophy. For instance, in the introduction to their translation of Leibniz's *De ipsa natura* (1698),[164] Ariew and Garber reduce him to "a minor figure in the history of physics and a correspondent of Leibniz's" (AG, 155). This dismissive treatment of Sturm seems to result from the fact that he is reworking (i.e., mechanising) an Aristotelian-scholastic natural philosophy, as well as carefully negotiating common ground between the old philosophy of the schools, and the new mechanical philosophy prominent during his days.[165] But in doing so, Sturm *prima facie* talks the language of the schoolmen. Scholars find him employing the scholastic terminological apparatus, e.g., the four Aristotelian causes, the matter-form distinction, the three kinds of souls etc. Therefore, they are led to treat him as 'yet another scholastic'. What they fail to notice is that the institutional constraints of being a university professor of physics and mathematics in Germany are what make Sturm hold on to this terminology.[166] Indeed, a careful analysis of his philosophy reveals how he forges his own original philosophical path by working his way out of the philosophy of the schools on the one hand without producing a mere replica of Descartes' philosophy (as the most prominent alternative) on the other hand.

163 Malebranche is a thinker in whom mechanism, occasionalism and teleology coincide, see Pyle (2003). However, like Cordemoy, Malebranche—contra Sturm—does not accept final causes in natural philosophy.

164 In the *De ipsa natura*, Leibniz attacks Sturm's *De idolo naturæ* (1692). See the introduction of this dissertation.

165 Appropriately, one of the posthumous manuscripts possibly from a student of Sturm's is entitled *Physica novantiqua compendiaria*. It can be found in the City Library of Nuremberg under the signature Will V 554.

166 Lind (1992, 83f) points out that neither Descartes nor any of his immediate followers had developed "a consequent mechanist systematics" nor was it straightforwardly possible to treat all phenomena of nature in a strict mechanical fashion. In light of this, mechanist philosophers like Sturm stuck to the framework of Aristotelian-scholastic authors retaining but reinterpreting the handed down scholastic notions. Lind notes, however, that this leads to some inconsistencies.

Even when scholarship has been less dismissive, the majority of it focuses on Sturm's eclecticism (Albrecht 1994, 309-357; Albrecht 2001; Ahnert 2003; Blackwell 1995 and 1997; (to some extent) Bohatec 1912; Mercer 2001, 47-49); occasionally on his discussion about the status of nature with Leibniz (and Schelhammer) (Ahnert 2003; Dennehy 2009; Kratochwil 2004; Nobis 1966); more occasionally still on his scientific method (Albrecht 2004); his reconciliation of Aristotelian scholasticism and Cartesianism (Bohatec 1912); or his occasionalism (Leinsle 2004). The role of occasionalism in Sturm's natural philosophy has thus received very little attention—even in comparison with other areas of his philosophy.

Specht and Sangiacomo, however, are notable exceptions. Specht (1985) mentions Sturm's role in the history of the dissemination of occasionalism in early modern Germany. Sangiacomo (2020, 2018a) investigates Sturm's natural philosophy paying particular attention to occasionalism, mechanism and teleology are connected. However, Sangiacomo's and my own work differ in several respects. First, Sangiacomo situates Sturm in a historiography different from mine. Following the narrative of Carraud's *Causa sive Ratio* (2002), he portrays Sturm's philosophy as an instantiation of the coming apart of the notions of cause and reason which had been united in late Aristotelian philosophy, but were then increasingly reconceptualised in early modern philosophy—although Leibniz is an exception to this. Sturm, for me, presents an instantiation of the yet to be written German reception of early modern occasionalism—in this I follow Specht. I significantly diverge from Sangiacomo in that I take Sturm to be mostly a second generation occasionalist in accordance with and building upon his French predecessors. Sangiacomo, in contrast, tells us how little Sturm has in common with occasionalist philosophers, such as Cordemoy, La Forge, and Malebranche. At the same time, he takes Sturm to be building an "eclectic version of occasionalism" (2020, 23), which seems hard to justify, if one takes Sturm to have barely accepted any element constituting occasionalism found in other authors. I take my reading of Sturm to be more compatible with his scientific method as well as his eclectic convictions. Second, Sangiacomo hints at a novel argument in Sturm in favour of occasionalism—what I will be calling the *argument from spatio-temporal grounding*. He does not, however, spell out the details of this argument, the foundations on which it is built, and how it is supposed to convince the disinclined reader. In contrast, I will analyse this argument step by step. Finally, Sangiacomo uses a different case to show how the theoretical principles of Sturm's physics are to be applied. While he discusses the case of gravity, I will be focusing on the case of life.

In this chapter, my overall goal is to show how Sturm harmonises mechanism, occasionalism, and finality in his natural philosophy, and how occasionalism grounds his natural philosophy. More specifically, I am interested in showing how the combination of mechanism, occasionalism, and finality can be applied to account for life as a test case. That is, how these three elements *qua* theoretical foundations of Sturm's natural philosophy are applied to the actual scientific practice of dealing with generation and procreation. The explanation of life and the generation of living beings is

indeed the touchstone of natural philosophy in general and mechanical philosophy in particular (for the latter see Pyle 1987; Pyle 2006, Hutchins 2021). Still, mechanical philosophy suitably adjusted in combination with occasionalism can go some way to addressing these challenges.

The structure of this chapter is as follows: I will start by delineating Sturm's methodological framework, i.e., his scientific method (sect. 1). Against the background of his scientific method, Sturm takes mechanism, occasionalism, and finality as convincing hypotheses of natural philosophy. Sturm then develops the metaphysical reasoning behind these three elements, developing their consequences and interconnections. Finally, he applies these elements to the test case of life. Accordingly, I will scrutinise his mechanical philosophy (sect. 2), i.e., his mechanisation of matter and especially form (sect. 2.1), and the role so called 'passive forms' play in 'performing' particular functions (sect. 2.2). I will then study Sturm's case for occasionalism (sect. 3). I will first analyse Sturm's own contribution to the debate, i.e., what I call the *argument from spatio-temporal grounding* (sect. 3.1). I will then show Sturm's indebtedness to his French occasionalist predecessors, which I take to be the first generation early modern occasionalists. From this emerges Sturm's mostly second-generation occasionalism (sect. 3.2). I will then turn to Sturm's endorsement of finality, i.e., final causes (sect. 4). After that I will show how Sturm accounts for life (sect. 5). I will end by providing a conclusion (sect. 6).

1. Sturm's Scientific Method

Sturm's scientific method provides the methodological framework in which the constitutive elements of his natural philosophy are embedded. Therefore, we need to understand the former to understand the latter. Against the backdrop of this scientific method, mechanism, occasionalism, and finality emerge as convincing hypotheses of physics, or so Sturm believes.

As a shorthand, Sturm's scientific method can be described as eclectic, hypothetical[167], experimentalist and dynamic.[168] I will go through each of these dimensions in turn. However, I will begin by outlining Sturm's overall procedure in his flagship text, the *Physica electiva* (PE).

Throughout the PE, Sturm follows a three-step process in natural philosophy[169]: The first step consists in collecting phenomena, either reported by other natural philosophers or encountered by means of observation or experimentation itself. They need to be reported faithfully (*fideliter*), accurately presenting the circumstances under which the phenomena occurred (PE I.1, preface, art. 3.4).

167 Sturm talks about the use of suppositions (*suppositiones*) or hypotheses which he takes to be the same (PE I.1, preface, art. 3.1). Abbreviations of Sturm's works are as follows: *Physica electiva* = PE; *Physicæ modernæ sanioris compendium erotematicum* = CPMS; *Physicæ conciliatricis conamina* = PC; *De philosophia sectaria et electiva* = PSE.

168 I show elsewhere that Sturm's eclectic scientific method shows strong Baconian characteristics (Henkel forthcoming).

169 See also Albrecht 1994, 347; Albrecht 2004, 132. Albrecht (1994, 333; 2004, 121) notes that the same three-step process is at work in Sturm's (1685) *Physicæ conciliatricis conamina*. I think it is absent in Sturm's posthumously published (1703/4) *Physicæ modernæ sanioris compendium erotematicum*.

However, Sturm does not content himself with putting forth a mere natural history, a mere list of things found in nature, but aims at a natural philosophy that gives deeper causal explanations for why the phenomena are such as they are, and why they occur. Hence, the second step consists in collecting and presenting with the same faithfulness old and new hypotheses that have been suggested to account for the phenomena (ibid). Sturm meticulously presents hypotheses old—*inter alia* Presocratic and Aristotelian ones—and new—the physics of Gassendi, Descartes and the latest Aristotelian-scholastic philosophers. Sturm shows himself to be an assiduous, diligent reader of the *philosophia naturalis* available at his time. His knowledge of more and even less prominent authors is impressing and precise.[170] The third step—gearing into his eclectic method—aims at selection and reconciliation. Sturm selects what he deems good and reasonable while ridding himself of mere pseudo-explanations, prejudices and preconceived notions. Overall, in this three-step process, the presentation of phenomena establishes the *explanandum*, while hypotheses cover some ground towards approximating a solution. But since these different hypotheses either contradict or run parallel to one another, a true explanation must select from existing theories what is true, reject what is false, and add what needs be added. This brings us to Sturm's eclecticism.

The eclectic method consists in nothing else than "to select and adopt [*sibi sumere*] from all sects of Philosophers that which is true, having left behind what is false and erroneous" (PE I.1, preface, art. 2.1).[171] According to Sturm, any free future philosopher should be an eclectic.[172] Sturm himself encountered the eclectic method during his one year stay in Leiden in 1660 and was probably inspired by Henricus Bornius (1617–1675).[173] Both the preface of Sturm's *Physica electiva* and his disputation *De philosophia sectaria & electiva* (PSE) (defended in 1679) are pleas for eclecticism, which contrasts sharply with sectarian philosophy. According to Sturm, all philosophers except sceptics and doubters (*scepticos ac dubitatores)* can be subsumed under two classes: sectarians and eclectics (PSE, 3).[174]

Sectarian thinkers are led by an authority on which they slavishly depend. They do not follow their own reasoning, but spend their time absorbing, reproducing and fiercely defending what they have learned *ex cathedra*.[175] Most of the sectarians follow one leader (*unum Ducem sequentium*) (PSE, 4), and that is why Sturm defines sectarian philosophy as follows:

170 I provide an excerpt of Sturm's sources (for the first part of his general physics of the PE, and selected parts of his other two physics textbooks) in the *appendix* to chapter 2, β. See also section 1.1 of myself and Sangiacomo's entry on Sturm in the *Stanford Encyclopedia of Philosophy* (Sangiacomo and Henkel 2020).

171 "ex omnibus Philosophorum sectis id quod verum est seligere & sibi sumere, relictis falsis & erroneis" (PE I.1, preface, art. 2.1). See also *De philosophia sectaria et electiva*, 6. All translations unless indicated otherwise are mine. All emphases are in the original unless indicated otherwise. In general, I will leave Sturm's orthography unchanged. To facilitate reading, I will occasionally change the punctuation when I deem it necessary.

172 "Eclecticum esse debere, qui futurus liber Philosophus est" (PE I.1, preface, art. 2.1).

173 Sturm mentions Leiden (*Lugdunum Batavorum*) in the preface of the PE (art. 2.1). See Albrecht 1994, 312 and Ahnert 2003, 607. For the eclecticism of Bornius, see Albrecht 1994, §21.

174 Bohatec (1912, 14) points out that Sturm follows Gerardus Vossius' (1577–1649) characterisation of philosophy as presented in the latter's (1657/58) *De philosophia et philosophorum sectis*. The category of the philosophers mixing various ideas at random—Vossius calls these 'miscellones'—is, however, absent in Sturm.

> Therefore, in this treatise [i.e., the *De philosophia sectaria et electiva*], we call S*ectarian Philosophy* that which draws [*hausit*] nearly all its doctrines [*dogmata*] not seldom even the very order of what is to be taught, from the mouth or the writings of one Master or Teacher in such a way that it seems to their followers that almost everything, like other things said more truly or correctly, can nowhere be found (PSE, 11f).[176]

Sectarian philosophers do not follow the truth of what is being said, but the authority of the person who said it.[177] The most notable sects in Sturm's days are the Aristotelians (*secta Aristotelica*) with its two main branches, i.e., the Greek interpreters and the scholastic commentators; the Cartesians (*secta Cartesiana*); the Gassendists (*secta Gassendica*) reviving Epicurean and Democritean thought; and the Neoplatonists (*secta Neo-Platonica*) (PSE, 13). In his *Physica electiva*, Sturm mentions the alchemical school (the *Spagyric* school or that of the chemists (*Chymicorum*)) as the fourth main sect, omitting Neo-Platonism (PE I.1, preface, art. 3.5).

The case for eclecticism is made *ex negativo* by challenging sectarianism, and positively by bringing to light the strengths of the eclectic method. Concerning the repudiation of sectarian philosophy, its adoption is first of all not a necessity (*Sectariæ quippe Philosophiæ* primo *nulla est necessitas*, PSE 28). It is not the only option (PSE, 28f). Secondly, following one authority is not only unnecessary and not useful, it is even dangerous and damaging to the advancement and augmentation of the sciences.[178] In contrast to this, eclectic philosophers are defined as:

> those who did not want to hang on to every word of someone, nor swear by the words of one master; they had become acquainted with and collected for their storehouse everything that is true and good from the words and writings of whatever Teachers, not convinced by the authority of the person teaching but by the weight of the arguments and the force of the demonstrations; even more they added from themselves as much as they could; they made

175 Sectarians are "those who preferred to be led [rather] than to walk and [who] followed a leader leading the way with such effeminate affect that they place all effort in correctly perceiving and interpreting the teachings and hypotheses familiar to them, defending them tenaciously against those thinking otherwise [*contrasentientes*], fighting fiercely and refuting contrary opinions" (PSE, 3). "qui duci quàm ire malebant & præeuntem magistrum affectu fœmineo ita sequebantur, ut omne suum studium in dogmatibus ac hypothesibus sibi familiaribus recte percipiendis ac interpretandis, adversus contrasentientes mordicus defendendis, horumque contrariis opinionibus acriter impugnandis ac refutandis, collocarent."

176 "*Sectariam* itaque *Philosophiam* hoc nostro tractatu eam appellamus, quæ dogmata sua, imò haut rarò docendorum etiam ordinem ex unius Magistri aut Doctoris vel ore vel scriptis ita hausit pleraque omnia ut alia veriùs rectiusque dicta nuspiam repertum iri videatur ipsius asseclis" (PSE, 11f).

177 "eos [the sectarians] non magis de veritate eorum quæ dicta sunt, quam de authoritate ejus à quo dicta sunt […] esse solicitos" (PSE, 12).

178 "That way of philosophising [i.e., the way of the sectarians], which trusts but the authority of one leader, is not only not necessary, but not even useful, nay even dangerous and damaging to the advancement of the sciences" (PSE, 29). "Neque verò *non necessarius* tantùm, sed ne utilis quidem, imò perniciosus noxiusque scientiarum augmentis est ille philosophandi modus [i.e. the way of the sectarians], quo ducis unius authoritati fidere nimiùm."

> it their business (*sustinebant*) to see with their own rather than with someone else's eyes (PSE, 3f).[179]

The anti-authoritarian approach of eclecticism, following one's own reasoning rather than the dogmas of a certain teacher, is what allows one to appreciate truth in (almost) every philosopher's works. "Seeing with one's own eyes" means keeping an open mind, judging things by oneself. Moreover, the eclectic method acknowledges the feebleness of the human mind, its proclivity to err (*errare humanum est*, PSE, 23). In this it is more humble than sectarian philosophy which believes to find all the truths in one author. Since humans on their own tend to misjudge things or make mistakes, they depend on one another as correctives. What has been misjudged by some can and needs to be corrected by others insofar as they depart from an unprejudiced starting point. Engaging a multiplicity of people means opening up a multiplicity of perspectives from which natural phenomena can be viewed and explained. If past or present scientific theories show signs of error in that they do not meet the objective criteria that good hypotheses, on which they are based, have to meet (see below), they can be improved. The scientific study of nature, if it is to succeed, becomes a collective endeavour:

> By the name of Eclectic Philosophers, we understand in this whole treatise no others than those, who do not reject without a difference all the things that are found [*inventa*] and handed down [*tradita*] by the heads of different sects, and who are not so moved by the authority of one Leader that they do accept all of his utterances and *bons mots* [*dicteria*]; but who acknowledge the feebleness [*imbecillitatem*] of the human mind [*humani ingenii*], which makes it apparent that all depths of Nature and Reason are never exhausted by one or a few men; but that they can be viewed in part; and they persuade themselves that the sciences are to be advanced and stabilised by means of united powers [*junctis viribus*] and communicated advice [*communicato consilio*] (PSE, 7f).[180]

What matters for an eclectic is *what* is being said, and not *who* says something. Sturm makes this point drawing upon Vossius' *De philosophorum sectis* (1657/1658): "Therefore, if no one is free from error, it has to be considered [*videndum*] not so much who says something, as what someone says" (PSE, 59).[181] Science is also to be seen as a collective endeavour, because the amount of things to be studied

179 "qui ab unius ore pendere, aut in verba unius Magistri jurare nolentes, ex ore scriptisve Doctorum quorumcunque, quicquid veri bonique, non docentis authoritate, sed Argumentorum pondere ac demonstrationum ἀνάγκη convicti, cognovissent, in horrea sua colligebant, adeoque, de, suo subinde, quantum poterant addentes, oculis suis potius, quàm alienis videre sustinebant" (PSE, 3f). See also PSE, 6, 28.

180 "Eclecticorum Philosophorum nomine per totam hanc tractationem non alios nos intelligere, quàm eos, qui non rejiciunt promiscuè quæcunque ab aliis sectis earumque capitibus inventa sunt aut tradita, nec unius Ducis authoritate ita commoventur, ut ejus effata & dicteria promiscuè probent & propugnent omnia; sed humani ingenii imbecillitatem agnoscentes, quæ ab uno aut paucis quibusdam hominibus omnes Naturæ & Rationis abyssos exhauriri nunquam patiatur [ab aliis quoq]; verum ex parte perviderі posse, junctisq; viribus & communicato consilio scientias augendas & stabiliendas esse, sibi persuadent" (PSE, 7f). See also PSE, 23; PE I.1, preface, art. 3.3. For the feebleness of the human mind as motivating eclecticism, see Ahnert 2003, 605; Albrecht 1994, 322, 329, 354; Albrecht 2001, 945.

is endless (PSE, 16; PE I.1, preface, art. 1.6 & 2.3; Albrecht 1994, 318; Albrecht 2001, 945).[182] The "multitude of works and artifices of the divine Intellect and Omnipotence in this vastness of Nature is so great and [their] subtlety so abstruse" (PE I.1, preface, 2.3) that no scientist on her own not even the most ingenious one could exhaustively investigate it.[183] Only by means of a collective effort can progress be made. This is to say that some scientists specialise in one discipline, others in another, while at the same time sharing their results (ibid).

It should be stressed that although eclecticism means collecting what is good in other authors, it does not just aim at a mere collection of true or probable hypotheses, but instead at the formulation of a coherent system of natural philosophy (PE I.1, preface, art. 3.2; Albrecht 1994, 323). Eclecticism in Sturm's eyes explicitly invites the correction, emendation and augmentation of existing theories (PSE, 48, 69). It is a philosophical approach more useful and appropriate for the advancement of the sciences (*utiliorem & augmento scientiarum accomodatiorem*) than thinking in line with one author as the sectarians do (PSE, 14). Finally, Sturm takes Potamon of Alexandria to be the first eclectic philosopher, while at the same time pointing out that every great philosopher was an eclectic: Pythagoras, Democritus, Plato, Aristotle & Descartes (PSE, 44-55), as well as Francis Bacon (1561–1626) and Honoré Fabri (1608–1688) (PSE, 57-59).[184] Furthermore, according to Sturm, nearly all the ecclesiastical doctors and most of the church fathers were eclectics (PSE, 55f).

We have seen that eclecticism, according to Sturm, explicitly engages in scrutinising and selecting existing hypotheses. Undeniably, natural philosophy is to a large extent hypothetical for Sturm. Blackwell (1997, 384) also notes that "the elective method had of necessity to use reasoning by hypotheses, rather than certitude since human beings could not know enough to establish scientific certainty." Hence, the feebleness of the human mind, alluded to earlier, grounds to some extent both the eclectic method and the use of hypotheses. Sturm's reference to the feebleness of the human mind becomes intelligible against the background of his religion. In light of the fact that Sturm was a convinced Lutheran-Protestant—he even worked as a priest—we understand why he took the human mind after the Fall to be essentially corrupted. Harrison (2007, 56) points out that "Luther […] stressed the general incapacity of the postlapsarian mind in both its moral and intellectual operations." Sharing Luther's sentiment on human nature while holding a "more positive view of the sciences" (ibid., 97), Melanchthon saw natural philosophy, i.e., physics, as a way of partially emending the human condition (ibid., 99). Doing away with the kind of Aristotelian natural philosophy that Melanchthon had still endorsed, thinkers such as Bacon and Boyle maintained that the mind could to some extent be cured from its proclivity to err and be kept in check. While Bacon's outlook on the

181 "*Quod si nemo erroris expers, non tam videndum quis aliquid dicat, quàm quid aliquis dicat*" (PSE, 59). Vossius himself takes this from Seneca (Albrecht 1994, 252). For the eclecticism of Vossius, see Albrecht 1994, §23.

182 Blackwell (1995, 56) underscores that Sturm's eclectic approach is motivated by the idea that "[ŧ]ruth was collective and not the possession of any one man."

183 "Naturæ vastitate tanta sit multitudo, & subtilitas tam abstrusa" (PE I.1, preface, art. 2.3).

184 See also Albrecht 1994, 331; Albrecht 2001, 945; Blackwell 1995, 55.

world is Calvinist (rather than Lutheran), Calvin shared Luther's sentiments concerning the corruptness of postlapsarian human nature (Harrison 2007, 172, 59, respectively). In taking the postlapsarian human condition as a starting point for natural philosophy, Sturm then seems to follow Melanchthon and Bacon (and Boyle). Overall, Harrison has shown that it is a "mitigated scepticism" steering a middle way between the Aristotelians' and Descartes' epistemic optimism on the one hand and thoroughgoing scepticism one the other hand that drove an experimental (and eclectic, I might add) approach to natural philosophy (2007, 7, 81, 184).[185]

Hypotheses—at least in Sturm's last physics, the *Physicæ modernæ sanioris compendium* (CPMS)—are situated between observations by the senses, and, *pace* his earlier writings, certainties revealed by the demonstrative method. He points out that some things—bodies themselves, their effects, passions (that which they undergo), and phenomena—are obvious, in that they are observed by the senses, or by means of experiments including the use of newly invented instruments (CPMS, 2f). Some things—the particular natures and 'forms' of natural bodies, which are hidden from the senses—are merely conjectured rather than infallibly demonstrated (*supponuntur veriùs & conjiciuntur, quàm infallibiliter demonstrantur*) (CPMS, 3). Finally, some things—the proximate causes of observed effects as well as their way of operating—can be made certain, when phenomena and hypotheses align:

> Some things […] are deduced [*deducuntur*] from phenomena and hypotheses in such a way by means of the demonstrative method that due to the ubiquitous harmonising correspondence itself of the phenomena with the hypotheses and their [correspondence] with the former, by means of a certain demonstrative regress, the things that had previously been assumed in a way seemingly true [*verosimiliter*], ascend to [*evadent*] truth and certainty itself (CPMS, 3f).[186]

As is also clear from Sturm's three-step procedure in physics (outlined above) hypotheses play a central role in all theory-building. Natural philosophy starts from phenomena but aims at causal

185 Sturm's proximity to Bacon has been analysed in a forthcoming article of mine.

186 "quædam […] ex phænomenis & hypothesibus demonstrativâ methodo sic deducuntur, ut ex ipsa phænomenorum cum hypothesibus, & harum cum istis, consonante ubique correspondentia, per regressum quendam demonstrativum, ea quæ antea verosimiliter erant supposita, in veritatem ac certitudinem ipsam […] evadant" (CPMS, 3). The "demonstrative method" is in fact the geometrical method. This can be established both historically and philosophically. Historically, the German logician Johann Christian Lange (1669–1756) identifies Sturm's method as the "demonstrative mathematical method" (*methodus demonstrativa mathematica*) and places him in a line together with Antoine Arnauld (1612–1694), Pierre Nicole (1625–1695) (the authors of the so called *Port-Royal Logic*), Erhard Weigel (1625–1699), Baruch de Spinoza (1632–1677), and Samuel Pufendorf (1632–1694) (Lemanski 2018, 14). The work of Sturm referred to here is his *Universalia euclidea* (1661) —a work engaging with Euclid's *Elements* (see ibid, 19). Euclid in turn is often seen as the founding father of the geometrical method (Goldenbaum 2019, introduction). This as well as the fact Spinoza is mentioned makes it very likely that the "demonstrative method" is nothing other than the geometrical method. From a philosophical perspective the geometrical method has two essential components: analysis and synthesis (Goldenbaum 2019, sect. 1). The regress from phenomena to causes mentioned above is a clear indication of an analytic process. Indeed, part of the geometrical method was to replace nominal definitions of things with causal definitions (ibid., sections 1 to 3). The synthetic aspect of the geometrical method in Sturm is evident from the fact that he puts forth the most fundamental principles of nature first and builds his way up to ever more complex and particular aspects of nature.

explanations. Causes cannot be observed, but only approximated by hypothetical reasoning (PE I.1, preface, art 3.1). Hypotheses are developed, connected to one another, and put into a coherent, and consistent system. But how do we choose hypotheses? What criteria are we to apply?[187]

At the beginning of his preface to the PE, Sturm—possibly inspired by Boyle—identifies the criteria good hypotheses have to meet[188]: (1) They have to have a reasonable degree of possibility and need to be connected with the phenomena.[189] (2) They have to satisfy the circumstances that obtain.[190] (3) A hypothesis is preferable if it can accommodate more phenomena and the circumstances under which the most notable ones obtain.[191] (4) Simpler hypotheses are to be preferred.[192] Hence, Sturm avails himself of Ockham's razor in choosing between hypotheses. The reasoning behind this is that simple hypotheses mirror God's ways which are simple (PE I.1, preface, art. 3.1).[193] God as the wisest creator of nature (*Opificem naturæ Sapientissimum*) designed the world by simple means which ought to be taken into consideration when studying nature and its design. (5) Good hypotheses should neither conflict with phenomena, nor other established hypotheses, nor evident principles (PE I.1, preface, art. 3.2).[194] Finally, Sturm points out that (6) hypotheses have to satisfy not only the intellect but also the imagination and the senses (PE I.1, preface, art. 3.3).[195] Sturm's reasoning here seems to be that all natural phenomena pertain to the world of extension and its modifications like shape and motion. The senses and the imagination are first and foremost concerned with the realm of extended beings, and therefore to assess the aptness of hypotheses about natural phenomena, one needs to consult both faculties. Mere abstract conceptual reflection about nature, as was characteristic of the scholastics (or so Sturm thinks), is not sufficient, since worldly phenomena are most proximate to and accessible to the senses and the imagination (PE I.1, preface, art 3.3)

Let us now turn to the role of experiments. Sturm was among the first university professors in Germany to introduce experimental physics on an academic level.[196] Inspired by the experimental

187 It is an interesting question how hypotheses are themselves developed. However, as far as I can see, Sturm does not address this issue.

188 Note that my enumeration diverges from Sturm's in that I summarise his criteria more broadly. For Boyle's influence on Sturm's criteria for good hypotheses, see Albrecht 1994, 343f; 2001, 946; Albrecht 2004, 126. For Boyle's general influence on Sturm, see Dennehy 2009.

189 "aliquam saltem possibilitatem sanæ rationi conspicuam, & cum phænomenis connexionem ostentent" (PE I.1, preface, art. 3.1).

190 "circumstantiis utcunque satisfacere" (PE I.1, preface, art. 3.1).

191 "Tantò meliorem esse hypothesin, quantò pluribus phænomenis & primarii circumstantiis satisfecerit (cæteris interim paribus existentibus)" (PE I.1, preface, art. 3.1).

192 "una verò cæteris sit simplicior ac minus quæsita, suppositisq, paucioribus constans, hæc utique cæteris præferenda erit (PE I.1, preface, art. 3.1).

193 "Opificem naturæ Sapientissimum […] nunquam per ambages & operoso apparatu facturum fuisse, quod simpliciore modo nulloq negotio fieri potuit" (PE I.1, preface, art. 3.1).

194 "sui generis phænomenis tantùm accuratè respondere debet bona hypothesis, sed nec ab ullo alterius generis, quod compertum quidem sit & exploratæ certitudinis, nec ab ullo sanæ rationis evidenti principio dissentire" (PE I.1, preface, art. 3.2).

195 "non intellectui solùm, sed imaginationi quoque, si non etiam sensui satisfaciant" (PE I.1, preface, art. 3.3). For another take on Sturm's criteria for selecting hypotheses, see Albrecht 1994, 342f; Albrecht 2004, 126-128.

196 See the appendix to chapter 2, α.

method advanced by Boyle and before that by Bacon (Blackwell 1997, 383, 407; Albrecht 1994, 312), Sturm offered regular, albeit private, experimental *collegia*. His *Collegium experimentale sive curiosum* (1676/1685) reveals that Sturm was familiar with the state of the art of experimental science, putting to good use the new instruments available at the time, i.e., the telescope, microscope, air pump, diver's bell etc. (see also Albrecht 1994, 314). The use of instruments can again be taken as an attempt to overcome the weaknesses of postlapsarian human nature (here, the senses), as Harrison (2007, 203) shows in the case of Glanvill. Furthermore, we have seen that hypotheses—the basis of theory-building—are measured both against their congruence with phenomena and the results of experiments. Paradigmatic experimenters for Sturm are Caspar Schott (1608–1666), Robert Boyle, and Otto von Guerikke (1602–1686) (Wiesenfeldt 2004, 195).

Finally, Sturm's method conceives of natural philosophy as dynamic (see also Albrecht 1994, 329). It is in a state of constant transformation. To illustrate this point, Sturm compares philosophy as a whole to a ship: It is somewhat complete, though undergoing constant changes and mending. Both philosophy and a ship in use need to be fixed from time to time. Old, used-up parts––hypotheses in the case of philosophy, planks in the case of the ship––should be discarded and replaced by new parts fit to allow both to advance (PSE, 79). The study of nature is a never-ending project. It can only approximate truth, getting closer and closer. A research community, however, due to a shared workload, a multiplicity of perspectives, and mutual feedback provided by its members fares much better than an individual researcher left to herself.

We have already seen that the eclectic method discussed above is based on the "belief in the limitations of the human understanding" (Ahnert 2003, 615). No single natural philosopher has or could have exhausted and sufficiently explained the phenomena occurring in nature. Hence, what needs to be done is to diligently assess and select what is good and true in other philosophies, adding what needs to be added. New phenomena are being discovered and new competing hypotheses are being developed to explain them. They, too, need to be assessed. What is reasonable remains. What is not able to stand up to the demands of a good hypothesis will have to go. The experimental study of nature, too, progresses. New instruments are being developed raising new challenges to old hypotheses. The vastness and subtlety of nature (PE I.1, preface, art. 2.3), the manifold of its phenomena and the fact that causes cannot be observed but only conjectured add to the difficulty of the natural philosopher's task. It would indeed be temerity and arrogance to think that one has explained all that needs to be explained in nature (CPMS, 67). Therefore, Sturm is making a case for the open-endedness of natural philosophy. Its goal is to know oneself, to know the world, and ultimately to know God (PE I.1, preface, art. 4.5; CPMS, 7f; Leinsle 2004, 172). This goal is not reachable within the life span of a single human being, but is nonetheless a goal worth striving for. Even though a complete knowledge of nature will not be obtained even in the future, studying the

world and its perfection suffices to convince us of God's existence and constant presence. In this respect, Sturm's outlook on natural philosophy qualifies as a physico-theology.[197]

Having discussed Sturm's scientific method, let us now move on to study Sturm's natural philosophy itself, that is, his reworking of the scholastic matter-form theory, his occasionalism, his endorsement of finality in nature and eventually the problem of life. I will show how these elements are interconnected and make up Sturm's system of physics.

2. Natural Philosophy

In the preface to the *Physica electiva*, Sturm defines the science of physics (*physicam scientiam*) as natural philosophy (*Philosophiam Naturalem*) or the science of nature or natural things (*Naturæ seu rerum naturalium scientia*). Nature is defined as "that enormous fabric of this corporeal World" (PE I.1, preface, art. 1.1).[198] The study of nature is the study of all natural bodies, that is, of all bodies not created by us human beings. Bodies created in this latter sense are called artificial. The study of nature, however, can profit from the study of artifices as I will explain later (sect. 5).

Sturm's physics are all composed following a tripartite structure: the general part (*Pars generalis*) comes first. It deals with the universal and common principles of natural bodies. The second and special part (*Pars specialis*) reflects on the supralunary and sublunary world, i.e., the macrocosm and the geocosm. The third and very special part (*Pars specialissima*) treats of particular (classes of) bodies of the sublunary world distinguishing animate and inanimate bodies.[199] The organisation as well as the subject matter studied in Sturm's physics is classically Aristotelian, and Sturm quotes Aristotle more than any other philosopher in the PE. However, we will find an interesting reworking of Aristotelian physics inspired by the new mechanist philosophy (especially that of Cartesian origin) popular during Sturm's life time. While the presentation of Sturm's physics follows the Aristotelian-scholastic tradition, the actual content oftentimes deviates and embraces (*inter alia*) mechanism and occasionalism.

197 Lind (1992, 15-22) points out that physico-theologies were wide-spread in eighteenth-century physics. The purpose of physics as studying oneself, the world, and God is common to both Aristotelian and even (most) mechanist physics textbooks of late seventeenth-and eighteenth-century Germany (ibid., 58, 75).

198 "*Naturæ voce nihil aliud hîc intelligendo, quàm stupendam illam Mundi hujus corporei fabricam*" (PE I.1, preface, art. 1.1 unpaginated preface). See also CPMS, 1. I will focus on the PE consulting the PC, and CPMS when they offer material different from the PE, or when they add clarity to Sturm's discussion.

199 "Primus [liber], sive *Pars Generalis*, Universaliora & corporibus Naturalibus vel omnibus, vel plerisque, vel pluribus saltem diversorum generum, communia pertractabit; Secundus [liber], sive *Pars Specialis*, Mundum & sublunarem & Supra-Lunarem separatim contemplabitur; Tertius [liber], sive Pars *Specialissima*, Sublunaris Mundi particularia corpora, tum inanimata, tum animata seorsim consideranda sumet" (PE I.1, preface, art. 4.10). Cf. also the preface to the CPMS. Only the general and special part of the *Physica electiva* were published, the latter posthumously in 1722 by Christian Wolff. Gaab (2003, 77) has it that the third part of the *Physica electiva*, which Sturm's student Doppelmayr claims to be lost, can be found in manuscript form in the City Library of Nuremberg under the signature Will V553b and Will V 554c. However, having analysed these manuscripts myself they seem to be student notes on Sturm's lectures on (the very special part of) natural philosophy. They do not continue the work of the *Physica electiva*.

For Sturm, general physics is not confined to a mere description of natural phenomena but aims at reasoning about their causes: "in general physics, phenomena are not only known historically, but also scientifically reduced to their reasons [*rationes*] and principles" (PE I.1, 3).[200] Accordingly, in the first section of the *Physica electiva* as well as in the *Physicæ modernæ sanioris compendium*, Sturm discusses the principles and causes of natural bodies. In particular, he reconceptualises their internal principles, i.e., matter and form, and analyses their external principles, i.e., the efficient cause and the final cause.

I will commence the discussion of Sturm's natural philosophy by looking at the constitution of natural bodies, i.e., the internal principles of matter and form (sect. 2.1, and 2.2). This leads directly to the discussion of the external principles of natural bodies, i.e., efficient and final causes. Here, we will encounter Sturm's case for occasionalism (sect. 3), as well as his endorsement of finality in nature (sect. 4), the latter of which directs us towards Sturm's analysis of life and living beings (sect. 5).

2.1 The Constitution of Natural Bodies: Matter and Passive Forms

Approximating the Aristotelian-scholastic tradition, Sturm identifies matter and form as the internal principles of natural bodies (PE I.1, 3f; CPMS, 11).[201] Matter itself is an uncontroversial principle of physics (PE I.1, 10), that is, natural philosophers accept the existence of matter constituting physical reality. Debates between philosophers have mostly focused on the nature of matter (prime matter, atoms, etc.), but not on whether matter has a place in physics overall (see PE I.1, 23-40). Sturm supports the idea that (prime) matter is the same in all, even imperceptible bodies (corpuscles):

> all bodies of the World or of Nature consist of the one common prime matter, whole bodies, partial bodies, big, smaller, the smallest ones; each one, of course, put together and woven together out of imperceptible particles (PE I.1, 67).[202]

The essence of matter consists solely in extension: "if the nature of these imperceptible [*insensibilium*] particles themselves is examined [*inquiratur*] more subtly and abstractly, they [the philosophers] acknowledge that it is placed [*repositam*] in extension alone" (PE I.1, 234).[203] In this, Sturm follows Descartes but also Aristotle (PE I.1, 26-29).[204]

200 "phænomena in Physica Generali non historicè solum cognosci, sed scientificè ad rationes suas & principia reduci" (PE I.1, 3).

201 For the sake of simplicity, I bracket the discussion of privation. It does have a place in Sturm's physics, i.e., that of a mode of form (PE I.1, 10), the latter itself being reduced to a mode of matter, but privation does not play an important role in Sturm's physics as far as I can see.

202 "unâ communi primævâ materiâ constent omnia corpora Mundi seu Naturæ totalia, partialia, magna, minora, minima, nimirum ex particulis insensibilibus conflata singula & contexta" (PE I.1, 67).

203 "si subtiliùs adhuc abstractiusque in ipsarum harum particularum insensibilium naturam inquiratur […] in extensione unicè repositam agnoscant" (PE I.1, 234).

204 Bohatec (1912) presents Sturm as a mediator between Aristotelianism and Cartesianism though he overlooks Sturm's other commitments, in particular, his commitment to occasionalism, neither shared by Aristotelianism nor (orthodox) Cartesianism.

In his *Physicæ modernæ sanioris compendium*, Sturm argues in favour of the existence of prime matter by showing that otherwise the physical world cannot be conceived (CPMS, 12-14): We know that material objects, chunks of a certain kind of matter formed in certain ways such as, say, the form of shoes, are made out of other chunks of matter, such as (pieces of) leather. Leather is made out of the skin of animals etc. If we continue this line of reasoning, we must either accept that this reductive procedure is infinite, which is tantamount to admitting that reality is bottomless. Or we need to posit some ultimate foundation of physical reality called prime matter. Since a bottomless reality is absurd, prime matter needs to be posited to ground the physical world.

However, matter cannot be the principle of individuation of natural bodies, since they are all alike in this regard, i.e., they are made up of corpuscles whose essence is extension. Sturm hints at form being the principle of individuation:

> They [all bodies] nevertheless [despite the fact that they are made out of the same matter] differ from one another in various ways and, according to these observed differences, they are distinguished into different orders and classes by the human judgement, not blindly and merely seemingly, but on the basis of certain reasons and a consideration of the things themselves (although it may not everywhere be sufficiently circumspect and accurate). And they designate these differences by the name of *Forms* (PE I.1, 67f).[205]

It is true that Sturm is here merely citing a philosophical position on forms that can reasonably be ascribed to late Aristotelian-scholastic philosophers.[206] However, Sturm is *de facto* convinced that forms serve to individuate otherwise homogeneous prime matter. Within the framework of a matter-form model of whatever kind, nothing else could do the job: "As matter is common to all genera and species of natural bodies, so *forms* are different for individual ones, because they give them substance and [their] essential difference" (PC, 30).[207] However, in Sturm's physics form has no place *qua* incomplete substance. In this Sturm clearly deviates from a classic (late) Aristotelian-scholastic stance.[208] He reworks form into a mere mode of matter.[209] Sturm thinks that: "[T]he form of every

205 "multimodis tamen inter se differunt [omnia corpora] & secundùm observatas istas differentias in varios ordines classesq.; distincta sunt hominū arbitrio, non temerario tamen & merè-tali, sed certis rationibus ac rerum ipsarum consideratione (tametsi non ubique fortasse satis circumspectâ & accuratâ) adducto. Has differentias autem *Formarum* nomine insigniverunt" (PE I.1, 67f). Sturm does not say who "they" are, who use the term 'form' in this way. I suspect he has in mind scholastic philosophers in general, especially since for them form was serving as the principle of individuation of bodies (among other things). For form in (late) scholastic philosophy, see Des Chene 1996, ch. 3, and Pasnau 2011, ch. 24.

206 We should bracket the nominalist undertones. This has been pointed out to me by an anonymous reviewer of a paper of mine on Sturm's natural philosophy (Henkel 2021).

207 "Uti materia communis est omnibus corporum naturalium generibus ac speciebus; ita *formæ* singulis diversæ sunt, utpote quæ hisce substantiam & essentiale discrimen largiuntur" (PC, 30).

208 For the late-Aristotelian stance of forms as incomplete substances, see Des Chene 1996, ch. 3.

209 Sturm might have been inspired by the Paduan School in turning form into a mode of matter. For the Paduan school, see John Hermann Randall's *The School of Padua* (1961); Charles Schmitt's *Aristotle and the Renaissance* (1983); and Ernst Lewalter's *Spanisch-Jesuitische und Deutsch-Lutherische Metaphysik des 17. Jahrhunderts* (1967 [1935]). Lewalter (ibid., 14, 33, 48-50) points out that the teaching at Altdorf University was inspired by the Italian Aristotelian tradition, especially the Paduan School. He mentions authors such as Mirandulus and Caesalpinus. The influence of Italian (Averroist) Aristotelians at Altdorf

[natural body] is not a certain peculiar substance distinct from matter, or any absolute entity, but a mere mode subject to matter, an aspect and condition [*habitudinem*]" (PE I.1, 10).[210] The notion of form is hence mechanised following a Cartesian approach: "[T]he production of all forms involves nothing other than the variegated disposition, coordination of matter differently divided etc. and the peculiar union and correspondence [of matter] so ordered" (PE I.1, 118).[211] Sturm's source of inspiration was probably Descartes, who in the *Principles of Philosophy* (part I, art. 65, and 69, CSM I, 216f) had argued that shapes, sizes, motions, etc. are modes of matter. They do not exist independently of matter, i.e., they are not substances.[212]

Sturm is clear that forms *qua* modes of matter originate from motion. Different forms are produced by matter when it is moved in different ways:

> The production of all forms […] and indeed that division of matter and every motion cannot happen without the motion of the parts […]. The power [*Virtutem*] of the Creator and a Will [*Numinis*] most potently acting is revealed undoubtedly in the epilogue to chapter two [of PE I.1]. It is now obvious that the received origin and result of every form, of those that existed once, of those that exist now, and of those that will be imposed has to be ascribed [*ferendam*] to the same power [*Virtuti*] (PE I.1, 118).[213]

Sturm emphasises in the aforementioned epilogue to chapter two of the PE that matter is itself "*a merely passive Substance, which undergoes many things* [*pati multa*], *but can bring about* [*agere*] *nothing*" (PE I.1, 65).[214] The passivity of matter, its inability to actively move something applies to its parts as well: "That passive Substance of matter could neither divide itself, nor separate parts divided,

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University has been emphasised even earlier by Emil Weber in his *Die Philosophische Scholastik des deutschen Protestantismus im Zeitalter der* Orthodoxie, 1907, 9f, 16f, 47. Indeed, we find Sturm, professor of mathematics and physics at Altdorf University, mentioning Italian Aristotelians much more often than Spanish-Jesuit thinkers whose influence dominated at most other German universities. For the influence of Spanish-Jesuit Aristotelians at German universities, see Wundt 1938, and Lewalter 1967.

210 "formam cujusque [i.e., of natural bodies] non esse peculiarem quandam & materiæ contradistinctam substantiam, aut absolutam aliquam entitatem, sed merum subjectæ materiæ modum, respectum & habitudinem" (PE I.1, 10).

211 "formarum omnium productio secundum hactenus demonstrata nihil aliud involvat, quam materiæ varie divisæ, variam dispositionem, coordinationem &c. & sic ordinatæ [...] peculiarem unionem & correspondentiam" (PE I.1, 118). I take disposition in Sturm to designate nothing other than the organisation of certain parts of matter. Indeed, Des Chene (1996, 127) notes: "Form identified as organisation or disposition, or as activity or power, must be realised in a material subject. In Aristotelian terms, that is to make form a mode of matter, as Descartes did." This strikes me as precisely what Sturm did, too. See also Leinsle 2004, 175.

212 Retaining the notion of form while re-working (mechanising) it into a mere passive mode of matter is not unique to Sturm, it can be found, e.g., in Pierre-Sylvain Régis' physics as well (see Ott 2008a, 11), but also in English authors, such as Boyle, Charleton and Grew as Emerton (1984, 126-153) shows.

213 "formarum omnium productio […] & vero ista materiæ divisio, motioque, quæque sine motione partium fieri non potest […]. Virtutem Creatoris & Numinis alicujus potentissimè agentem in Epilogo cap. II indubiè arguerit; in propatulo nunc est, omnium formarum quoque, quæ vel extiterunt unquam, vel nunc existunt, vel extituræ sunt imposterum, originem & resultantiam eidem Virtuti, quæ sola nihil patiendo operatur, acceptam esse ferendam" (PE I.1, 118).

214 "*Primam istam sive communem omnium corporum naturalium materiam esse Substantiam merè-passivam, quæ pati multa, agere nihil possit*" (PE I.1, 65). See also PE I.1, 117, 158, 231f; CPMS, 20.

nor could one of its parts move another; because all the parts are of the same homogeneous merely-passive nature“ (PE I.1, 67).[215]

Since forms are mere modes or accidents of matter, their causal status cannot be any different from that of matter itself.[216] Forms are passive, too. Since matter is passive, it does not produce motion. It is not able to receive or communicate any form of activity:

> And not only is *Matter* an essentially merely passive thing, but it is moreover unable to receive activity or active potency. […] He [God] absolutely does not wish that Matter, which He wanted to be an essentially passive substance, is endowed with a faculty to truly act, which has to be equally maintained firmly and fiercely against our prejudices and preconceived notions (PE I.1, 66).[217]

As I mentioned before, forms are brought about by God through motion. Sturm distinguishes two different *designata* of the term: ‘motion’ either designates the mover or the thing moved:

> The term Motion usually indicates [*indigitari*] two very different things, the first of which is conceived [*concipitur*] in the thing moved, and is the received impetus itself, by means of whose force that [body] is transferred from the vicinity of some bodies to the vicinity of others, which in turn are at rest [*quiescentium*] or less moved [*minus motorum*]; the second is conceived in the mover as some force, as it were, which produces the impetus in the thing to be moved; so that in this way cause and effect, very different things, come under the same name of motion (PE I.1, 231).[218]

Since the cause and the effect of motion are distinct, matter (i.e., corporeal substance) being moved does not cause its own motion. Bracketing for the moment the case of the human mind (and angels etc.), which is located halfway between purely passive matter and God who is purely active (PE I.1, 67), there are only these two extremely contrary substances left to explain motion.[219] It is clear, for Sturm, that a purely passive substance cannot cause anything. Hence, only the one most powerful

215 “Passiva illa materiæ Substantia, nec seipsam dividere, nec partes divisas separare, nec pars ejus una alteram movere potuit; cùm partes toti suo homogeneæ ejusdemque cum ipso sint naturæ mere-passivæ” (PE I.1, 67). Needless to say, subtle matter is passive, too (PE I.1, 179, 191).

216 In contrast to (late) Aristotelian-scholastic thinkers, but in line with the Descartes and Boyle (see Des Chene 1996, 132), Sturm identifies modes and accidents.

217 “Non solùm autem rem essentialiter merèque passivam esse *Materiam*, sed activitatis aut activæ potentiæ recipiendæ prorsus incapacem. […] Materiam quam voluit [Deus] esse substantiam essentialiter passivam, nunquam volet agendi verè facultate præditam; quod pariter adversus mentis nostræ præjudicia & præcipites conceptûs firmiter mordicusque tenendum est” (PE I.1, 66).

218 “Vocabulo Motûs communiter indigitari duas res distinctissimas, quarum altera concipitur in re mota, & est ipse impetus receptus, vi cujus ista ex vicinia unorum corporum in vicinam aliorum, interea quiescentium aut minùs motorum, transfertur; altera concipitur in movente, tanquam vis aliqua, quæ impetum istum in re movenda producat; ut hoc pacto causa & effectus, res diversissimæ, eodem motûs nomine veniant” (PE I.1, 231).

219 “Hence, following reason only, we find two extremely opposed substances, the first of which is inert and unable to act, the second of which is the one acting most powerfully” (PE I.1, 66f). “Invenimus ergo solâ ratione duce […] Substantias duas extremè sibi oppositas alteram inertem & agere nesciam, alteram potentissime agentem.”

substance acts and causes motion in the world: "From this it can be inferred further that the efficient unique cause of every motion in matter is the same" (PE I.1, 67).[220]

The ontological status of motion is that of a mode of existence of (a chunk of) matter. Insofar as (a chunk of) matter is successively in different places relatively defined, it moves. However, the principle of sufficient reason (see below) requires that a ground be given for a bit of matter's existence in every place—and there are infinitely many in space—not to mention a cause bringing about the successive passing of matter through different places:

> Motion is not some separate [*peculiaris*] thing, but only a mode of existence of things moved; just as to be moved is nothing other than to exist not in one, but different places successively. This mode of existence solely depends no less than any thing's very existence on the divine merely discretionary power [*virtute*], because to exist successively in multiple places is in a way more than to exist *simpliciter*. Likewise, to exist successively in multiple vicinities or the continuation of existence are more than to exist once and *simpliciter*. Indeed, the conservation of things does not depend any less, but even more on the most powerful Will of GOD than their very existence (CPMS, 262).[221]

What we see is that an infinity with regard to the effect (i.e., the continuous existence of matter in an infinity of points of space) requires an infinitely powerful cause; namely, God. I will call this Sturm's *argument from spatio-temporal grounding*, which I will analyse in detail in the next section. For the moment it suffices to note that the passivity of matter, the grounding argument as well as the causal impotency of all finite minds point together towards God as the first and continuous mover of things moved. God is the substance defined by pure activity, and He is the only truly efficient cause of all motion in the world:

> Only God's most efficacious volition is that truly acting power [*virtutem*], which moves while not being moved, which rigorously speaking moves, which moves one body by means of another, and which moves the whole corporeal world, its parts, some by means of others, and in this way He brings about [*efficiat*] every one of the natural effects that happens in even the most remote corners of the Universe by means of His sole immediate power (PE I.1, 164).[222]

220 "promptè porrò hinc inferatur, hanc eandem omnis motûs in materia causam efficientem unicam esse" (PE I.1, 67).

221 "Non est motus res aliqua peculiaris, sed rerum motarum existendi modus tantùm, sicut moveri nihil aliud quam existere non in uno, sed in aliis aliisque successivè locis; qui modus existendi non minus quàm ipsa cujusq; rei existentia à virtute divina mere arbitraria unicè dependet, siquidem existere in pluribus successivè locis, quodammodo plus est quàm existere simpliciter; quemadmodum plus est existere pluribus successivè vicibus, sive existentiæ continuatio, quam existere semel & simpliciter, adeoque rerum conservatio non minus, sed magis etiam, à Voluntate DEI potentissima dependet, quàm ipsa earum existentia" (CPMS, 262).

222 "Solam Dei voluntatem efficacissimam esse virtutem illam verè agentem, quæ non-mota moveat, propriissimè loquendo moveat, unum corpus per alterum moveat, totum hunc mundum corporeum, partesque ejus unas per alteras moveat, hoc pacto quicquid fit effectuum naturalium in omnibus etiam reconditissimis Universi angulis, suâ solius immediatâ virtute efficiat" (PE I.1, 164).

We can conclude that the internal principles of every body are matter and passive forms. However, forms turn out not to be a true principle, but one of second rank. *Qua* mode, forms are derivative upon matter. Matter itself is identified as purely passive. As such it cannot bring about its own variegated modifications, i.e., passive forms, since the production of such forms hangs on motion, and the production of motion is an activity. Neither can matter ground its (continuous) existence in different points of space. The case of the human mind apart (as well as that of other immaterial beings such as angels, demons and the like), the only true efficient cause of motion is God.

2.2 The Role of Passive Forms

Since bodies do not differ with regard to prime matter of which they are ultimately composed—though they oftentimes differ with regard to higher orders of matter[223]—what renders a thing fit to 'bring about' certain effects cannot be matter. What makes the thing the very thing it is, is its form. Accordingly, Sturm has it that "form is the form of the thing formed, and it is that by means of which the thing is what it is, by means of whose aid it carries out its ordinary function [*officio*], according to that commonplace [*tritum*], *Form gives the being and acting* [*operari*] *of the thing*" (CPMS, 21).[224] He continues: a thing's form is that which "insofar as it is posited, the thing itself and its faculty to act [*facultas operandi*] are posited at the same time" (CPMS, 21).[225] Sturm gives the example of a clock: "Insofar as the form of the clock is posited, the clock itself is posited, as well as its proximate ability [*potentia*] to measure hours and factions [*scrupula*] of time" (CPMS, 21).[226] It is worth noting thatSturm's proximity to the scholastic terminology complicates the true meaning of his approach. After all, forms cannot easily be ascribed a faculty to act, and be said to be merely passive modifications of matter at the same time. Scholastic authors took forms to be inherently active.

223 Whereas prime matter in absence of any form is mere homogeneous extension for Sturm, higher orders of matter are formed, i.e., modified in a certain way. Form being the principle of individuation, this means that they are individual distinguishable bodies. They can enter into ever more complex compositions with other bodies. A shoe, for example, is composed of different bodies, different kinds of leather, cloth, cotton threads, cotton laces etc. All of these are themselves either complex, or are simple bodies made up of prime matter and one form only. If the former, they can be deconstructed further to either less complex bodies or again simple ones. This way the whole of physical reality comes down to prime matter and form, i.e. modifications of matter, where the former is ontologically prior to the latter.

224 "forma sit rei formatæ forma, atque id per quod res est id quod est, & cujus ope suo defungitur officio ordinario, juxta tritum illud, *Forma dat esse rei & operari*" (CPMS, 21). Emphasis in original. The commonplace is a reference to Aquinas. See also PE I.1, 94.

225 "quo posito res ipsa simul ejusque facultas operandi ponitur" (CPMS, 21).

226 "e.g. positâ horologii formâ ipsum ponitur horologium, ejusque potentia proxima dimetiendi horas & scrupula temporis" (CPMS, 21). Roughly, for Aristotelian-scholastic authors, the (substantial) form of a thing though in itself an incomplete substance actualises, individuates, unifies and brings about all effects of a thing once it is united with its underlying prime matter, which is an incomplete substance, too. Depending on the philosopher, the substantial form constitutes (at least partly) the essence, nature or *quiddity* (whatness) of the thing it informs. All actions of a thing depend on its essence or nature. The form of "clockness" united with prime matter makes the resulting thing a clock; the form of "tableness" united with prime matter makes the resulting thing a table. I cannot go into more detail about the intricate role substantial forms played in Aristotelian-scholastic thought here, let alone further complications associated with hylomorphism. Pasnau 2011, ch. 24 is an excellent source for the metaphysical and physical role that substantial forms played and what is at stake in discussions about them.

Sturm's notion of passive forms, therefore, seems a bit like a *contradictio in adjecto*. Can Sturm have his cake and eat it, too? That is, can he retain forms, speak of them at times like a scholastic, and at other times declare them passive modifications? I am not suggesting that Sturm's terminology is optimal. However, there might be a way of rendering his approach consistent.

First, I take Sturm's conception of forms as mere passive modifications of matter to be key. The question we then have to answer is how Sturm can help himself to some of the more active scholastic vocabulary concerning forms. We have seen before that God is the only true mover of matter. We might therefore be inclined to see Sturm's use of a faculty to act pertaining to forms as shorthand for God's actions. Forms as modifications of passive matter do not act, but God does. However, sometimes convention makes it easier to talk about the things themselves as acting. This should, however, not be taken as metaphysically rigorous.

Similarly, other occasionalist authors like Cordemoy allow that:

> since we do not always consider this first cause of motion [i.e., God], and because we dwell only upon what is seen—since often this is sufficient to allow us to understand what is happening—when we want to say why a certain body that was at rest begins to be moved, we are content to explain how it was in contact with another body that was in motion, *thus offering the occasion as the cause* (DCA, 97; my emphasis).

In every day situations, we can say that one body 'caused' the motion of another body even though, strictly speaking, this would turn out to be false for an occasionalist thinker. Analogously, Sturm can help himself to talk about a body's 'actions' in terms of its form as a faculty to act even though, again, strictly speaking, only God really acts. Returning to Sturm's example, the ultimate form of a clock is not its "clockness," but the figures, shapes, sizes, etc. of its corpuscles.[227] Their production hangs on motion instilled and conserved in matter by God.

Natural and artificial bodies alike take their operations from their internal principle(s): "artificial no less than natural bodies enjoy [*gaudent*] a certain internal principle of all their operations and passions" (CPMS, 37).[228] The nature of a thing defines and demarcates what a thing is able to do or undergo. Sturm explains that a thing's nature in turn is its internal set-up, its form: "The intrinsic nature of every natural body is nothing other than its form itself or its internal fabric or its disposition and particular and proper texture, viewed in matter of such a kind [the kind that it is]" (CPMS, 35f).[229]

227 Emerton focusing on the geometrical-mechanical or corpuscularian reinterpretation of form (1994, 126-153) gives an example from *A Physico-Chemical Essay* of Boyle—whose mechanist attitude to nature seems fairly well-established, and whose philosophy Sturm appreciated—speaking of forms as that "which gives it [a concrete entity] its being and denomination" prior to making it clear that they are only modifications and dispositions, i.e., arrangements, of matter (ibid., 144).

228 "artificialia non minus quàm naturalia corpora interno quodam principio gaudent omnium suarum operationum & passionum" (CPMS, 37). I will say more about this in section 4 of this chapter.

229 "Naturam ejusque corporis naturalis intrinsecam, nihil aliud esse quàm ejus formam sive fabricam internam sive dispositionem ac texturam particularem & propriam, in tali materia spectatam" (CPMS, 35f). Emerton (1994, 143-146) has pointed out that for someone like Boyle texture is tantamount to internal structure, and

In light of the absolute sameness and homogeneity of (prime) matter, only its (passive) forms, i.e., its proper modifications, can explain the characteristic 'operations' of a thing, and what changes the thing undergoes.

Understanding the role which the modifications of matter play for the functions a thing 'performs' brings us closer to understanding what finality in Sturm will look like: the fitness of a thing to (passively) perform certain functions, to lend itself to certain uses, and (if it is a natural body) to strive towards certain ends hangs on the things' mechanical forms, i.e., modes of matter. They are produced by motion. They are generated and conserved by God as the only true cause of the (continuous) existence of matter in motion, which is itself merely passive. The finality of nature owes its being to God's acting on and governing of the world. I will continue this discussion in section four. Let us now turn to Sturm's occasionalism.

3. Occasionalism

Discussing efficient causes in the general part of his physics, Sturm not only rejects the existence of truly efficacious secondary (natural) causes opting for occasionalism instead. He also presents himself as an attentive scholar of French occasionalism. He leaves no doubt that he is conversant with the occasionalist philosophies of Géraud de Cordemoy, Nicolas Malebranche, and Pierre Poiret (1646–1719) (PE, 137-139). He even showcases the occasionalism of his teacher Erhard Weigel (1625–1699), professor of mathematics at the University of Jena, probably to emphasise that occasionalism has made its way to Germany and *a fortiori* that it is endorsed by first class academics. I will not be arguing for this latter point though. What I will do instead is to show two things: (1) Sturm brings to the fore a novel argument in favour of occasionalism, which I will call *the argument from spatio-temporal grounding*. (2) Overall Sturm is best thought of as a second-generation occasionalist, that is, he places his occasionalist theory in a line of descendance originating from French early modern occasionalism. This means that many elements that help make the case of occasionalism in first-generation occasionalists, at least in Cordemoy and Malebranche, are present in Sturm. These include scepticism about sense-perception, the passive nature of matter (PN), the non-transference of modes (NT), the idea that causation has to be necessary or, inversely put, the claim that there is no necessary connection between (alleged) finite causes and their effect (NNC), as well as the role of involuntary bodily motions to rule out mind-body causation.[230] However, in contrast to his early modern occasionalist predecessors, Sturm presents very condensed versions of these arguments where the conclusions are stated with very little emphasis on the premises that lie behind them. I take this as

that this is consistent with Boyle's geometrical, or mechanical reconceptualisation of form not only as mode of matter but—in extending Descartes' use and building in turn on Gassendi—in seeing forms as structures of matter.

230 Most of the elements just mentioned are not by themselves sufficient to establish occasionalism, nor are they original to early modern philosophy overall. It is the way of tying these elemental claims together, and the way to argue on their basis that strikes me as characteristic of early modern continental occasionalism.

evidence that Sturm not only takes his readers to be familiar with some of the arguments for occasionalism, but also that it has been shown to some extent that these arguments carry some weight.

In line with Malebranche, Sturm's occasionalism is motivated by theological concerns about the compatibility of genuine secondary causes and God's omnipotence. However, diverging from Malebranche, Sturm does not endorse intramental occasionalism, i.e., occasionalism with regard to the creation of the mind's own ideas. The mind itself (in non-transient terms) remains an active substance for Sturm. Lastly and importantly, occasionalism for Sturm provides the necessary foundation for grounding natural philosophy.

3.1 The Argument from Spatio-Temporal Grounding

Sturm develops a novel argument that I will call *the argument from spatio-temporal grounding*. The argument is based on what I take to be three separate principles: (1) the infinity of time and space; (2) the principle of sufficient reason*;* and (3) the causal containment axiom. Most of these principles were (sometimes implicitly) held by Sturm's early modern contemporary philosophers. Sturm is not very outspoken about any of these principles, especially not about (2). However, it should be possible to ascribe to Sturm the acceptance of the principle of sufficient reason based on its widespread adoption in early modern thought. Let me first introduce each of the three principles in turn:

(1) *The infinity of time and space*: The infinity of time consists in the idea that an infinity of moments of time existed up until this point, i.e., the present, and—until God chooses to annihilate the world—it seems reasonable to believe that an infinity of moments of time will follow in the future. The infinity of space consists in the idea that there is an infinity of points of space.

Schechtman (2019) identifies three distinct notions of infinity in early modern philosophy: (1) quantitative infinity endorsed by Locke, (2) ontic infinity endorsed by Descartes, and (3) iterative infinity endorsed by Leibniz. Quantitative infinity, which I believe is what Sturm has in mind with regard to time and space, consists in something's having "infinitely many unit-parts" (Schechtman 2019, 1123). Quantitative infinity, in turn, can be distinguished according to infinity in multitude and infinity in magnitude: "A quantity is infinite in multitude if it has infinitely many parts, whereas it is infinite in magnitude if it has infinitely many parts and its measure is infinite" (ibid, 1123, n17). Time and space, for Sturm, are both infinite in multitude, since they are infinitely divisible. Space is infinite in magnitude, since it is itself infinite. Time is probably not infinite in magnitude given the Creation and Last Judgement. I will not analyse Sturm's understanding of time and space in detail. I will confine myself to saying this much: Concerning time, Sturm thinks that one cannot explain what kind of thing, or what its nature is (PE I.1, 230). Time is intimately linked to local motion, the latter of which (swiftness or slowness) is measured by time. Time, in turn, is measured by (planetary) motion (ibid.). Concerning space, it is worth noting that Sturm endorses Aristotle's and Descartes' plenism: the world is full of bodies. Empty space is an abstraction; as it were, an *ens rationis*, produced by the

mind (PE I.1, 64).[231] Since the essence of bodies is extension, and there is no empty space, space and extension (three-dimensionality) are coextensive.

(2) *The principle of sufficient reason*: For every x, if x exists, there will be a sufficient reason why x exists *in general* and why it exists *in particular* in the way it does. By 'in general,' I understand that there be a sufficient reason for why x exists *instead of* not existing. By 'in particular,' I understand that there be a sufficient reason for why x exists the way it does rather than in any other way. More specifically, why x exists at t_1 rather than at t_2, or continuously at times $T = \{t_1, t_2, t_3, \ldots t_n\}$ and why x exists at $\{x = 1; y = 2; z = 3\}$ rather than at $\{x = 0; y = 1; z = 2\}$ in space.[232]

(3) *The causal containment axiom*: For any effect *b* of a given cause *a*, it must be the case that *a* has at least the same degree of reality or ontological perfection as its effect *b*. Whatever is contained in an effect *b*, has to have been contained in its producing cause *a*. The motivation for this axiom comes from the absurdity associated with a possible world where the inverse held, i.e., where the effect *b* contained at least the same degree of reality or ontological nobility as its cause *a*, but could also contain more than was contained in its cause. If the effect *b* exceeded its cause *a* in ontological reality or perfection, than in (some) acts of causation something could be produced that was not somehow or

231 "So that we, therefore, end this quite empty Speculation about empty Space, let us acknowledge its Extension as clearly distinct from the Extension of Matter, the former of which [is] formed from the latter by means of a certain abstraction of our mind and imagination, and is even more as it were an *Ens rationis* which can nowhere be found outside our [mental] conception." "Ut igitur hanc de Spatio inani satis inanem Speculationem finiamus, agnoscimus equidem ejus Extensionem ab Extensione Materiæ plane diversam, illam quippe ab hac per abstractionem quandam mentis & imaginationis nostræ formatam, atque adeò, tanquam Ens rationis extra conceptum nostrum nullibi reperiundam" (PE I.1, 64).

232 One might immediately think of Leibniz as the inventor of PSR. However, Carraud (1997, 727-729) shows that Descartes not only possessed all the necessary building blocks to formulate PSR (although he did not), but he also de facto applied it—again without formulating it as an explicit principle though equating cause and reason (*causa sive ratio*)—as an extension of the principle of causation to account for the special case of God (ibid., 733f). The principle of causation states that "[c]oncerning every existing thing it is possible to ask what is the cause of its existence" (*Second Set of Replies to the Meditations*, CSM II, 116). As is well known, Leibniz would later explicitly formulate PSR. However, the history of PSR is more complicated than one might think and this has ramifications for the case of Sturm as well. Not only is it highly likely that Sturm knew of PSR due to his familiarity with both Descartes' and Leibniz's writings, he himself at least strongly approximates PSR even if he does not explicitly commit himself to it. In a striking passage discussing the nature of fire, Sturm not only rejects the scholastic approach of Honoré Fabri (1608–1688) who takes heat to be an absolutely irreducible and, hence, inexplicable quality residing in corpuscles, precisely because this begs the question of what heat consists in, and how it produces its effects, Sturm also makes the following remark: "And just as above the hypothesis of the Democriteans for explaining the gravity of elementary bodies was hence rejected, because they supposed gravity […] in the atoms themselves *without any reason* [*sine omni ratione*], so it will be less suitable when showing the nature and heating power of fire to suppose the nature of fire and the highest [degree of] heat in minima or points [i.e., corpuscles] themselves" (PE II.1, 103). Emphasis mine. "Et quemadmodum in superioribus Democritorum hypothesis pro gravitate corporum elementarium explicanda, ideo rejiciebatur, quod gravitatem […] in ipsis atomis sine omni ratione supponebant, sic in ignis natura & virtute calefactoria declaranda, tanto minus congruum erit, ignis naturam & summum calorem in ipsis minimis ac punctis supponere." I take Sturm's use of 'without any reason' (*sine omni ratione*) to be key here. Sturm's invocation of the case of gravity fulfils the same philosophical purpose as that which one can find in Leibniz (e.g., in the *Anti-Barbaric Physics*, in AG, 314) and later in Wolff's *German Physics*, §§84f (*Vernünftige Gedancken von den Würckungen der Natur* (Halle, 1723), 85), both of which are strong defenders of PSR. Explaining gravitation in terms of the irreducible property of heaviness in physical bodies counts for both Leibniz, and Wolff as violating PSR and taking refuge to the occult qualities of the scholastics.

other present before. This would amount to allowing creations or productions *ex nihilo* into the realm of natural causation, which is absurd, or utterly unintelligible for most early modern philosophers.[233]

The *argument from spatio-temporal grounding* works as follows: setting aside the possibility that matter could be annihilated by God's absolute will, matter or some part of it will continue to exist through an infinity of moments of time and through an infinity of points of space. It might not persist through infinity itself but at least through a number of moments of time and points of space converging towards infinity. A sufficient reason or ground needs be given both for matter's existence rather than its non-existence and for its particular persistent existence through (something converging towards) an infinity of moments of time and points of space rather than any other particular persistent existence.[234] Matter's existence, both in general and in particular, needs to be grounded. This is especially pressing, since—given its passivity—matter seems unlikely to be the kind of thing that could ground itself, occluding the question of whether genuine cases of self-grounding obtain in nature. However, the persistent existence throughout an infinity of moments of time and points of space requires a ground that has at least the same degree of ontological reality of the existence to be grounded. The ground of something existing infinitely in time and space, or converging towards an infinite existence in time and space needs to be infinite itself. That is, only a ground that is itself infinite will be able to underpin the existence of matter which spans over infinitely many points of time and space. This ground could only be God who is eternal, omnipresent, and infinitely powerful. Only He is able to sustain matter's existence and prevent it from falling into nothingness. God's infinity, however, is not of the same kind as the infinity of time and space. Following Schechtman's three notions of infinity, the infinity of time and space qualifies as quantitative infinity, whereas God's infinity qualifies as ontic infinity: "A being is infinite just in case it has the highest degree of reality, where *x* has the highest degree of reality just in case *x* is absolutely independent" (Schechtman 2019, 1134).[235]

Sturm argues as follows:

> Indeed, no one can have any doubt that the same matter existed constantly through infinite moments of time past, and continues to exist today and also in innumerable moments of time (as is plausible) to come; indeed this mode of existence with regard to different and infinite points in time, can at least also not be ascribed to a minor power, because to exist infinitely and to make something else exist infinitely, is something infinitely greater than to exist once, or to make something exist once or at an instant [*momentum*]. Hence, why do we not acknowledge that this other mode of existence needs to be posited [*ferendum*] by means of which matter or some other parts of matter exist in every moment now here, now

233 Andrea Sangiacomo has pointed out to me that Hobbes is an exception to this, in that Hobbes allows for the creation of accidents in natural philosophy.

234 I do not exclude causal relations from counting as grounding relations.

235 For the remaining notion of iterative infinity as exemplified by Leibniz, see Schechtman (2019, 1135-1138, 1141). I omit this notion, as it does not apply to our present discussion.

> there, now somewhere else, that is, which we observe being moved, must be attributed to the same highest and uniquely most efficacious volition? Because to make that something exists here, there, and somewhere else and in numerous parts of space successively is not something less, but much more than to make that it exists *simpliciter* (PE I.1, 161).[236]

Every moment of time that matter exists and it exists (*ceteris paribus*) continuously through a series of infinite moments of time, there needs to be a ground for its existence. The existence of the material world is not self-supporting, and so it needs existential support. Insofar as matter's temporal existence is infinite, its ground needs to be (at least) infinite, too. Grounding something requires a power to do so. Grounding something infinitely would hence require an infinite power. For Sturm, it seems to be clear that there can be only one such infinitely powerful ground which supports matter's indubitable existence since its creation, and that is God, the creator of matter Himself.

The creation and continuous existence of matter through time is due to God. However, matter also exists in an infinity of spatial points, or in a number of spatial points converging towards infinity. Again, (the act of) maintaining matter in existence in every (of the infinitely many) points of space requires an infinitely powerful being. Furthermore, since matter is not only stretched out in space infinitely, but can also be moved and thus acquire new (relative) spatial specifications, the need for a ground that is itself infinitely powerful (and thus capable of supporting matter in every point of space) is once again pressing. For Sturm, setting matter in motion and maintaining it in motion is the work of the divine will. Bodies cannot move other bodies. Neither the human mind nor any other finite spirit can set bodies in motion. Their will is finite and inert:

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236 "Nec illud etiam dubium esse cuiquam potest, ut eadem materia per infinita temporis præteriti momenta jugiter existeret, hodieque, & in futuri quoque temporis innumerabilia momenta (ut est credibile) existere pergat, adeoque hunc existentiæ modum quoque, puncta temporis diversa & infinita respicientem, non minori saltem potentiæ tribui posse; cùm existere infinities & facere aliquid infinities existere, sit quiddam infinities majus, quàm existere semel, aut facere quiddam semel vel ad momentum, existere. Quidni ergo agnoscimus, alterum quoque illum existentiæ modum, quo materiam aut partes aliquas materiæ, nunc hîc, nunc ibi, nunc alibi existere singulis momentis, h.e. moveri observamus, eidem isti summæ & efficacissimæ voluntati unicè acceptum esse ferendum? quandoquidem hîc etiam, facere quicquam hîc, ibi, alibi, spatiique partibus innumeris successivè existere, non minus quippiam, sed multò majus est, quàm facere id simpliciter existere" (PE I.1, 161). Sturm's teacher Erhard Weigel might have inspired this argument. In the *Theodicée* (1710), §384, Leibniz refers to an argument to prove God's existence set forth by Weigel. Leibniz summarises Weigel's argument as follows: "Mister Weigel, I say, communicated to his friends a certain proof of God's existence, which in fact took recourse to this continuous creation [of which Leibniz spoke before]. He said that the foundation of his proof was the starting point of the Pythagorean Table, *one times one is one*. These repeated unities were the moments of existence of things, each of which depended on God who, so to speak, resuscitates all things outside of himself in every moment. And since they fall in every moment, they always need someone who resuscitates them, which could not be anyone but God." "M. Weigel, dis-je, communiquait à ses amis une certaine démonstration de l'existence de Dieu, qui revenait en effet à cette création continuée. […] il disait que le fondement de sa démonstration était ce commencement de la Table Pythagorique, *une fois un est* un. Ces unités répétées étaient les moments de l'existence des choses, dont chacun dépendait de Dieu qui ressuscite, pour ainsi dire, toutes les choses hors de lui, à chaque moment. Et comme elles tombent á chaque moment, il leur faut tousjours quelqu'un qui les ressuscite, qui ne saurait être autre que Dieu." I took the cue to look at this passage in Leibniz from Schmaltz (2018 44). Schmaltz, however, does not acknowledge the relevance of Weigel's argument for Sturm, whom he does not even mention. The case of Weigel's occasionalism—touched upon by Specht in his commentary on Wolff's *Disquisitio philosophica de loquela* (2019, 102-105)—is in itself interesting and merits future research.

> Likewise that some matter existed, before which nothing had (pre-)existed, was the work of the most powerful will of the Highest Command […]; the continuation throughout all Ages [*Secula*] of that existence, which is not a different or a new thing, but the illustrious noteworthy mode of the same existence, requires the same [will] even more; Therefore, also a different mode of existing so that the same matter exists here, there, over there, and in any other of the infinitely many points of space cannot suppose a power less than that which is needed [*exigere*] to make it such that it existed *simpliciter*; indeed to bring it about that matter or any of its parts at rest before begins to be moved is the work of the infinite divine will alone, whose will and power [*velle & posse*] are one and the same: consequently, neither can a body move any other body, nor can any one of them be moved by the will [*arbitrio*] of the human mind or another finite spirit, because they clearly lack this will [i.e., the characteristics of the divine will]; they certainly do have a will [*voluntatem*], but a finite and inert one whose willing [*velle*] stands very far apart from the power (τω *posse*), which is testified by innumerable daily examples (CPMS, 49).[237]

Sturm stresses that the same matter continues to exist through time. It is not the case that "back in the days" some other matter existed that is non-identical to that which currently exists, although this does not preclude matter undergoing various modifications. Matter's creation as well as its continuous existence in infinitely many points of space must have the same ground: God's will. Not only is God the creator of matter, but He is also the only being capable of supporting matter's infinite existence in virtue of His own infinity, to wit, the infinite unconstrained power of His will. God is also the only being capable of supporting matter's existence when it is being moved around acquiring new spatial modifications. Of course, for Sturm, God is the only infinitely powerful being overall. Finite beings *qua* finite and *qua* being (if at all) only finitely powerful, could not ground matter's infinite existence. Were this otherwise, there would be a clear mismatch between cause and effect, and the grounding of matter's existence would be insufficient. In addition to the finitude that excludes our minds as well as other mental principles, such as angels or a world soul, from grounding matter's existence and changes, Sturm also refers to "innumerable daily examples" proving that in the case of our own minds there is a gap between having volitions and the power to realise these volitions.

Arguing for mind-body occasionalism (in this direction), Sturm might be thinking of the cases adduced by Cordemoy (see section 2.2 of chapter 1 of this dissertation). Remember that Cordemoy,

237 "Quemadmodum, ut materia aliqua existeret cujus ante nihil præextiterat, opus erat voluntate Summi Numinis potentissimâ, [...] multoque adeò magis eandem poscit illius existentiæ in tot Secula continuatio, quæ non est alia vel nova res, sed ejusdem existentiæ illustris aliquis modus; Ita, alium quoque existendi modum, ut eadem materia hîc, ibi, istic & in aliis spatii punctis infinitis existat, non minorem eâ potentiam supponere, quæ, simpliciter ut existeret, potuit exigere; adeoque efficere, ut materia aut ejus aliqua pars, antea quieta, incipiat moveri, solius infinitæ voluntatis divinæ opus esse, cujus *velle* & *posse* unum idemque sunt: consequenter, neque corpus ullum movere posse alterum, nec horum ullum aut mentis humanæ aut alius spiritûs finiti arbitrio moveri, quia illa voluntate planè carent, hi verò voluntatem quidem habeant, sed finitam & inertem, cujus velle quantum distet à τω posse, innumera exempla quotidie testantur" (CPMS, 49).

too, invokes the feebleness of our mind to move our body drawing on the case of drunkenness and old age among others. Even if the drunkard wished to walk in a straight line, his mind (its will) would still not be powerful enough to overcome the poor disposition, i.e., the intoxication, of the bodily machine to which it is united. Similarly, the old man might wish to run quickly, but, alas, his mind cannot surpass the decay, i.e., the old age, of the bodily machine, either.

At this point, one might wonder whether and to what extent Sturm's *argument from spatio-temporal grounding* differs from the argument that God's conservation (of the world) is but continuous creation (CCC). Lately, CCC has received considerable scholarly attention (*inter alia* Lee 2008/2020; Nadler 2011; Ott 2008a; Sangiacomo 2017; Schmaltz 2017a). Its most prominent appearance is in Malebranche's *Entretiens sur la Metaphysique et la Religion* (dialogue seven). Nadler (2011, 127, n8) points out that Malebranche is likely to have been inspired by La Forge's *Traité de l'Esprit de l'Homme*. In a nutshell, CCC argues that God not only creates the world *ex nihilo*, but that He also continuously conserves its existence, hence preventing its fall into nothingness.[238] Conservation is thought to be the same as creation in that it is fully determinate. God not only creates-conserves substances but also modes. He not only wills a thing to exist, but also to exist at a particular time, in a particular (relatively defined) place, and in a sufficiently determined way. Since God's will is omnipotent, and there are no genuine cases of causal overdetermination in the world, finite substances do not contribute at all to the happenings in the world. Everything flows from God's will in accordance with His world-plan, that is, His divine decrees.

Despite the fact that CCC and Sturm's *argument from spatio-temporal grounding* argue for occasionalism, they do so in different ways. To be sure, they have commonalities, such as the intuition that, as Ott (2008a, 12) puts it, "physical reality is fully determinate." However, CCC starts from God, from the fact that He has to will the world to persist in order for it to do so, and the fact that He has to will the world to exist-persist in a particular way. *The argument from spatio-temporal grounding* starts from the created world and the fact that it is unable to ground its own continuous existence, the latter being indubitable given our experience. Furthermore, Sturm's argument makes a case for God's grounding of the world based on the belief that the world's quantitative infinity in multitude and magnitude of space and time needs a ground that is infinite itself, though in a different respect (ontic infinity). Infinity plays no role in CCC. In addition, CCC takes the existence of God as a given. In contrast, *the argument from spatio-temporal grounding* has the advantage of approximating a physico-theological proof of God's existence alongside establishing occasionalism. The (indubitable) existence of matter in time and space is infinite. It needs to be grounded by a being that is itself infinite, but the only being whose idea involves the required ontic infinity is God. Only the idea of God entails infinite

238 In the discussion to follow, I will talk about the world instead of matter. I do not think that this is a huge shift, given that the world is just the whole of matter though probably 'world' accentuates its cohesive structure or organisation.

existence and infinite power which are necessary to ground matter's infinite existence in time and space. Hence, God exists.

Finally, from a methodological standpoint, CCC has an *a priori* flavour to it whereas *the argument from spatio-temporal grounding* has an *a posteriori* flavour to it. The former reflects on the nature of the divine will which contains no indeterminateness or vagueness. God does not create things in a state of superposition, but in a concrete spatio-temporal and existential way. Even if the world did not exist, God would produce it in a concrete way if He chose to create it at all. He could not do otherwise than create it in a concrete determinate way. CCC would be valid for all possible worlds including non-existent ones. In contrast, *the argument from spatio-temporal grounding* starts from the given existence of the actual sensible material world in time and space. The particular existence of the world, spanning over an infinity of points of time and space, then leads to more abstract reflections about how this existence is grounded. To be sure, we do not experience the world as infinite, but we notice that matter constituting the world is everywhere. Also, we experience the world as physically stable. It exists continuously, it does not just vanish before our eyes only to reappear moments later. We can conclude that despite their similarities, CCC and *the argument from spatio-temporal grounding* make a case for occasionalism in different ways.

3.2 Second-Generation Occasionalism

In his *Compendium physicæ*, Sturm makes it clear that concurrentism is the wrong way of understanding causation in natural philosophy. Freddoso defines concurrentism as follows:

> According to concurrentism, a natural effect is produced immediately by *both* God *and* created substances, so that (*pace* occasionalism) the latter make a genuine causal contribution to the effect and indeed determine its specific character, but (*pace* conservationism) they do so only if God cooperates with them contemporaneously as an immediate cause in a certain 'general' way which goes beyond conservation and which makes the resulting cooperative *transeunt* action to be in all relevant respects the action of both God and the secondary causes. This cooperation with secondary causes is called God's *general concurrence* or *general concourse* (1991, 554; Emphases in original.).[239]

Sturm does not offer much by way of argument against concurrentism, but instead outrightly rejects it as inconsistent with God's glory (*Divinæ gloriæ inadæquatum*) (CPMS, 58). Furthermore, Sturm complains that it is a causal model introduced into the schools by learned men more accustomed to philosophise about natural effects *metaphysically* rather than *physically*, and that it does harm to students (CPMS, 57f).

239 In this article, Freddoso also goes into the technical details of how to properly define causes and causation in concurrentism as well as arguments in its favour. For an early modern account of concurrentism, see Luis de Molina's *Concordia liberii arbitrii* (1588), disputation 26, pp. 167-174.

Endorsing occasionalism as a better, and more pious way to conceive of causation (see PE I.1, dedicatory letter), Sturm also avails himself of a form of reasoning he would find in French early modern occasionalists, to wit, Cordemoy, Malebranche, and Poiret.[240] While Sturm brings into play a new argument—*the argument from spatio-temporal grounding* (sect. 3.1)—to establish occasionalism, he otherwise confines himself to briefly stating the constitutive elements of occasionalism (most of them are *ex negativo*) present in these (and other) French thinkers. Most of the time, these elements are not brought into an argumentative form, and remain rather suggestive in Sturm's physical writings. One is inevitably led to think that Sturm considers the case of occasionalism made by his predecessors to be already quite convincing. I will take a look in turn at each of the elements Sturm touches upon, and then show how they support occasionalism when they are connected.

(1) Scepticism about sense-perception: Sturm shares his predecessors' scepticism about sense-perception as supporting judgements about causal relations obtaining in the world. When we think that one body moves another body upon impact, we believe more than we actually see (*Hîc plus videre nos credimus, quàm reverà videmus*) (CPMS, 50). We do not actually observe that one moving body produces motion *de novo* in another body. Cases of collisions of bodies, indeed, cases where the true cause of motion is sought need to be decided by the mind's capacity of judgement (*mentis judicio decernendum*) (CPMS, 50). This, in turn, reveals that only the same cause which moved the first body brings about motion in a second, and a third body upon impact (CPMS, 50f). The same holds when we think that the mind moves the body with which it is united:

> Again we attribute more to the inner consciousness of the mind [when we think that it makes the hand, the feet and other parts of the body with which it is conjoined move] due to some precipitated judgement than it observes in the truth itself of the thing, if one has understood the admonition to consider the thing a bit more carefully (CPMS, 51).[241]

(2) The passive nature of matter (PN): Sturm points out on a number of occasions that matter itself is passive: "That prime or common matter of all natural bodies is a merely passive Substance, which undergoes many things [*pati multa*], but can bring about [*agere*] nothing" (PE I.1, 65).[242] By itself the claim that matter is passive does not establish occasionalism (Sangiacomo 2020, 508). The passivity of (prime) matter was the standard position in late-scholastic and early modern philosophical debates. Authors as different as Suárez, Descartes, More, and Locke endorsed it, but their theories of causation and natural philosophy more generally look very different. Sturm is in agreement with these authors on the passivity of matter, but argues for it in a different way, refusing to make any of the

240 Hence, I disagree with Sangiacomo's verdict that "Sturm does *not* reach his occasionalist conclusion by building on the same argumentative strategy used by other Cartesian occasionalists (Malebranche included) (2020, 506). My emphasis.

241 "Iterum plus internæ mentis conscientiæ, præcipiti quodam judicio, tribuitur, quàm in rei veritate ipsa deprehendet, si cautius rem paulò æstimare monita didicerit" (CPMS, 51).

242 "*Primam istam sive communem omnium corporum naturalium materiam esse Substantiam merè-passivam, quæ pati multa, agere nihil possit*" (PE I.1, 65). See also PE, 117, 158, 231f.

philosophical commitments they make. In reducing forms to mere (passive) modes of matter, Sturm develops a case against his late-scholastic predecessors, such as Suárez, who argued in favour of substantial forms as the principle of activity in matter.[243] Furthermore, contra More, Sturm rejects an active (for More, a hylarchic) principle other than God present in nature (PE I.1, 181f, 191f). What is more, contra Leibniz (and Schelhammer) and siding with Boyle, Sturm does not believe in nature itself as an active agent (see the Sturm-Leibniz Correspondence).

(3) Non-transference of modes (NT): Sturm works with a substance-mode ontology. Anything that exists is either a substance or a mode. While substances like matter, mind, and God in the most rigid sense subsist independently of anything else, and are subjects of predication, modes or accidents inhere in or are predicated of substances. The existence of modes is contingent upon the existence substances. In contrast to Late Aristotelian-scholastic thinkers, Sturm nowhere indicates that he allows for real accidents as located in between substances and modes. Modes *qua* modes, i.e., *qua* dependent beings do not migrate:

> it is impossible to understand [*conceptu*] in what way motion, a mere accident or a mere mode of existing, can migrate from one subject into another without any substantial vehicle, and it is not easier said what that vehicle should be by mediation of which [*quo mediante*] [motion] is transferred (CPMS, 257).[244]

A mode migrating from one substance to another, and hence at least for a short period of time existing independently of the substance it belonged to previously, violates the underlying logic of 'mode,' precisely because modes are not capable of independent existence. If they were, they would be substances. That, however, would not solve the problem, because then a substance would have to inhere in another substance. But substances *qua* substances do not inhere in other substances.[245] The non-transference of modes is again relatively uncontroversial. Sturm's contemporaries of different philosophical camps, as well as late Aristotelian-scholastic authors accept NT. Unlike Sturm, however, Late Aristotelian-scholastic thinkers do not equate accidents and modes (Des Chene 1996, 132). Distinguishing between real accidents, and those that are called 'adverbial,' they only identify the latter with modes (ibid, 113).[246] And in general they think that neither of the two types of accidents can "'migrate' from one subject to another" (ibid., 146). In the absence of active principles such as nature

243 Des Chene (1996, 122f) points out that the reduction of forms to modes of matter as well as the Platonists' stance to free forms from matter entirely were—in the case of the Late Aristotelians he discusses, such as Suárez, Fonseca, Toletus, Abra de Raconis and others—considered extreme positions to account for the relation between matter and form.

244 "impossibile est conceptu, quo pacto motus, merum accidens, aut merus existendi modus […] ab uno subjecto in aliud absque vehiculo aliquo substantiali, migrare queat, neque facilius dictu, quodnam aliud vehiculum sit quo mediante transferatur" (CPMS, 257). See also PE I.1, 231.

245 Régis is an exception to this in that he takes (formal) motion to be a substance inhering in bodily substances (Ott 2008a, 6f).

246 Des Chene (1996, 113) explains the difference between real and adverbial accidents as follows: "A real accident is a feature of the world that, though neither a complete individual in its own right nor capable of conferring existence of itself (like substantial form), serves as the basis for further specification, as quantity for figure, or heat in general for intensities of heat. An adverbial accident is such a specification."

itself or substantial forms inhering in matter activating the latter's potency to move, the source of the production of motion has to be sought elsewhere, or so thinks Sturm.

(4) No necessary connection (NNC): Sturm agrees with his occasionalist predecessors that causation has to be (logically) necessary, such that a cause invariably brings about its effect:

> according to innumerable and the most familiar examples it is very evident that a certain effect can depend upon another [thing] of necessity so that without the latter [i.e., the cause] the former [i.e., the effect] would never have come forth, nor would the latter [i.e., the cause] deserve to be rightly called the efficient and truly productive cause of the former [i.e., the effect] (PE I.1, 157).[247]

The connection between cause and effect has to hold invariably, without aberration: when a cause is posited, the effect must follow. Conversely, if it can be conceived that the effect is not to follow, what is alleged to have brought it about is not its true cause. Indeed, Malebranche has put the idea in a clear-cut form in his *Recherche de la Verité* (VI.2.3): "A true cause as I understand it is one such that the mind perceives a necessary connection between it and its effect" (LO, 450). It is clear that Sturm is familiar with the work of Malebranche since he explicitly cites from book six, part two, chapter three of Malebranche's *Recherche* (PE I.1, 137f). According to Malebranche (and Sturm), occasional causes are not true causes, because the required necessitation between an occasional cause and its effect is absent. For example, I can conceive, and it oftentimes happens, that my volition to bring about a certain motion in my body fails to bring about such a motion. Hence, my will is not the true cause of my bodily motions but only an occasional cause inciting God to act. It should be noted that to claim that causation is necessary, and to claim that no such necessity holds between natural causes and their effects is not the same. However, Malebranche is committed to both and so, I believe, is Sturm. Nonetheless, believing that causation in general must be necessary does not automatically commit one to occasionalism. Régis, for example, takes causation to be necessary, but opts for concurrentism (Ott 2008a, 10f), or, according to Sangiacomo (2018b), neither concurrentism nor occasionalism.

(5) Involuntary motions: As far as the relation between the mind and the body is concerned, Sturm calls it a prejudice to attribute an active force (*vis activa*) to the mind to move the body (CPMS, 29f). The mind is conscious of an active force pertaining to it (*anima verò nostra* […] *vim activam sibi inesse sciat*) (PE I.1, 231). This active force, however, is restricted to immanent activities such as thinking and willing (*eam* [the *vim activam*] *tamen in volendo tantùm & cogitando positam probè novit*) (ibid.; see also CPMS, 20, 30). In contrast to French occasionalists such as Malebranche (and possibly Cordemoy), Sturm does not opt for *intramental* occasionalism. The mind remains capable of

247 "innumeris maximeque familiaribus exemplis abundè constet, effectum quendam ab alio eâ posse dependere necessitate, ut absque hoc ille extiturus nunquam fuisset, nec tamen hoc illius causa efficiens & verè productrix ullo jure dici mereatur" (PE I.1, 157)

producing and assenting to or refraining from its own ideas.[248] Sturm does hold, however, that experience testifies to our mind's feebleness, and that this constitutes an argument in favour of occasionalism. Our mind is simply unable to make our body move because it is too weak:

> Since the will [*voluntas*] of our mind cannot even (re-)move a particle sitting on [our] clothes or on the body itself from [its] place by means of its own force [*virtute*], that is, by means of its bare willing (whose feebleness the mind is itself very much aware of [*conscia*]), it can even less [be able to] move the innumerable particles constituting the animal spirit (CPMS, 261).[249]

Furthermore, we observe bodily motions which we cannot influence by means of our mere willing to do so: "our mind although it knows that active force [*vim activam*] belongs to it […] clearly has no force to accelerate, slow down, stop etc. at will either the beating of the heart or contractions of the belly or of the intestines within its body" (PE I.1, 231).[250] In using the case of involuntary motions, Sturm follows *inter alia* Cordemoy and Malebranche for whom these cases raise doubts about whether the mind can be said to be the true and efficient cause of bodily motions.

These elements can be tied together in a coherent argumentative form in the following way: Sense-perception cannot be used to prove the causal efficacy of secondary causes like finite minds and bodies. We perceive bodily collisions, but we do not perceive motion flowing from one body into the other. We notice that when we will our arm to move, this usually comes about, but we fail to grasp how this can be done. What sense-perception brings to light is correspondences: *Whenever x, then y*. Sense-perception, however, cannot establish causal relations: *x causes y*. Reason needs to be used to uncover causal relationships. Contemplating matter, whose essence is extension, reveals its passivity. Forms *qua* mere modifications of matter are as passive as matter. Since causation is an action, matter *qua* passive is unable to cause anything. Bodies *qua* merely material cannot cause other bodies to undergo changes. Furthermore, even if bodies could cause other bodies to move, this would raise the question of exactly how this can be done. Motion is a mode, and as such is dependent on the substance in which it inheres. Transfer of motion *qua* mode violates the very notion of what it is to be a mode. A motion, if it were it to exist independently of something else, would either be a real accident or a substance. Real accidents are banned from mechanist early modern metaphysics. They are taken to be obscure and their metaphysical status is thought to be dubious. Turning a mode (when it is

248 For Cordemoy on intramental occasionalism, see Henkel 2017; Ablondi 2005a, ch. 3.iv; Nadler 2011, ch. 8. For Malebranche, see Nadler 2001, ch. 4.

249 "Nam cùm animæ nostræ voluntas ne quidem unicum pulvisculum, vestimentis aut corpori ipsi insidentem, suâ solâ virtute, h.e. per nudum suum velle de loco movere possit (cujus imbecilliatis anima sibi ipsi nimis conscia est) multò minus innumerabiles pulvisculos, spiritum animalem constituentes, movere possit" (CPMS, 261). Cf. Malebranche *Search after Truth*, VI.2.3 (LO, 449): "Now it appears to me quite certain that the will of minds is incapable of moving the smallest body in the world."

250 "anima […] nostra, tametsi vim activam sibi inesse sciat […] nullam planè vim habeat […] intra corpus suum, aut pulsûs cordis, aut ventriculi intestinorumque contractiones pro lubitu accelerandi, retardandi, sistendi &c." (PE I.1, 231).

'externalised') into a substance smacks of miraculous intervention. And even if a mode were turned into a substance to become part of another substance, this would require predicating a substance (here, motion) of a substance (the second body), thereby violating the very notion of substance. Turning motion—taken to be a substance in this hypothetical scenario—back into a mode upon its 'flowing into' the second body would again seem miraculous, and would also raise questions about the very identity of this mode of motion passed on upon bodily collision. Bodies are ruled out as true causes. Given a commitment to substance dualism, changes in the natural world could, hence, only be brought about by mental substances. There are two kinds of mental substance, finite and infinite. Finite mental substances, that is (bracketing angels) human minds, strike us as feeble. Involuntary motions show that the mind cannot manipulate certain bodily processes at will.[251] Furthermore, causation must be logically necessary. It is conceivable, and, hence, possible for a finite mental substance to fail to bring about its effect. Therefore, it cannot be a true cause. Metaphysical analysis rules out any finite substance as a true efficient cause. The only substance left to be causally efficacious is God. Accordingly, Sturm concludes and emphasises that: "*In the whole of corporeal Nature, there is no force* [*virtutem*], *or power* [*potentiam*] *or faculty* [*facultatem*] *truly active, truly operative, truly efficient* [other] *than the celebrated efficacy of the great Divine will*" (PE I.1, 192).[252]

4. Final Causes

Sturm's physics follow the scheme of the Aristotelian four causes. He first discusses matter and form, which (following Du Hamel) he argues should be understood as the parts composing material objects rather than as causes (PC, 16).[253] Sturm then turns to the efficient and final cause. Efficient causation leads him to discuss and argue for occasionalism. We are left with an examination of final causes. However, finality foreshadows the way Sturm reconceptualises forms, and the role they play in passively performing certain functions. In this section, I will analyse the role final causes play in Sturm's natural philosophy. In the next section, I will pick up the discussion of forms from section two in explaining how living beings are to be understood, and how they differ from non-living beings, according to Sturm. Life is the domain where the three grand hypotheses constituting Sturm's natural philosophy, i.e., mechanism, occasionalism, and finality, are put to the test.

251 There is a certain inconsistency concerning the invocation of sense-perception or sense-experience in this line of reasoning. Authors like Sturm, but also Malebranche and Cordemoy, do believe that sense-perception is insufficient as a basis for making causal judgements. However, they do believe that sense-perception is sufficient for proving the feebleness of the mind to manipulate certain bodily processes like one's heart beat. In short, they think sense-perception is suitable to prove the absence of a causal connection, but they do not think it can prove the existence of a causal relationship. It would seem more consistent to hold that sense-perception is either a sufficient means to judge causal connections *tout court* or not at all.

252 "*Nullam in universa Natura corporea virtutem esse, aut potentiam, aut facultatem, verè activam, verè operativam, verè-efficientem, quàm celebratam toties Divinæ voluntatis efficaciam*" (PE I.1, 192). Emphasis in original.

253 A similar distinction of causes into internal (material and formal cause) and external (efficient and final cause) can also be found in Clauberg (Platt 2020, 152). It seems to have been rather popular among some seventeenth-century academic philosophers.

Perhaps surprisingly, Sturm adopts the classical (late) Aristotelian-scholastic position which conceives of the world and its constituent parts as aiming—knowingly or unknowingly—towards certain ends (see Des Chene 1996, ch. 6). Sturm himself ascribes this position to Aristotle and Galen, citing its reception in their respective schools (PE I.1, 206). Thus, in opposition to philosophers such as Descartes, Sturm admits final causes in natural philosophy.[254] In the chapter dedicated to final causes in the PE, Sturm presents to the reader numerous phenomena which are supposed to back up or at least make her inclined to accept finality in nature, as well as the necessity of studying it. Sturm mentions *inter alia* bodily organs fulfilling certain functions—the eyes are there to see; the heart pumps blood through the body—and the well-adaptedness of certain animals. For example, he cites the fact that certain types of birds have well-adapted wings, the lightness of certain birds' bones, or the fact that certain birds (like geese, ducks, or storks) are equipped with different types of beak. Sturm then provocatively asks:

> Indeed, who, based on the few things that we have presented here and through the preceding phenomena, does not see as if placed in the light itself of the Sun that all natural and artificial bodies, matter and form, as well as other conditions that are particularly proper and peculiar to them, respect certain uses, scopes and ends, and even more that the consideration of final causes in Physics is actually most useful? (PE I.1, 205).[255]

For Sturm, ends and uses are an inextricable part of both the world as a whole and its parts (PE I.1, 226). However, Sturm diverges from previous authors in thinking that ends and uses are not really distinct, but can be conceived as two sides of the same coin (PE I.1, 218f; CPMS 62-64).[256] The end designates the intentions of the maker of a thing whereas the use designates the function of the thing used:

> It can in no way be denied that that which is the use of someone's work already done (e.g., of a clock to distinguish time in hours, minutes etc.), was the end or scope in the mind of

254 Descartes famously rejects the idea that natural philosophy should be treating of final causes: "When dealing with natural things we will, then, never derive any explanations from the purposes which God or nature may have had in view when creating them <and we shall entirely banish from our philosophy the search for final causes>" (*Principles of Philosophy*, I, §28, CSM I, 202f). The part of the quotation in diamond brackets is an addition from the (1647) French translation of Descartes' originally Latin work.

255 "Quis denique ex his paucis, quæ hoc & præcedentibus phænomenis enarravimus, non in ipsa quasi Solis luce positum cernat, omnia naturalia æquè, ac artificialia, corpora & materiam, & formam aliasque, conditiones, cuique proprias præsertim & speciales, certos usûs, scopos & fines respicere, adeoque finalium quoque causarum considerationem in Physicis etiam utilissimam esse?" (PE I.1, 205).

256 Ends and uses have, of course, been distinguished by previous authors, and this terminological distinction has a long history dating back to (at least) Aristotle. The details of such a complex story are beyond the scope of this chapter. Andrea Sangiacomo has suggested Suárez's account to me, which I will briefly sketch as a contrastive point, here: In his *Disputationes metaphysicæ* 23, Suárez distinguishes ends and uses in that the former are that on account of which something comes to be or is ("finis esse dicitur *propter quem aliquid fit*, *vel est*) (DM 23.1.7) whereas the latter are means to achieving an end, or effects of the end (DM 23.3.5). This account is complicated by the fact that in long chains of striving for a certain (ultimate) end, intermediate, i.e., proximate and remote, ends can be identified, which are both means to acquiring the ultimate end, but can also be called ends insofar as they are desired for the sake of themselves that is, their goodness.

> the maker, when it was still to be done, or when the work was first contrived (PE I.1, 219).[257]

Following up on Sturm's example, the use of the clock to tell the time, distinguishing between hours and minutes is nothing but the end *propter quid* (on account of which)—as the schoolmen would say (Des Chene 1996, 171)—it was designed by its maker. The clock's ability to tell the time––setting aside the role of its intelligent user—is, of course mirrored by its make up: matter with some but not just any material forms (i.e., modifications) like springs, gears, an hour hand, and a minute hand, and so on. Sturm's example is suggestive: The fact that things are designed for a certain use or strive towards a certain end leads to the idea of a designer purposefully designing and creating things in that way (see PE I.1, 226f). Once the finality of the whole of nature is the subject of scrutiny, one is inevitably led to contemplate the most intelligent designer-creator of the world:

> Hence, everything in this world acts on account of some certain ends, but unbeknownst to itself and not intended by any of its own resolutions [*consilio*]; but known and constantly as it were put before the eyes [*oculis expositos*] of the omniscience of that most powerful Director alone; nay [speaking] with philosophical rigour they [things] do not act so much on account of them [i.e., ends], but are acted upon towards them by the same Most Wise Director, who always foresees most precisely the means [*media*] and directs them towards innumerable [ends]; not even (as we have already mentioned elsewhere) by means of an absolute, but a conditioned volition not repeated on a case-by-case basis [*nec iterata in singulos casus*], but by means of a simple act of His, reaching out most efficaciously as it were by means of a certain universal law into every corner of the Universe, into all moments of times and centuries (PE I.1, 227).[258]

In general, it is not necessary for things to be aware of the ends they strive towards. It suffices that God knows the ends and purposes of things (CPMS, 65). He directs beings lacking rational cognition such as animals towards certain ends. While rational beings are conscious of the ends they seem to strive for, non-rational beings both animate and inanimate are not. Non-rational agents are immediately guided by God alone. This intimate connection between cognition and final causation has recently been called the 'cognition condition,' "according to which only agents that cognise their ends can operate for the sake of these ends in virtue of their own nature or internal principle of change" and

257 "[E]nim negari neutiquam possit, id quod operis alicujus jam facti usus est (e.g. horologii, distinguere tempora in horas, minuta &c.) id in opificis mente, cùm esset adhuc faciendum, aut primitus excogitatum opus, fuisse finem & scopum" (PE I.1, 219).

258 "Agunt ergo in hoc mundo omnia propter certos aliquos fines, sed ignotos sibi nec ullo suo consilio intentos, adeoque solius Directoris illius potentissimi omniscientiæ cognitos ac perpetuò ejus quasi oculis expositos; imò in rigore philosophico non tam agunt propter illos, quàm aguntur in illos, ab eodem Sapientissimo Directore, in istos, innumerabiles licet, exactissimè semper prospiciente mediaque certissimè dirigente; non absolutâ quidem (ut alibi jam monuimus) sed conditionatâ, nec iteratâ in singulos casûs, voluntate, sed uno simplici hujus actu, tanquam lege quadam universali in omnes Universi angulos omniaque temporum & seculorum momenta efficacissimè se exporrigente" (PE I.1, 227). See also CPMS, 62.

it is a development originating in late scholasticism (Sangiacomo 2019a, 50).[259] Bearing in mind Sturm's occasionalist stance, however, he cannot simply adopt the late-scholastic position, since finite beings do not possess a genuine internal principle of change—they are not endowed with a substantial form, force or anything of the kind. What then is Sturm's considered opinion?

Given that inanimate and animate non-rational beings are purely physical and lack a mind, finality remains external to them. Setting aside the level of complexity which distinguishes the living from the non-living, any non-rational being is directed towards certain ends by God. Thus, Sturm extends to every non-rational being the view attributed by Des Chene (1996 194) to the late-scholastic stance vis-à-vis inanimate beings and their actions, i.e., that they "have ends only at second hand, by virtue of being God's instruments." Human beings, in contrast, in virtue of being mind-body unities, can contemplate their ends. While it remains true that they are dependent on God for realising their goals, Sturm's occasionalism does not extend to the realm of the intramental. The mind's immanent actions and volitions are free (PE I.1, 67, 176).[260] Hence, the mind's own thinking is undisturbed by God's intervention. Finality is intrinsic to rational agents, i.e., human beings and, of course, God. In the narrowest sense, God is the only final cause, since He is the only efficient cause, and hence, the only being truly able to bring about the goals and ends He chooses.

What we find in Sturm's natural philosophy is that the scrutiny of every one of the four Aristotelian principles of nature: matter, form, efficient and final cause ultimately leads back to God: He created matter. He brings about material forms by means of motion. He is the only efficient cause. He is the pre-eminent final cause, responsible for the perfect design of the world. Hence, natural philosophy ultimately becomes a study of God. Indeed, God's existence and His attributes are revealed through the perfection of the world: "We can know GOD through his works, or we can see now his infinite wisdom, then his infinite power, then his infinite goodness shining through" (CPMS, 67).[261] For this reason, Sturm's natural philosophy can be characterised as a physico-theology.

One might wonder, however, whether studying God, i.e., His will, through His works (the ends of things) amounts to temerity and arrogance. Sturm is well aware of this objection: He agrees with

259 Similarly, Des Chene (1996, 187) notes that for the late scholastics "[o]nly in rational agents do ends operate straightforwardly. Animals are held to be acted upon by ends as rational agents are, but 'imperfectly,' because their ability to judge the goodness of things, and to deliberate about means, is limited. Inanimate things are not acted upon by ends except insofar as they are the instruments of God." Due to the fact that animals lack cognition *tout court* for Sturm, they will be treated like inanimate beings, that is, the goal-directedness of their actions is due only to the external workings of God. I will come back to the role of rational agents shortly.

260 Here, Sturm explicitly says that "when the same Du Hamel [whose position he discussed before] […] says that nothing is better known than that we think, doubt, love, and perform other vital acts, we easily concede this regarding the immanent actions of the mind (which are not be discussed here)" (PE I.1, 176). "cùm idem *Hamelius* […] nihil notius esse dicit, quàm nos cognoscere, dubitare, amare, & alios actûs vitales exercere; id de actionibus mentis immanentibus (de quibus hoc loco quæstio non est) facilè concedimus." In the *De ipsa natura* (AG 161), Leibniz—referring to this exact same passage—positively acknowledges this aspect of Sturm's occasionalism, that is, the fact that it stops short of being applied to every causal dimension.

261 "DEVM ex his suis operibus agnoscamus, sive ad ejus infinitatem tum sapientiam, tum potentiam, tum bonitatem, undique eluscentem respiciamus" (CPMS, 67). For God's indubitable existence, see PE I.1, 227.

Pierre Poiret that it is indeed a presumptuous and even insane endeavour to attempt to fathom God's decrees for creating the world such as it is: "Indeed to want to scrutinise the ends, motives and impulsive causes of all actions or divine decrees is not only a sign of Utmost arrogance and temerity, but even insanity" (PE I.1, 218).[262] However, what *prima facie* looks like an affirmation of the question, turns out to be a qualified 'no', albeit one that slightly shifts the subject matter of the question itself. If, by ends and final causes, one understands that which moved the divine will to order some things or other, no such ends or final causes can be given, since nothing precedes the divine will in the way that causes precede their effects. Proceeding in this way amounts to folly (*stultitia*). However, if by ends one understands those which transcend the boundaries of the scope of nature, the investigation of ends falls prey to temerity and arrogance. Examples of ends that transcend nature are God's allowing for the Fall of Man, and the fall of angels, but also God's reasons for setting up the world in this way rather than another. If, however, by ends one understands the use of created things, it is not only permitted, but also pious and very useful to study them diligently, for Sturm. Finally, Sturm warns that to think that oneself or others will have uncovered all ends of natural things at a certain point in time amounts to arrogance and unfairness vis-à-vis God (CPMS, 66f). The last aspect resonates with Sturm's belief in the feebleness of the human mind, and the project-character of science in general, which, as we saw, motivates his eclecticism (sect. 1).

5. Life

Sturm's natural philosophy includes a discussion of animated or living bodies. Plants, animals, and human beings count as animated or living bodies, and Sturm treats of them in the *pars specialissima* of his physics. Life is defined as follows: "we say of a thing that it lives, when it is nourished, grows, and is conserved intrinsically (*ab intrinseco*)" (PE I.1, 111).[263] The use of 'intrinsic' here indicates that it is the internal processes within a living being that allow it to carry out these tasks. Nourishment entails internal physiological processes (such as digestion) by means of which the body is replenished. Growth happens from within, not by means of extrinsic super-addition of lumps of matter. Living beings conserve themselves, that is, they are not immediately conserved by other beings (save God). To this definition of life Sturm adds that living beings produce beings of their own kind, i.e., procreate (CPMS, 566f). Living beings are alike with regard to performing these functions (*munia vitalia*), that is, nutrition, growth, generation/procreation and conservation. I call this the *life-function*.

262 "Omnium equidem actionum ac decretorum divinorum fines, motiva, & causas impulsivas pervestigare velle, Summæ non solùm arrogantiæ ac temeritatis, sed etiam dementiæ esse" (PE I.1, 218). In the CPMS (65f), Sturm also cites Descartes' *Principles of Philosophy* (part I, §28) and the *Meditations on First Philosophy,* IV. In the latter, Descartes makes it clear that "I [Descartes] consider the customary search for final causes to be totally useless in physics; there is considerable rashness [*temeritate*] in thinking myself capable of investigating the <impenetrable> purposes of God" (CSM II, 39). I added the Latin original in square brackets. The addition in diamond brackets is from the French translation of the *Meditations* (1647).

263 "vivere rem dicimus, cùm ab intrinseco nutritur, augescit, & conservatur" (PE I.1, 111).

According to Sturm, all living beings have an organic body and some kind of soul (*anima*) which is why they are called 'animated' (CPMS, 562f; PC, 243f). However, plants are only able to perform the most basic functions of living beings—the ones just mentioned. On top of these functions, however, animals are able to move and sense. Humans, finally, possess all the capacities of animals and plants, but are also endowed with a mind (CPMS, 566f). The main faculties of the mind are the intellect and the will (CPMS, 577f).[264]

Prima facie, Sturm works with the Aristotelian-scholastic tripartite distinction of souls: Plants are described as having a vegetative soul (*anima vegetativa*), animals as having a sensitive soul (*anima sensitiva*) in addition to a vegetative soul, and human beings as having a rational soul (*anima rationalis*) in addition to the others.[265] However, none of these souls except for the rational soul, insofar as it is linked to thought, escape a materialisation or mechanisation (CPMS, 607f). The vegetative and sensitive soul are not immaterial or mental principles, but are reduced to physiological-mechanical processes in the respective being. I will focus on the case of animals, because, according to Sturm, there is consensus between philosophers both old and new that they are alive and because studying animals allows us to avoid complications that arise with regard to the status and the operations of the immaterial soul of human beings and its relation to the body.

Animals lack the immaterial rational soul that marks out human beings (CPMS, 646). They do not possess true language, reason, or cognition (CPMS, 648, 653), all of which are ascribed to the presence of an immaterial soul (united with a body). Here, Sturm takes a Cartesian standpoint. Animals, for Sturm, perform two kinds of operations: (1) They live (as do plants) and (2) they move and sense (as do humans) though in a purely mechanical way. In the case of animals, this means that sense-perception is a purely bodily, i.e., mechanical function. It does not involve or give rise to mental states, such as volitions or judgements or any kind of *feeling*.

Both of these operations, i.e., motion and sense-perception, are explicable in terms of a vegetative and a sensitive soul, respectively. However, speaking with philosophical rigour, for Sturm, these "souls" can be explained in terms of purely physiological-mechanical processes. Nothing in the operations of animals exceeds the realm of the mechanical:

> I conclude the following: That it is not necessary to ascribe [*tribuere*] to animated brutes not even the hottest ones or, as it seems, most astute ones any reason or true cognition, since all their effects and whatever marvellous or admirable operations can come forth from (as we call it) a certain *natural instinct*, that is, from the internal structure or organisation of their bodies, and from the fluxes of blood, lymph, air, vital flame, and spirits; it is very credible from this that these mechanisms [*machinationes*] have the highest

264 For the sake of stringency, I omit the discussion of the state of the human mind.

265 For the Aristotelian-scholastic account of the three souls, whether they are distinct (and if so how they can be united) or one a well as related problems, see Des Chene's *Life's Form* (2001), in particular, parts three and four. Sturm dismisses questions along these lines as useless (*frustraneas*) (CPMS, 565f).

> Will for their artificer and inventor by means of which many more admirable things can come about [*expedire*] than all those [which] could until now be furnished […] thought out by human ingenuity by means of automata and crafted by human hand" (CPMS, 653).[266]

The quotation appears in the context of a discussion of animated bodies (*de corporibus animatis*) (CPMS, 646). Sturm points out that despite the fact that we observe operations in animals that make us want to ascribe a mind or an immaterial principle to them, such operations are expressions of natural instinct, which, for Sturm, is reducible to the realm of physiology. Nothing in animals exceeds the realm of the purely mechanical; that is, matter, motion, and modifications and higher-order structures of matter. Life in animals comes from the blood and the heat of the heart: "I can find nothing other than the vital heat in the blood, which can take over [*obire*] the functions [*vices*] of the vegetative soul" (CPMS, 658).[267] Movement and sensation come from the brain and the animal spirits, the latter being composed of the most subtle parts of the blood:

> All the power [*potentia*] to perceive the sensible impressions, namely in a bodily way [*modo corporeo*], to excite the internal humours and move the external limbs (which the Schools call the *sensitive*, *appetitive*, and *locomotive power*, when they define the *sensing soul*, not ineptly as *the first act of the animate body by means of which it perceives and apprehends those* [things] *that are outside itself, seeks the ones beneficial, avoids the ones detrimental and engages in self-motion*) is due to the *spirit* which they call *animal*, the offspring of the vital flame, i.e., the most spirituous [*spirituosissimis*] parts of the blood secreted especially in the brain, and diffused with the nervous juice (*succo nervoso*) through the nerves in the whole body (PC, 270f).[268]

Sturm is availing himself of Cartesian physiology as it can be found in Descartes' *Treatise on Man* (*Traité de l'Homme*). Bodily processes in animals are of a purely material nature. They are purely mechanical-hydraulic, and (as concerns an animal's behaviour) they follow stimulus-response patterns. Sturm agrees with the 'more recent' philosophers (*recentiores*), that is, the mechanists, that heat,

266 "Hoc infero: Non esse necesse, brutis animantibus, etiam callidissimis [sic], uti videntur, vel astutissimis, quicquam aut rationis aut veræ cognitionis tribuere; quandoquidem omnes ipsorum effectûs & operationes utcunque mirabiles & stupendæ, ex *naturali* quodam *instinctu*, quem vocamus, h.e. ex interna corporum suorum structura sive organizatione [sic], & his interfusis sanguinis, lymphæ, aëris, ignis vitalis, spirituumque fluoribus, provenire posse, vel ex eo credibilissimum est, quod hæ machinationes, ipsum summum Numen artificem & inventorem habeant, quibus adeo mediantibus multò magis stupenda expedire valeant, quam esse possunt ea omnia, quæ ab automatis humano ingenio excogitatis, & humanâ manu elaboratis, hactenus præstari potuerunt" (CPMS, 653). Perhaps surprisingly, Sturm was sceptical of the doctrine of the beast-machine before in his earlier *Physica conciliatrix* (PC, 272f).

267 "nihil aliud in animalibus reperire possum, quàm calorem in sanguine vitalem, qui vegetantis animæ vices obire possit" (CPMS, 658).

268 "Omnis autem hæc impressiones sensibiles, modo corporeo puta, percipiendi, humores interiores ciendi & externa membra movendi potentia (quam *Sensitivam, Appetitivam & Locomotivam* Scholæ vocant, *Animam sentientem* ideò non malè definientes *Actum primum corporis animalis, quo percipit & apprehendit ea quæ extra ipsum sunt, appetit salutaria, aversatur noxia & loco-movetur*) *Spiritui* quem vocant *animali*, vitalis flammæ soboli, h.e. partibus sanguinis spirituosissimis in cerebro præcipuè secretis & cum succo nervoso per nervos in totum corpus diffusis, debetur" (PC, 270f).

which in the form of the vital flame plays a key role here, is reducible to corpuscular motion: "heat consists in the fast and jumbled agitation of subtle and rigid particles" (PE I.2, 598).[269]

Since animals function like machines, we are inevitably led to a discussion of the similarity and difference between natural living and artificial bodies. The underlying art-nature distinction dates back to antiquity and was a commonplace in Renaissance and early modern thought (Close 1969). However, the similarity and difference between natural and artificial things is important for Sturm's natural philosophy as well as his treatment of living beings. Their similarity allows us to study nature through artificial things that are alike in important respects to the functions natural beings perform: "artificial no less than natural bodies enjoy [*gaudent*] a certain internal principle of all their operations and passions" (CPMS, 37).[270] The inner 'principles' of bodies are matter and passive forms. Despite the fact that they differ with regard to higher orders of matter, all bodies are the same vis-à-vis prime matter. What distinguishes them is their passive forms, i.e., their modifications and higher order structural properties. But in the case of some natural and artificial bodies their forms are strikingly similar. For instance, Sturm draws attention to the similar workings of the lungs and a bellows (PE I.1 116). In virtue of their forms, i.e., their material dispositions, they are able to perform a certain function: the inhaling and exhaling of air. Their material design (form) is very much alike and the performing of their particular function does not require the stipulation of any active principle or active force (*vis activa*) in any one of them. Forms of both artificial and natural bodies are mere modes of matter, and as such as passive as matter itself is. Some artificial and natural bodies are perfectly similar which means that by studying the design of a bellows (for example), we can study the lungs.

On the other hand, natural and artificial bodies are different in five respects (CPMS, 23-25): (1) Artificial bodies are immediately created by the effort of the mindful human craftsperson while natural bodies are created by God (through His wisdom). (2) They also differ in the subtlety of their design, because natural bodies are more refined and artful than artificial bodies. This is because God is infinitely more artful than humans in the creation of things. Furthermore, (3) artificial bodies are formed by an external cause (the artisan) while the formation of natural bodies is internal (upon their creation). (4) (Some) natural bodies are alive, while artificial bodies are not. (5) Artifice cannot endow the bodies it creates with senses. Sturm later adds that (6) the creation of artificial bodies is dependent

269 "calorem in subtilium & rigidiuscularum particularum celeri confusaque agitatione consistere [ostensum … distinctè fuerit]" (PE I.2, 598). See also PE II.1, 103. For Sturm's—correct, I believe—allusion to the general consensus among mechanist philosophers about the nature of heat as corpuscular motion, see PE I.2, 595-597. Indeed, e.g., Descartes (see Hutchins 2021, 5), and Boyle (see Eaton 2005, 109-127), perhaps the two most prominent mechanical philosophers, agree with this.

270 "artificialia non minus quam naturalia corpora interno quodam principio gaudent omnium suarum operationum & passionum" (CPMS, 37). I agree with Sangiacomo (2018a, 48) that according to Sturm "natural beings are not different in kind from any other artefact and thus must be explained in the same way in which artefacts are explained (i.e., by studying how different configurations of matter and forms are capable of accounting for different effects)." Des Chene (2007, 143) tells us that studying nature by means of art is indeed a Cartesian move: "The slogan 'art imitates nature' is reversed: now [in Descartes] nature imitates art. The forms of art provide a *model of intelligibility* for the science of nature." Emphasis in original.

upon the prior creation of natural bodies by God. Craftsmanship entails a reworking of the natural material already provided by God through the creation of the world (CPMS, 38).[271]

At this point, we are left with the following problem. Life consists in the performance of a certain function: nutrition, growth, generation/procreation and conservation, i.e., the *life-function*. Some natural bodies are able to perform the life-function while some other natural bodies (those that are called inanimate, like stones), and especially artificial bodies which are generically non-living beings, are not. Furthermore, some living beings (animals) are able to perform even more complex functions like self-motion and (mechanical, non-phenomenological) sensing. However, natural and artificial bodies are very much alike. Their inner 'principles' are matter and form, i.e., modes of matter. Matter and forms are passive. At the same time, being alive is not explained by some vital principle, and does not mean being active. An explanation for the difference between living and non-living beings must, then, be sought elsewhere.

In conceiving the world as merely matter in motion, Sturm's mechanical philosophy faces tremendous difficulties in providing a sufficient and satisfactory account of life, especially its generation. Indeed, life and the generation of living beings are the touchstones of any mechanical philosophy.[272] Or, perhaps, its pitfall in the case of Descartes' approach (Pyle 1987, 233-238, 253; Pyle 2006, 199-201). However, Sturm hints at a difference between living and non-living beings that can serve as a starting point to solve the problem: the degree of subtlety. Living beings are refined and perfected in a way that is impossible to recreate or imitate by a human artisan with finite knowledge. It is this difference in degree of *raffinement* that accounts for life, i.e., the ability to perform an (extremely demanding) function. Function follows form. Forms are modifications of matter and they are produced through motion. Yet, God is the only mover, because He is the only true cause. Hence, the ontogeny of life hangs on God and His actions. However, God does not act on a case by case basis when living beings are generated. His divine will does not operate by means of particular volition but instead by means of a general volition (PE I.1, 227). Hence, later in the PE, when Sturm shows how living beings come about and how this ties in with God's engagement in the world, he tells us that:

> But therefore it was not necessary that whenever the generation of a new living being, which has to be begun or be brought about, occurs, God as it were moved the hand to the work anew, and by means of a new labour in every single moment immediately undertakes a new formation; but it can be said that in the beginning by means of the efficacy of the one divine command [*nutus*] the first makings of living, and animated beings were effected in

271 Sturm takes the distance between natural and artificial bodies to be infinite (*infinita naturalium* [*corporum*] *ab artificialibus* [*corporibus*] *distantia*) (CPMS, 24). Natural bodies are infinitely more complex. This statement is theologically motivated in that Sturm wishes to make it clear that nothing compares to the creation of God, i.e., the creation of the natural world. For Sturm, saying anything else would probably amount to sacrilege. Even if natural bodies are infinitely more complex, studying artificial bodies and the functions they perform is still a useful and necessary approximation to understanding natural bodies.

272 This has been pointed out by Hutchins 2021, 6; Pyle 1987, 227, 231, 253f; Pyle 2006, 195, 207. See also Wilson 1995, 128.

> such a way that they would then form others similar to them, and they in turn [form] others in a continuous threat unaware and unknowingly through a certain necessity of their mechanism [*machinationis*]; or that all organic insensible rudiments of future living beings are at some time once and for all [*simul & semel*] formed, and that their elementary mass is everywhere so mixed and spread out that nature now, by means of the work of heat alone, and by means of the intervention of the nutritious juice joining at the appropriate place, proportionate to the genus of the rudiments, without any cognition [*cogitatione*] and cleverness [*prudentia*] does not form originally these makings [of living beings], but that God has formed and delineated [these makings] a little while ago; the vegetative and sensitive soul is only able to nourish them and educe them gradually into that visible and sensible *shape* [*staturam*] and to develop them [*elaborare*]; indeed, the vegetative and sensitive soul very much suffices for this whole work [*negotio*] insofar as it depends on the particular nature of a generating [being], even if it is not immaterial and not endowed with any cognition (PE I.1, 183f).[273]

What Sturm has in mind here, I believe, is a theory of preexistence famously developed by Malebranche in cooperation with Swammerdam (Pyle 1987, 240; Pyle 2006, 211f).[274] The theory of preexistence, which must not be mistaken for preformationism, holds that "organisms have been in existence in the form of miniatures since the creation of the universe" (Bowler 1971, 222).[275] "Every plant and every animal is the product of the original supernatural act of creation, not of a natural process of generation" (Pyle 2006, 195), and hence the origin of living beings is supernatural as creation is indeed a supernatural act (ibid., 214; Pyle 1987, 229, 246). However, the development of these preexistent organic beings follows the mechanical laws of nature, that is, entirely mechanical

273 "Neque tamen opus ideò fuerit […] ut, quoties novi viventis generatio vel inchoanda vel peragenda occurit, DEUS de novo quasi manum operi admoveat, novoque in singula momenta labore novam efformationem immediatè aggrediatur; sed vel in principio, nutûs unius divini efficaciâ, sic effectas esse primas viventium animantiumque fabricas, ut alias deinceps sui similes, & hæ iterum alias continuo filo, nesciæ & imprudentes, necessitate quadam machinationis suæ efformarent […] dici potest, vel […] universa omnium viventium unquam futurorum organica rudimenta insensibilia, simul & semel efformata, massæque huic elementari undique permixta & perfusa esse, ut nunc natura, solius caloris ope, & obvii loco commodo succi nutritii, cuique generi rudimentorum proportionati, interventu, sine omni cogitatione & prudentia, non efformare originaliter istas fabricas, sed efformatas ac delineatas dudum divinitus, enutrire tantùm & in sensibilem conspicuamque staturam sensim educare valeat & elaborare, adeoque toti huic negotio, quatenus à natura generantis particulari dependet, anima vegetativa & sensitiva abundè sufficiat etsi nec immaterialis sit, nec ulla cognitione prædita" (PE I.1, 183f).

274 Wilson (1995, 117) takes Augustine to be the ultimate inspiration for the theory of preexistence.

275 For the difference between the doctrine of preexistence and the doctrine of preformation, see Bowler 1971, 222; Pyle 1987, 229; Pyle 2003, 166; Pyle 2006, 195; Wilson 1995, 117. In contrast to the theory of preexistence, the theory of preformation holds that "the miniature which grows into the full organism is actually formed within the body of the parent" (Bowler 1971, 222). Although the theory of preformation has the advantage of a naturalist understanding of generation—generation is one natural process among many others with no special metaphysical status—it is incompatible with mechanical philosophy insofar as "the new organism is 'elaborated' […] in a process governed by the soul of the respective parent" (Pyle 2006, 195; see also Pyle 1987, 229).

principles (Pyle 2006, 204, 207).[276] In light of the marvellous complexity and subtlety of living beings as well as the functional interdependence of organs in a living body in the absence of active principles in nature and in light of doubts about the possibility of a satisfactory purely mechanical story about the generation of living beings, the theory of preexistence seems to be the only way out. In virtue of His omnipotence and omniscience, God Himself must have created miniatures of organic bodies that develop according to the laws of nature, that is, God's general actions. This, however, comes at the cost of solving the problem of generation by *fiat*. Indeed, the doctrine of preexistence does not *explain* generation but takes it as a given. The generation of living beings is taken to have its ultimate roots in the supernatural creation of the world.

Before discussing the case of Sturm further, let us pause for a brief comparison between his own and Cordemoy's approach. Sturm and Cordemoy share the view that matter is passive and that there are no genuine cases of self-motion. For both of them, motion is extrinsic to the moving body. They are equally convinced that the only type of motion is local motion, which is nothing other than a relative displacement of a body from one set of surrounding bodies (serving as a reference frame) to a different set of bodies. They agree that motion is a mode of existence of corporeal entities and that modes do not travel from substance to substance. Furthermore, any interaction between bodies requires contact. Overall, Sturm's and Cordemoy's approaches coincide in their Cartesian-mechanist outlook on the physical world. Besides their endorsement of (type) substance-dualism, they are equally convinced of the feebleness of finite minds. In their search after the origin and cause of the transfer of motion, they are both led to the first cause, i.e., God as the only truly efficient cause. They both adopt not only physical, but also psycho-physical occasionalism. Finally, Sturm and Cordemoy tackle the problem of what distinguishes living from non-living beings. In pointing to subtlety and complexity as characteristics of living beings, they develop similar strategies in order to solve the issue. These strategies might therefore also fall short in similar respects.

Despite their commonalties, Sturm and Cordemoy disagree when it comes to their matter theory. While the former sticks to a more orthodox plenist account, the latter endorses atomism and the (possible) existence of vacua.[277] This, however, has no (immediate) impact on their occasionalisms. Nonetheless, Sturm and Cordemoy do diverge when it comes to the case of intramental occasionalism. While Sturm is against it, Cordemoy seems open to accept the complete passivity of the mind. In

276 It must be noted that the doctrine of preexistence enjoys no direct experimental support. Microscopy can be said to shift the burden of proof towards other theories of generation (Pyle 2006, 209-214), but it does not provide direct evidence for the veracity of preexistence (Pyle 2003, 169f; Pyle 2006, 213). Further, theories of preexistence were not motivated by microscopic findings. On the contrary, once developed these theories systematically reinterpreted microscopic observations in their favour (Bowler, 235, 243). (However, Wilson (1995, 139) disagrees in that "we need not read the theory of preformation [preexistence?] as an example of the distorting influence of ideas on visual experience; we may see it instead as an uneasy compromise between experience and intelligibility.") Finally, the argumentation for preexistence is in itself very much *ex negativo* (see Pyle 1987, 243; Pyle 2003, 170-172; Pyle 2006, 206f).

277 Cordemoy explicitly say that "it is conceivable that there should be no body between bodies that do not touch each other" (DCA, 67)

contrast to Cordemoy, Sturm is not only interested in finding the distinguishing mark of the living, but also to provide a more thorough account of the generation of living beings. While Cordemoy implicitly seems to allow for some kind of teleology when dealing with living beings, Sturm explicitly accepts final causes as part of natural philosophy overall, and considers them useful. This might be due to the fact that despite the emendations to Cartesian physics which Cordemoy presents in his *Six Discourses*, he sees himself as a member of the Cartesian party, the founder of which, Descartes, had dismissed teleology. Sturm, however, cautions against such sectarian alignments and reserves his eclectic right to make any of the most promising hypotheses his own, no matter who developed them.

Discussion

In explaining living beings, Sturm is committed to a mechanist ontology: everything in the world can be accounted for by means of matter in motion. Motion is what modifies matter. It brings about passive forms dependent upon matter, which is itself essentially passive. These forms account for the (albeit passive) performance of functions. These functions capture the (mostly extrinsic) finality and goal-directedness of things in nature. However, the creation of passive forms by means of motion leads to the problem of the cause of motion and change in the world. Given the purely passive nature of both bodies, and finite minds, and the absence of other immaterial active principles, Sturm argues that it can only be God who gives existential support to the world in time and space. Only God brings about change in the world by means of motion. It follows that it is also only God who brings about living beings by supplying them with the complexity of 'forms' needed to 'perform' the life-function.

Why does Sturm endorse mechanism, occasionalism, and finality? I believe this can be best illustrated by conducting a thought experiment. Assuming the absence of each element and analysing the consequences will bring to light what motivates Sturm's natural philosophy. Again, life will serve as the touchstone. Rejecting mechanism would surely have seemed very disadvantageous to someone like Sturm. It would have struck him as a return to the unsuccessful and ontologically dubious natural philosophy of the scholastics. The explanatory power of occult virtues, qualities, faculties and active forms was thought to be had by mechanism, too. Mechanism, however, was taken to have the additional advantage of a particularly parsimonious ontology. For the mechanical philosopher, matter in motion is explanatorily sufficient.[278] Rejecting occasionalism while maintaining the passivity of matter would have required positing intermediary active mental principles to account for change, such as hylarchic principles, a plastic nature, celestial intelligences or even angelic minds. Sturm, however, is convinced that making use of such principles is unworthy of God and detracts from His omnipotence. After all, why would God as an omnipotent being have a need for any such entity? Furthermore, Sturm takes the design of nature to be perfect, and for him it would have seemed hard to

278 Clarke, too, emphasises "the elimination of various so-called occult powers from the explanatory repertoire of Cartesian natural philosophy", and "the parsimony of the metaphysical categories that Descartes introduced" as (partially) motivating Cartesian occasionalism (2000, 131 and 132, respectively).

conceive how perfection could be brought about by *finite* mental principles. According to Sturm, the finitude of these mental principles implies their imperfection, and something imperfect could never have created something as perfect as this world with its perfectly adapted living beings. Rejecting finality would be an outright denial of the phenomena. For Sturm, it is plain that birds are meant to fly, that the eye is there to see, that living beings knowingly or unknowingly strive towards certain ends. It would seem then that any system of natural philosophy lacking either mechanism, occasionalism or finality is somewhat reactionary and at odds with the principle of ontological parsimony (like the philosophy of the schoolmen), implausible or unworthy of God (like Neoplatonism), at odds with the phenomena or in bad faith. The latter would have been somewhat true of Descartes' system which denies finality while at the same time knowingly or unknowingly collapsing into teleological language as seems obvious from reading Descartes' *L'Homme*. The complexity and goal-directedness of living beings (finality) which are composed of passive matter appropriately modified and disposed (mechanism) can only come from the divine artificer as the only true cause of motion (occasionalism).

Sturm's natural philosophy is embedded in an eclectic framework (section 1). He attempts to reconcile the various old and new natural philosophies available at his time. While not every theory thought out to account for the phenomena can be held onto, elements of both the *philosophia antiqua*, such as finality, and the *philosophia nova*, such as mechanism, even elements from what we might call the *philosophia recentissima*, such as early modern occasionalism, make the cut. While I believe that the *philosophia novantiqua* that emerges is quite coherent, some of the moves Sturm makes might strike us as somewhat unfortunate unless they are seen in their proper historical context. One such move is that Sturm oftentimes retains scholastic terminology, albeit reworking it. To speak of matter and form as 'principles,' where principles were standardly held to be active entities is somewhat misleading, in particular, in light of the fact that Sturm takes matter and forms to be equally passive. Similarly, the concept of 'passive forms' would have struck an Aristotelian-scholastic philosopher as a *contradictio in adjecto*. That Sturm takes forms to 'perform' certain functions would seem equally puzzling precisely because they are purely passive modifications of matter.

For the sake of reading Sturm charitably, and thus trying to respond to this first set of concerns, we should bear in mind that Sturm was a university professor in Germany and that the general framework of philosophical teaching was still by and large Aristotelian. Sturm avails himself of the mandatory Aristotelian-scholastic speak, but undermines it by assigning new designations to the technical terms of Aristotelian-scholastic philosophy. In his in-depth study on physics in German universities and schools from 1700 to 1850, Gunter Lind (1992, 83) points out that "initially a consequent mechanist systematics was hardly realisable. For the teaching of dogmatic physics, a system seemed necessary, and as long as there was not a new one, one had to stick to the old one, and still used the old terminology." While the structure of physics textbooks in late seventeenth- and early eighteenth-

century Germany was Aristotelian, this Aristotelian terminology was *de facto* undermined and reinterpreted (ibid., 82-85). Important for our purposes, here, is Lind's following observation:

> [e]ven the Aristotelian principles of the world, matter and form are retained, although they were truly not the principles of a mechanist physics. They are then reinterpreted in a way that one can only call a deformation. Materia prima or atoms are matter, and form is the *gestalt*, order and movement of the smallest particles of a body (1992, 84).

An apt description of what we find in Sturm. Finally, when Sturm uses active verbs in describing what happens in nature, this should be understood as shorthand for God's actions as Sturm is clear that God is the only truly efficacious cause. These shorthand formulations and this reliance on common language is not untypical of occasionalist authors. It can be found, for instance, in Cordemoy and Malebranche.

A second set of concerns might have to do with Sturm's return to finality, and the invocation of complexity and design arguments to account for the special status of living beings. We have seen that Sturm wishes to retain the Aristotelian-scholastic idea of finality in opposition to philosophers such as Descartes. What is more, Sturm takes the finality of nature to be obvious. We should bear in mind though that retaining finality is by no means unique to Sturm. Quite the contrary. Sturm finds himself in the company of such luminaries as Leibniz. In addition, insofar as finality can guide a research agenda in natural philosophy, Sturm somewhat anticipates Kant's notion of its value. Taking finality to be plainly obvious, however, remains problematic. Even if Sturm does seem to have a point in taking living beings to be characterised by a greater degree of complexity than artificial beings, the concept of complexity requires further elaboration. Pointing to complexity and then waving ones hands hardly offers a satisfactory account of living beings and what makes them significantly different from artificial beings. Design argument are, of course, common to a number of early modern philosophers, and physico-theologies were *en vogue* at the time Sturm published his works. The contemporary reader might find them unappealing, but they reflect the *zeitgeist* of many seventeenth- and eighteenth-century philosophies.

6. Conclusion

Sturm's scientific method—the essential framework of his natural philosophy—is eclectic, hypothetical, experimental and dynamic. Sturm diligently surveys hypotheses put forward by his predecessors in physics, in order to provide causal explanations of natural phenomena (*pace* a mere natural history). In virtue of his eclecticism and selection criteria for good hypotheses, he is able to select and reconcile different aspects of natural philosophy. However, he remains an independent thinker choosing his own way. Sturm reworks and mechanises the natural philosophy of his Aristotelian-scholastic predecessors by making use of the mechanist theory prominent during his lifetime. Sturm understands matter and form as merely passive. Forms are reworked into modes of

matter brought about by local motion. They account for the functions that both natural and artificial bodies 'perform'. Sturm retains finality as a central aspect of nature *contra* Descartes, but in line with the Aristotelians. Sturm's novel *argument from spatio-temporal grounding* as well as his reliance on French occasionalism serve to rule out the causal efficacy of secondary causes. This applies to both minds and bodies. Sturm's occasionalism holds for all dimensions except the realm of the intramental, that is, for the domain of the mind's own thoughts and volitions. God is the only efficient and the (at least) predominant final cause in nature. According to Sturm, life consists in the performance of *the life function*: nutrition, growth, generation/procreation and conservation. The difference between animate living and inanimate non-living beings is one of complexity or subtlety. Living beings are so delicately formed that they are able to perform the life-function. Animals, in particular, also move and sense, but only in a mechanical way. Sturm solves the problem of the generation of living beings by availing himself of the theory of preexistence. Miniatures of organic bodies have been produced by God at the time of creation, and they develop following purely mechanical laws from the moment of conception. Sturm's eclectic occasionalist natural philosophy is coherent but by no means perfect.

CHAPTER 3

CHRISTIAN WOLFF'S PROJECT OF GROUNDING THE WORLD AND HIS RECEPTION OF OCCASIONALISM

Introduction

Occasionalism and system-building tend to go hand in hand. Cordemoy endorsed occasionalism to defend his account of how the world of experience can be broken down into its basic constituents and reconstructed on solid metaphysical grounds (chapter 1). Sturm also regarded occasionalism as the fundamental cohesive force allowing him to construct a natural philosophy capable of giving accurate explanations of natural phenomena without having taken refuge in dubious assumptions about powers or occult qualities inherent in natural entities themselves (chapter 2). Hardly any other philosopher in the first half of the eighteenth century was more closely identified by their contemporaries with the idea of system-building than Christian Wolff. Correspondent and quasi-disciple of Leibniz, well aware of Sturm's work (see appendix to chapter 3, α), Wolff is testimony to the changing fate of occasionalism at the turn of the new century. Wolff's drive to build a systematic, deductive and scientific philosophy as well as his influence on future generations of German philosophers make him a central figure for exploring and understanding how far occasionalism can indeed be said to have contributed to projects attempting to provide a thoroughgoing explanation of reality. However, Wolff's attitude changes drastically over time from initial endorsement—within the scope of mind-body interaction as part of an account of speech not too different from Cordemoy's—to a later rejection in light of developments of his scientific method and changing convictions about grounding. Interestingly, it is precisely as part of a comprehensive systematic philosophical project of explaining reality that Wolff finds occasionalism falling short. This chapter investigates Wolff's transformation from both a historical and a philosophical point of view. It situates and contextualises Wolff's change of heart in relation to his unfolding philosophical system as well as the theoretical problems that it raises.

Wolff's position vis-à-vis occasionalism has been the subject of very little contemporary scholarship. Specht's (1985) article on occasionalism in Germany in the Age of Enlightenment and his (2019) commentary to Wolff's *Disquisitio philosophica de loquela* as well as Favaretti's (2017) engagement with what he takes to be Wolff's own rational reconstruction of occasionalism by and large exhaust the existing literature. If one conceives of Wolff as a mere systematiser and populariser of Leibniz's philosophy and neglects Wolff's engagement with Cartesian authors, this earlier endorsement of occasionalism will surely come as a surprise. However, the young Wolff considered occasionalism capable of explaining the interactions between mind and body. A most relevant field of application in

this respect is speech, i.e., the communication of an idea of the mind of one human being to the mind of another human being by means of physical signs. Moreover, Wolff engaged in intellectual debate with French early modern occasionalists, such as Gérauld de Cordemoy (1626–1684) and Nicolas Malebranche (1638–1715) as well as German occasionalists, such as Johann Christoph Sturm (1635–1703). Given the young Wolff's endorsement of occasionalism, one might wonder: why did he reject it in his more mature years? What role did Wolff's interaction with Leibniz play in this? Why does occasionalism not have a place in Wolff's mature philosophy? How did the development of a thorough scientific method as well as Wolff's own philosophical project of grounding the world contribute to his rejection of occasionalism?

In order to explain why occasionalism became untenable for Wolff, we will need to scrutinise the scientific framework and unearth the quintessence of Wolff's mature philosophy, that is, his rigorous scientific method and his philosophical project of clearly, sufficiently (according to the principle of sufficient reason), systematically and thoroughly explaining and grounding the world with all its parts. In particular, Wolff's insistence on real, i.e., causal definitions of things and his insistence that explanations of nature have to be fully naturalised, i.e., have to exclude supernatural agents as the immediate causes of natural phenomena, was to prove crucial for his rejection of occasionalism. Grounding the world and thereby making it intelligible, for the later Wolff, can only succeed if it takes into consideration the essence of natural agents. Here, the notion of force is crucial. In stripping natural beings of their forces, occasionalism turns them into merely passive beings. Understanding change in nature then leads the occasionalist to the power or force of the only truly efficient cause, that is, God. However, in so doing the occasionalist ultimately provides supernatural and transcendental explanations of phenomena that, for Wolff, can and should be accounted for naturally. Supernatural grounding instead of natural grounding and giving transcendental instead of immanent explanations is something that the later Wolff finds insufficient if not disappointing. On top of more standard metaphysical objections, the mature Wolff therefore rejected occasionalism on epistemological grounds. According to Wolff, occasionalism ultimately does not prove to be compatible with a reasonable systematic scientific world view. His dismissal of occasionalism would prove influential among later generations of German philosophers (chapter 4).

In this chapter, I will first analyse Wolff's earlier adoption of occasionalism (section 1). That is to say, I will investigate Wolff's stance in the *Disquisitio philosophica de loquela* (1703) (section 1.1) before moving on to Wolff's first doubts about occasionalism raised by Leibniz in their correspondence (section 1.2). We will then need to broaden our understanding of Wolff's mature philosophical project as this will provide the necessary background against which to place his later rejection of occasionalism. The first essential constituent of this philosophical project is Wolff's scientific method (section 2). It can be summarised as seeking sufficient proofs based on ultimately self-evident definitions and principles. It combines reason, experience, experimentation and quantification. While,

generally speaking, Wolff thinks that science is demonstrative, due to the limitations of human knowledge he makes room for hypotheses and probability. In addition, Wolff regards science as dynamic, and a collective endeavour. The second essential constituent of Wolff's philosophical project is the rigorous use of PSR (section 3). Wolff tries to find sufficient reasons (mostly causes) for both the logical and physical possibility of things in the world and sufficient reasons for their existence. Wolff's project is one of uncovering the grounds of all things in the world (section 3.1). His rigorous endorsement of PSR and attempt to find sufficient grounds have strong ramifications for how Wolff thinks about natural philosophy. He dismisses the natural philosophies of his predecessors of both Aristotelian-scholastic and Cartesian origin, because they lack PSR and employ shaky principles, or so he thinks. Given that the young Wolff's adoption of occasionalism was based on a Cartesian understanding of bodies, one needs to understand his more mature critique of Cartesian physics, since this critique partially motivates his rejection of occasionalism (section 3.2). Finally, I will connect the discussion so far with Wolff's explicit rejection of occasionalism. In particular, I will scrutinise Wolff's dismissal of occasionalism based on its incompatibility with a rigorous, systematic scientific explanation of the world grounded in natural agents (section 4). The chapter closes with a brief conclusion (section 5).

1. Wolff's Early Position Concerning Occasionalism

Wolff was not only very familiar with 'the system of occasional causes,' but took it seriously, especially as an explanation of mind-body interaction. In fact, prior to his intellectual exchange with Leibniz, Wolff himself unambiguously endorsed occasionalism.

Wolff's intimate relation to occasionalism consists in the conjunction of a set of historical circumstances which are indispensable for an appreciation of the yet to be written history of the German reception of early modern occasionalism. (1) Wolff himself studied early modern French occasionalist authors first hand. He read Cordemoy's *Le Discernement du Corps et de l'Ame en six discours pour servir à l'éclaircissement de la physique* (DCA) (1666), as well as Malebranche's *Recherche de la Vérité* (first edition: 1674/1675) and *Entretiens sur la Metaphysique et la Religion* (1688).[279] Cordemoy makes his case for occasionalism in the fourth and fifth discourse of the DCA.[280] Malebranche argues for occasionalism in book six, part two, chapter three, and *Elucidation XV* of his *Recherche*, as well as in dialogue seven of the *Entretiens*. (2) In his more mature thought, Wolff developed his own historiography of occasionalism: he took Descartes to have developed occasionalism as a response to the insufficiency of the doctrine of physical influx—which Descartes had previously endorsed (or so Wolff thinks)—and he took Descartes' followers to have accepted the

279 This becomes clear from Wolff's later *Psychologia Rationalis* (1734), §589.

280 Cordemoy also advocates occasionalism in his *Discours physique de la Parole* (DPP), see chapter 1 of this dissertation. Specht conjectures that Wolff used the DPP when working on his *Philosophical Enquiry into Speech* (*Disquisitio philosophica de loquela*), but Wolff does not explicitly cite the DPP. See Specht's (2019) commentary to §2 of the *Disquisitio*, p. 30.

change of heart of their master. Some, like Cordemoy and Malebranche, then developed it further (*Psychologia Rationalis*, §589; *German Metaphysics*, §763, *Ausführliche Nachricht*, ch. 7, §99).[281] (3) When Wolff enrolled at the University of Jena as a young student. He read mathematics and physics with Georg Albrecht Hamberger—a student of Johann Christoph Sturm at the University of Altdorf—both of whom (alongside Johann Franz Budde) he took to be occasionalists (*Ausführliche Nachricht*, ch. 7, §99). In addition, (4) the intellectual setting in the realm of natural philosophy at the University of Jena was shaped by Erhard Weigel, who also propagated occasionalist ideas.[282] Furthermore, (5) when Wolff started teaching physics at the University of Halle, he initially used the works of Sturm. Despite the fact that occasionalism is by and large absent from Sturm's *Physica conciliatrix*, which Wolff mainly used in teaching physics (*Eigene Lebensbeschreibung*, 140), Wolff also edited the second volume of Sturm's (incomplete) philosophical masterpiece, the *Physica electiva*. Here, Sturm's occasionalism is unmistakeable. In the foundational first part (of the first part) of the *Physica electiva*, Sturm defends an occasionalist account of causation in nature, and Wolff is aware of this (*Psychologia Rationalis*, §589).[283] (6) Finally, in one of his earliest academic writings, the *Enquiry into Speech* (*Disquisitio philosophica de loquela*) (1703), Wolff himself advanced an occasionalist theory to account for the transmission of speech.

In this section, I will first analyse the reasons for Wolff's initial adoption of occasionalism. We will see that Wolff just as much as Sturm can be portrayed as a second-generation occasionalist in that he bases his case on the achievements of his French predecessors without seeing a need to argue in detail for

281 "This system [the system of occasional causes] is due to Descartes as its author, who since he had rejected physical influx in the motion of bodies, and in the Principles of Philosophy, part 2, art. 36 & seqq. had invoked [*provocasset*] the general will [*voluntatem*] of the divinity [*Numinis*] bound in the most liberal way to certain laws; also did the same in explaining the interaction between the soul and the body [*commercio animæ & corporis*]. *Malebranche* refined the same system in Dialogue 4, §18 & seqq. and in Dialogue 7, §2 & seqq. of the Dialogues on Metaphysics and Religion as well as in book 3 [Wolff must have meant book 6], part 2, ch. 3 of the Search after Truth and the Elucidations to this passage. *Cordemoy* also in dissertation 4, p. 83 of the Distinction of the body and the mind [that is, the *Six Discourses on the Distinction between the Body and the Soul*]. Although *Sturm* acted like an eclectic, [and] did not surrender onto any sect of philosophers, he nevertheless embraced the system of occasional causes in the eclectic Physics [i.e., the *Physica electiva*], vol. 1, p. 161 & seqq., in order to explain the actions of bodies upon one another, and [in order to explain the actions of] the soul on the body and the body on the soul. Since the *Cartesian* philosophy is common [*pervulgata*] these days, the system of occasional causes has many defenders" (*Rational Psychology*, §589, p. 513). "Systema hoc *Cartesio* debetur autori, qui cum influxum physicum in motu corporum rejecisset, & ad voluntatem Numinis generalem certis legibus liberrime adstrictam provocasset Princip. part. 2. artic. 36 & seqq.; idem quoque in explicando commercio animæ & corporis fecit. Idem systema excoluit *Malebranchius* Dialog. 4 de Metaphysica & religione §.18. & seqq. & Dial. 7 §.2. & seqq. it[em]. in Tract. de inquirenda veritate lib. 3. [Wolff must have meant book 6] part 2. c.3. & in Dilucidationibus ad istum locum. Atque *Cordemoi* in Dissert. 4 de distinctione corporis & mentis pag. 83. Etsi autem *Sturmius* eclecticum egerit, nec ulli philosophorum sectæ se mancipaverit; in actionibus tamen corporum in se invicem & animæ in corpus & corporis in animam explicandis systema causarum occasionalium amplexus est in Physica electiva Tom I, p. 161 & seqq. Cum philosophia *Cartesiana* hodie pervulgata sit, systema quoque causarum occasionalium plures habet defensiores." Unless stated otherwise, all translations are my own. Emphases are Wolff's unless explicitly stated otherwise. In general, I follow Wolff's orthography and punctuation.

282 Here, I am indebted to Specht's commentary to §12 of Wolff's *Disquisitio philosophica de loquela* on 'German occasionalists,' 96-109. For Weigel, see 102-105 in particular.

283 For an in-depth analysis of occasionalism and its role in Sturm's natural philosophy, see chapter 2 (esp. section 3) of this dissertation.

occasionalism (section 1.1). We will then turn to Wolff's early correspondence with Leibniz who raised doubts in Wolff about occasionalism (section 1.2).

1.1 Wolff's Flirtation with Occasionalism: The *Disquisitio philosophica de loquela*

The disputation entitled *Disquisitio philosophica de loquela* (1703) (abbreviated henceforth: DL)—one of Wolff's earliest academic writings—aims at explaining speech. The focus lies on the case of human beings which are composed of both minds and organic bodies conceived in Cartesian, that is, in purely geometrical, terms (DL, §11).[284] Speech is understood as the momentous action of communicating one's thoughts (DL, §1), which are defined as conscious mental events in line with Descartes (DL, §3), to others that are present. This commonly, but not exclusively, happens by means of external (physical) signs (DL, §2). Straightforwardly, however, this raises the problem of how to account for mind-body interaction. How can thoughts be made physical? How can the mind which the young Wolff here conceives as an essentially unextended, immaterial substance (DL, §3) act on the body, a purely extended substance? How can there be mind-body interaction, if the mind and the body have nothing in common—given that the mind can still be conceived even if all extension, or everything bodily is abstracted (ibid.)?[285]

According to the young Wolff, the communication of thoughts between embodied human beings requires the following processes[286]: (1) a conversion of thoughts into physical signs, that is, articulated sounds; (2) the propagation of sound(s) through the air; (3) the reception of these sounds by another human being, and the reconversion into thoughts. All of these processes—(1) mind-body interaction (psycho-physical causation), (2) body-body interaction (physical causation), and (3) body-mind

284 Concerning the nature of the body and the mind, Wolff says the following: "Mr. Des Cartes shows both in the Principles of Philosophy and in his *Meditations* that whatever we are conscious of [as] happening in us pertains to the Mind*;* those [things] that we are not conscious of affecting us [*nobis contingunt*]pertain to the body. […] Since in every body we conceive extension, but thought—incommensurable with any line—has nothing in common with extension […], the thinking substance [*Substantia cogitans*] is widely different from the extended one and free from any matter" (DL, §3, p. 301f.). "Dn. des Cartes tum in principiis Philosophiæ, tum in *Meditationibus* suis ostendit, quæcunque nobis consciis in nobis fiunt, ad Mentem; quæ nobis insciis in nobis contingunt, ad corpus pertinere. […] Cum enim in omni corpore extensionem concipiamus, cogitatio autem omni lineæ incommensurabilis cum extensione nihil prorsus habeat commune […] Substantia cogitans ab extensa longe debet esse diversa et materiæ omnis expers." Given the young Wolff's Cartesian inclinations, I take him to understand substance along Cartesian lines, i.e., as a being that exists independently of any other being (except God) (see Descartes' *Principles of Philosophy*, part I, §51, CSM I, 210).

285 We will see that Wolff will later find this process of abstraction very problematic and dubious (section 3.2).

286 Wolff remarks that although an immediate, direct communication between distinct (human) minds might not be impossible, it is at least unknown: "We confess that therefore it is unknown to us up to this point, whether a way [*modus*] could be given by means of which the mind could produce thoughts in another mind that are similar to its own [thoughts]" (DL, §11, p. 308). "Hactenus igitur nobis incognitum esse confitemur, an detur modus quidam, quo mens cogitationes suis similes in alterius mente producere valet." Two paragraphs later Wolff writes: "We conclude with high probability [*probabilissime*] yet not certainly [*non certo*] that we do not have the faculty granted to us by God [*Numine*] to act immediately on another mind" (DL, §13, p. 309). "nos non habere facultatem a Numine nobis concessam immediate in animam alterius agendi, probabilissime, utut non certo, concludimus."

interaction (physico-psychical causation)—are explained in terms of occasionalism. Wolff's approach of explaining speech strongly resembles Cordemoy's as presented in the latter's *Discours physique de la Parole* (1668).

I will split the discussion of Wolff's case in favour of occasionalism into two parts: (A) a discussion of body-mind/mind-body occasionalism; (B) a discussion of body-body or physical occasionalism. I will then highlight the similarites with Cordemoy. I will also hint at some differences between Wolff and Cordemoy. Comparing Wolff and Cordemoy will corroborate my description of the young Wolff as a second generation occasionalist. It will also add to a better understanding of Wolff's intellectual roots.

(A) Mind-Body and Body-Mind Occasionalism

In §15 of the DL, Wolff postulates more than he proves that:

> The cause of the interaction [*commercii*] between body and soul cannot be any other but the most efficacious will of the divinity [*Numinis nutus*], which we infer clearly enough *a posteriori* (DL, §15, p. 310).[287]

This passage can be situated with a set of remarks which allows for a fairly clear reconstruction of Wolff's reasoning. The incommensurability of mind and body raises doubts about how the contract (*foedus*) (DL, §17) between the two, that is, their harmonious relationship, could be explained without God bridging the metaphysical gap.[288] God as transcendent to the realm of finite minds and bodies and in virtue of His omnipotence, is the only being able to make minds and bodies engage with one another. He established the contract in virtue of which they are perfectly synchronised (ibid.). In addition to the disparateness of bodies and minds, bodies *qua* being material are purely extended, and hence passive. They lack any kind of force. According to Wolff, the very idea of matter ultimately implies nothing other than extension. Hence, bodies do not possess an active principle allowing them to bring about motion, which Wolff likely thinks is an action (DL, §14). The passive nature of matter (PN) itself rules out the possibility of matter being causally efficacious, i.e., able to produce thoughts in a mind. The mind, however, like every other created being *qua* created is completely dependent on the Creator for its continuous existence (DL, §§5, 12). Furthermore:

> And if one pleases to compare the idea by means of which we perceive the mind [*Mentem*] with the concept [*conceptu*] of God, we notice that our mind thinks and is conscious of its own thoughts because of the most powerful will [*nutum*] of the infinite mind, and we

287 "Commercii inter corpus et mentem esse nequit causa alia, nisi efficacissimus Numinis nutus, quem a posteriori clare satis colligimus" (DL, §15, p. 310). Specht notes that the use of the terms *numen* (divinity; God) and *nutus* (will; act of will) were used "frequently in the Weigel circle; this is true not least for Sturm" (DL, 51f). This serves as another clue of the young Wolff's indebtedness to the occasionalism of his predecessors, and his continuity with Sturm.

288 Note that in using the term 'foedus' to describe the unity of mind and body, Wolff builds upon the vocabulary of Johannes Clauberg (1622–1665) put down in the latter's *Conjunctio corporis et animæ* (1664), chapters 45 and 47. La Forge adopted the terminology in his *Traité de l'Esprit de l'Homme* (1666), ch. 15 (Specht, commentary to §17 of the DL, 129f).

> understand that it [our mind] depends entirely on its [God's] will no less than the beings of our reason [*entia rationis*] [depend] on the will [*nutu et arbitrio*] of our mind (DL, §12, p. 308).[289]

The mind depends on God for its continuous existence just as do its successive mental states. God is the *principium essendi et fiendi* of the mind. I take it that Wolff implicitly rules out both causal over-determination—mental states being sufficiently caused by both a finite mind, and God—as well as concurrentism—mental states being co-caused by a finite mind and God, where each of them causes insufficiently. While this argumentation reminds to some extent of both Malebranche's c*ausation is but continuous creation* argument (CCC) and Sturm's *argument from spatio-temporal grounding*, the textual basis in Wolff is too thin to identify its precise origin.[290] It is very likely that by the time he was writing the DL, Wolff was familiar with both Malebranche's works, especially the *Entretiens sur la Metaphysique et la Religion*, and Sturm's *Physica electiva*. In addition to his approximation of a conserver-creator argument, Wolff—again in line with his French predecessors—takes the mind to be too feeble to cause motions in the body, or else it could cause any motion it pleased.[291]

The young Wolff seems to favour a strong wholesale occasionalism in line with Cordemoy and Malebranche and in contrast to La Forge and Sturm. While the former two make a case for intramental occasionalism as well as psycho-physical and physical occasionalism, the latter two reject intramental occasionalism.[292] Insofar as Wolff opts for complete occasionalism covering all causal dimensions, he faces the problem of making room for human freedom. If all actions in the world are caused by God, to what extent can human beings be said to act and, in turn, be held responsible for their deeds? For the sake of succinctness, I will not discuss this issue.[293] To conclude this subsection then, we have seen that Wolff has ruled out any active unmediated relationship between the mind and the body. God is the only true cause of the existence of the mind-body union and the only truly efficient cause in mind-body interactions.

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289 "Quodsi cum conceptu Dei ideam qua Mentem percipimus, conferre placet, mentem nostram cogitare et cogitationum suarum sibi consciam esse propter nutum Mentis infinitæ potentissimum advertimus, eamque ab ipsius arbitrio, non minus ac entia rationis nostræ a nutu et arbitrio mentis nostræ, prorsus dependere intelligimus" (DL, §12, p. 308). I treat *nutu et arbritrio* as a hendiadys.

290 For Sturm's argument from spatio-temporal grounding, see the second chapter of this dissertation, section 3.1. It is more the style of Wolff's argument that is reminiscent of Sturm's argument from spatio-temporal grounding rather than the subject matter itself, since Sturm is mainly concerned with physical occasionalism.

291 The following mode of reasoning is philosophically dubious: "And if the will of the mind were *per se* efficacious [*efficax*] so that motion of the body were to follow it, it could reasonably produce whatever motion it wanted, and would not only be confined [*determinatus*] to certain [motions]" (DL, §15, p. 310). "Quodsi enim mentis nutus per se foret efficax ut eum corporis motus subsequerentur, motum sane quemvis producere posset, nec ad certos tantum determinatus esset." The fact that the mind is not able to effect whatever motion it pleases does not prove its absolute inefficacy. The mind's power could simply be limited. It does not need to be conceived as "all or nothing". Platt (2020, 278, n33) takes issue with the same problem in Cordemoy.

292 I am much inclined to read Cordemoy as arguing for intramental occasionalism (Henkel 2017), but the case is debatable, and perhaps cannot be settled based on the limited textual evidence we possess.

293 Ultimately, the problem of how freedom and evil (*malum morale*) can be dealt with in occasionalist systems is outside the scope of this dissertation.

(B) Body-Body Occasionalism

Wolff's case for physical occasionalism rests on the passive nature of matter, as well as the inconceivability of the transfer of motion from one body to another body:

> Since we observe nothing in matter except mere extension, and [since] we have no idea [*conceptum*] of motion migrating from one subject to another, […] the obscurity of the idea of matter needs to be dispelled by means of the concept of God [N*uminis*], and the natural laws of motion need to be deduced from the divine will [*ex divino nutu*] (DL, §14, p. 310).[294]

Given the young Wolff's proximity to Cartesian thought, it seems fair to assume that he works with a substance-mode ontology—which is also the case in his later work—and, consequently, that he is committed to the view that motion as a mode cannot be transferred (NT). Modes *qua* modes depend on the substances they inhere in, and the very idea that they could 'travel' violates their nature while also raising questions about their identity over time.[295] In light of the passivity of matter, i.e., its causal inefficacy, and the incomprehensibility of how motion could be shared by colliding bodies upon impact, one must take refuge in God. God makes it such that on the occasion of one body colliding with another body, the first body loses a certain degree of motion which is 'given' to the second body. He established the rule-book of mechanics and dynamics in accordance with which He rules the physical world. In the absence of other efficacious intermediate mental principles, and due to the dependence of the human mind on God both for its existence and 'actions,' God turns out to be the only mover in the physical world.

Overall, for Wolff's enquiry into speech this means that on the occasion of a volition in the mind to communicate its thoughts, God makes the body form articulate sounds. These sounds—nothing but suitably modified air set in motion and emitted when breathing out—impact (or touch) other bits of air. On the occasion of contact between some bits of air with others, God makes the latter move. Sounds 'travel' until they reach the ear of the interlocutor (DL, §27). On the occasion of contact with the interlocutor's body, God brings about the idea in her mind. if all goes well, the idea which one wished to be communicate will be 'shared with another mind.

Strikingly, the young Wolff's explanatory procedure closely resembles Gérauld de Cordemoy's account in the latter's *Discours physique de la Parole* (1668) (analysed in some detail in section 2.3 of my first chapter). Not only are the young Wolff and Cordemoy concerned with the same problem (that is, explaining speech), they also avail themselves of the same ontological and metaphysical resources. They both employ a substance dualist ontology in the Cartesian tradition as well as the classical

294 "Cum enim in materia præter meram extensionem nil quicquam deprehendamus, nec ullum motus ex uno subjecto in aliud migrantis habeamus conceptum; […] ideæ materiæ obscuritas per conceptum Numinis dispellanda atque ex divino nutu leges motus naturales deducendæ" (DL, §14, p. 310).

295 See also section 2.1 of my chapter on Cordemoy, as well as section 3.2 of my chapter on Sturm.

substance-mode distinction. Accounting for speech, that is, the communication of thoughts by means of physical signs, leads to an explicit engagement with what we nowadays have grown used to calling the mind-body problem. Wolff and Cordemoy both opt for an occasionalist solution.[296] However, neither the young Wolff's nor Cordemoy's occasionalism are *ad hoc* invocations of the deity to bridge the ontological gap between mind and body. Rather both are developed as a comprehensive solution to the communication problem broadly conceived. Occasionalism accounts for body-mind as much as for body-body relations. More specifically, Wolff makes it clear that by means of ruling out true causal relations between similar substances, true causal relations between dissimilar substances are ruled out as well:

> You cannot say here that dissimilar things can become so similar by some intervening medium that they can mutually act on one another: because we have indeed shown the nullity of this assertion that similar things can act on one another, we have therefore *eo ipso* disposed of this objection which could have been made (DL, §15, p.310).[297]

Having shown in the preceding paragraphs that minds cannot act on other minds (DL, §§12, 13) and that bodies cannot act on other bodies (DL, §14), Wolff thinks he has laid the foundations for disproving real efficient causal relations between minds and bodies. If two substances of the same kind cannot even act on one another, how could two substances of different kind do so? Furthermore, even if one considers introducing a medium like animal spirits to bridge the gap between the mind and the body this is of no avail as the problem of how motion could be communicated from minds to animal spirits recurs. Even if minds and animal spirits share some kind of metaphysical subtlety, this does not explain how minds can make animal spirits move (DL, §15). The radical ontological independence of substances in conjunction with the fact that modes are non-transferable entities preclude real inter-substantial causation between finite substances. The young Wolff, thus, avails himself of a motive found in Cordemoy (and La Forge) in claiming that body-body interactions are just as hard to understand as other interactions between substances.

However, deviating from Cordemoy, who holds that the communication between pure minds is easier to understand than that between embodied minds (*Discours physique de la Parole*, 143), Wolff also holds that interaction between minds is as difficult to comprehend interaction between bodies: "There exists no lesser difficulty to conceive in what way a body [acts] on a body than [in what way] a mind acts on a mind" (DL, §14, p. 310).[298] This suggests that, for Wolff, every form of inter-substantial causation is puzzling.

296 This suggests that there is some grain of truth in the old historiography of occasionalism as a solution to the mind-body problem. The falsity of this historiography, however, consists in limiting occasionalism to being a mono-perspectival solution to this one problem only, and in thinking that it was an *ad hoc* solution at that.

297 "Non est, quod hic dicas, per medium aliquod intercedens res dissimiles fieri posse similes, ut in se mutuo agere valeant: quia enim assertionis hujus, simile in sibi simile agere posse, nullitatem ostendimus, eo ipso quoque hanc quae fieri poterat objectionem removimus" (DL, §15, p. 310).

298 "Non minoris […] difficultatis existit sibi concipere, qua ratione corpus in corpus, quam qua mens in mentem agat."

Also, the young Wolff and Cordemoy concur again in that modes *qua* modes cannot migrate from one substance to another, and that the mind is a passive as the body. This shows why communication of motion in the physical realm is as difficult to comprehend as the communication of thoughts and ideas by means of physical signs. On top of this, both the young Wolff and Cordemoy are convinced that there is nothing in finite substances that either logically or metaphysically entails a connection between them. As a consequence of the relatively thin Cartesian account of essences of minds and bodies, each of which are characterised by one principal attribute (thought and extension, respectively) and as a consequence of the conception of substances *qua* substances in terms of their independent existence from one another (bracketing God), it follows that finite substances contain nothing in themselves that could connect them with other finite substances. In a way, they are worlds apart. However, this world is full of regularities. For instance, *ceteris paribus*, every unsupported heavy body will fall downwards. Whenever a body *x* collides with a (suitably disposed and suitably proportioned) body *y*, which was at rest before, *x* sets *y* in motion. For both the young Wolff and Cordemoy, God, in virtue of His omnipotence and omniscience, establishes the nomological connections obtaining in the world. Regularities or laws of nature are thus not grounded in the essences of finite substances, but in the will of God. God's causal power provides the metaphysical cement which holds the world together.

The young Wolff and Cordemoy differ to some extent concerning the use of speech. While the young Wolff does mention the socio-political function of speech in that "through taking of care of the conservation and perfection of others, man seeks the conservation and perfection of his own nature" by communicating thoughts to others (DL, §38, p. 325), the main function of speech is to praise God's glory (ibid.).[299] Cordemoy meanwhile argues that only by means of speech are individuals able to associate and form social groups, families, towns, and ultimately states. We have seen that speech is a necessary element of Cordemoy's ambitious project of reconstruction of human reality.

Due to his proximity to ideas propagated by early modern French occasionalists, and indeed Sturm, Wolff qualifies as a second-generation occasionalist in the same way as Sturm does.[300] Wolff avails himself of the same elements constitutive of French occasionalism, such as the passive nature of matter (PN), the non-transfer of modes (NT), a form of CCC (perhaps) as well as the feebleness of the mind in order to establish wholesale occasionalism. He even argues for inter-mental occasionalism (DL, §§12, 13), i.e., occasionalism between two distinct minds where at least one of them is disembodied as in the case of the exchange of thoughts between a human being and an angel, as do both Cordemoy and Malebranche.[301]

299 The whole passage reads in Latin: "Cum enim per principia moralia constet, Rectorem hujus universi voluisse, ut homo aliorum conservationi & perfectioni consulendo naturæ propriæ conservationem et perfectionem quærat; necessarium utique esse, ut suas cogitationes aliis significare valeat, nemo non, me tacente, intelligit" (DL, §38, p. 325).

300 See section 3.2 of the second chapter of my dissertation.

301 Since my focus is not on inter-mental occasionalism, I will not discuss it here. It serves, however, to further corroborate my claims about the young Wolff's dependence on French early modern occasionalism.

1.2 Initial Doubts about Occasionalism: Wolff's Correspondence with Leibniz

Initiated by the mediation of Otto Mencke, the editor of the *Acta Eruditorum*, Wolff started corresponding directly with Leibniz in December 1704. The whole correspondence consists of 148 letters: 64 from Leibniz to Wolff, 84 from Wolff to Leibniz as well as eight manuscript attachments, and nine letters to and from Leibniz pertaining to matters of the correspondence itself (Carboncini-Gavanelli 2001, 279).[302]

The main focus of this section is on the early exchange between Wolff and Leibniz and in particular their discussion of occasionalism incited by Wolff's *Disquisitio philosophica de loquela* (DL).[303] Wolff had sent the DL in his letter from 13 May 1705. He described it to Leibniz as a "Physico-Metaphysical specimen publicly presented in our Academy [i.e., the University of Leipzig] more than a year ago [*annum et quod excurrit*]," and Wolff regards it as a touchstone of "whether I am treading the right path in physics or not" (Gerhardt 1860, 26).[304] Leibniz thanks Wolff for the *Disquisitio philosophica de loquela*—as well as for another academic piece Wolff had sent, i.e., *On Cogwheels* (*De Rotis Dentatis*)—in his letter from 20 August 1705.

In these early stages, the relation between Wolff, and Leibniz fulfils the characteristics of that between student and supervisor, or else between that of protegé and patron.[305] Leibniz comments, mostly critically, on virtually every aspect of Wolff's piece, and points out further readings on the respective subject matter. Well-versed in theories of causation, Leibniz does not fail to notice that Wolff's dissertation defends "the opinion of Malebranche and other certain recent Cartesians on occasional Causes" (Gerhardt 1860, 32).[306] His strategy to convince Wolff of the falsity of the latter's occasionalist beliefs is twofold. (1) Leibniz points out that there is "another hypothesis" (*alia hypothesis*) to account for the communication between minds and bodies. Unsurprisingly, this is Leibniz's own system of pre-established harmony (ibid.). Leibniz backs up his case by providing his 'student' with further readings, that is, his own articles in the *Journal des Savants*, his exchange with Bayle published in the *Histoire des Ouvrages des Savants*, and Bayle's article 'Rorarius' in the latter's

302 The only available edition of the Wolff-Leibniz correspondence remains the Gerhardt edition (1860). However, Gerhardt's is by no means a critical edition. Carboncini-Gavanelli (2001, 280) points out correctly that Gerhardt's edition "is based on the self-evident assumption of that time [i.e., Gerhardt's] that Wolff were no important philosopher, but merely an ambitious young learned man who did nothing other than propagate Leibnizian ideas." Indeed, Gerhardt cannot help but portray Wolff as jealous of Leibniz's originality (Gerhardt 1860, 5), and dependent upon Leibniz (ibid, 11). He even goes so far as to accuse Wolff of exploiting Leibniz (ibid., 6).

303 A concise summary of the early correspondence—the first nine letters—including the philosophical matters touched upon is given by Specht in his epilogue to the *Disquisitio philosophica de loquela*, 283-289.

304 "Ut vero Excellentiæ Vestræ pateat, utrum in physicis recto incedam tramite, necne, commoda hac occasione transmittere placuit specimen aliquod Physico-Metaphysicam ante annum et quod excurrit in Academia nostra publice propositum" (Gerhardt 1860, 26).

305 At least in matters concerning Wolff's professional life, he often appeals to Leibniz's patronage (*patrocinium*). See for instance Gerhardt 1860, 14, 28.

306 "sententiam Malebranchii et aliorum quorundam Cartesianorum recentiorum de Causis occasionalibus" (Gerhardt 1860, 32).

Dictionnaire Historique et Critique.[307] (2) Leibniz already gives Wolff a hint of where he thinks the problem with occasionalism lies:

> In explaining the interaction [*commercio*] between the body and the soul one must not seek refuge to the divinity [*Numen*] alone any more than in [explaining] the interaction between bodies among one another by means of mechanical operations. In fact, in both cases motion can be explained distinctly, otherwise one has recourse to [a] miracle (Gerhardt 1860, 32).[308]

Leibniz's argument from the invocation of (perpetual) miracles by occasionalist authors becomes more intelligible when seen in connection with the articles Leibniz suggested to Wolff. In the issues of the *Journal des Savants* of 27 June and 4 July 1695, Leibniz anonymously published *A New System of the Nature and Communication of Substances, and of the Union of the Soul and Body*.[309] This is not only Leibniz's first public presentation of his system of pre-established harmony, but more generally a condensation of the whole of his philosophy. As it treats of the mind-body problem—dealt with in the issue of 4 July 1695—it also contains a critical discussion of occasionalism, or, what Leibniz famously labels '*the system of occasional causes*' (AG, 143; emphasis in original). Here, we find Leibniz's objection concerning the invocation of perpetual miracles by occasionalist authors that he refers to in his correspondence with Wolff.

While Leibniz agrees with the occasionalists that "speaking with metaphysical rigour, there is no real influence of one created substance on another, and that all things, with all their reality, are continually produced by the power [*vertu*] of God" (ibid.), he points out that:

> in solving problems it is not sufficient to make use of the general cause and to invoke what is called a *Deus ex machina*. For when one does that without giving any other explanation derived from the order of secondary causes, it is, properly speaking, having recourse to miracle. In philosophy, one must try to give reasons by showing how things are brought about by divine wisdom, but in conformity with the notion of the subject in question (ibid.; emphasis in original).

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307 Leibniz (Gerhardt 1860, 32) mentions that reading material on his hypothesis can be found in the "Diariis Gallice Parisiis et in Batavis editis" = the *Journal des Savants;* "in Diario Batavo" = *Histoire des Ouvrages des Savants;* and "Baylii Dictionario v. Rorarius" = the article 'Rorarius' in Bayle's *Dictionnaire historique et critique*. I rely on Specht (2019, 285, n5) for identifying these sources. Specht (ibid.) adds that Wolff could have easily found Leibniz's *De primæ philosophiæ emendatione, et de notione substantiæ* in the 1694 edition of Mencke's *Acta Eruditorum*.

308 "In commercio inter corpus et animam explicando non magis ad solum Numen confugiendum est, quam in commercio corporum inter se per mechanicas operationes. Utrobique enim motus distincte explicari potest, alioqui ad miraculum recurretur" (Gerhardt 1860, 32).

309 I will be using Ariew's and Garber's *G. W. Leibniz. Philosophical Essays* (= AG), 138-145. For more background information on the publication of the *New System*, see Woolhouse's and Francks' (1997) *Leibniz's 'New System' and Associated Contemporary Texts*, 7-10. Since I consider Ariew's and Garber's work the more exact translation, I will cite theirs and not Woolhouse's and Francks'.

Leibniz's critique has two sides to it. (1) Leibniz—at least sometimes—seems to understand occasionalism as a constant intervention of God in nature. Accordingly, he compares the occasionalist system of mind-body interaction to two faulty clocks (to wit, the mind and the body) that can only agree with one another insofar as they are "watched over by a competent workman, who would adjust them and get them to agree at every moment" (AG, 148).[310] The perfect agreement or harmony of mental and physical states—the fact that they are analogically speaking 'synchronous'—would call for a sheer infinite amount of little *ad hoc* fixes from God, or so the occasionalist would need to say according to Leibniz.[311] For Leibniz, this is a rather poor solution.

However, in his first edition of the *Dictionnaire Historique et Critique* (1696) in the article on 'Rorarius' (note H) as well as in his second edition of the *Dictionnaire* (1702) in the same article (this time note L), Pierre Bayle points out to Leibniz that this is not the only way to understand occasionalism. Instead of acting on a case by case basis, occasionalism assumes that God operates according to general laws (Woolhouse and Francks 1997, 74, 86f). Since God does not violate these general laws, He does not act miraculously (ibid., 86f).[312] It should be noted, however, that Bayle and Leibniz ultimately do not share the same conception of what counts as a miracle. While, for Bayle, "for an action to be miraculous it must be produced by God as an exception to general laws" (ibid., 86f), Leibniz points out that there is a popular sense of the concept of miracle which he tacitly attributes to Bayle, i.e., that of "a rare and marvellous thing," and in a more strictly speaking philosophical sense "as something which exceeds the power of created things" (ibid., 82).[313] It is in this second sense that occasionalism, according to Leibniz, provides miraculous explanations, or invokes a *Deus ex machina.* This leads us straightforwardly to the second part of Leibniz's critique.

(2) Ultimately, Leibniz believes that explanations of natural processes need to be anchored in the natural beings that partake in them. Explanations of nature must make recourse to the order of nature. They must make use of natural agents, their essence, and powers:

> It isn't sufficient to say that God has made a general law, for in addition to the decree there also has to be a natural way of carrying it out. It is necessary, that is, that what happens should be explicable in terms of the God-given nature of things (*A Letter from M. Leibniz*

310 The passage is from a letter to Henri Basnage de Beauval (1656–1710) published in the *Histoire des Ouvrages des Savants* of February 1696. For details on the publication of this letter called the 'Second Explanation of the New System,' see Woolhouse and Francks 1997, 61.

311 Along the same lines, Leibniz—in a letter (see below) commenting on Bayle's *Dictionary* article 'Rorarius' (note H) published in Henri Basnage de Beauval's journal *Histoire des Ouvrages des Savants* (July 1698)—compares the role occasionalism assigns to God to that of a "perpetual caretaker" (Woolhouse and Francks 1997, 82).

312 In the introduction to this dissertation, I have already alluded to these two readings of occasionalism, that is the Leibnizian-interventionist one, and the Arnauldian-minimalist one. The latter is the one Bayle, too, defended.

313 This distinction of a common and a philosophical use of the term 'miracle' will return in Wolff's mature argumentation against occasionalism (section 4). For more on Leibniz's discussion with Pierre Bayle, see also Lennon 1993. Radner (1993, 374) similarly points out that Leibniz and Malebranche (whose side Bayle chooses) do not agree "on what counts as being natural."

> *to the Editor* [of the *Histoire des Ouvrages des Savants*], *Containing an Explanation of the Difficulties which M. Bayle Found with the New System of the Union of the Soul and Body'* [July 1698], in Woolhouse and Francks 1997, 82).[314]

For instance, an explanation of why gold dissolves in *aqua regia* needs to take into consideration the nature of gold. An explanation along the lines of 'God wanted it so,' or 'This is due to God's ways' would be insufficient. Leibniz objects to the occasionalists that their explanations transcend the realm of nature by invoking God's decrees and His causal power. However, Leibniz's position might not do full justice to the occasionalist stance in that secondary causes do play some explanatory role. For instance, for Sturm and Malebranche secondary causes channel God's power. While secondary causes do not provide sufficient answers to *why*-questions, since they lack causal efficacy, they do provide answers to *how*-questions. Occasionalists do not invoke God at whim. Noteworthy for our endeavours here is that this objection of Leibniz contains in it the seeds of Wolff's later rejection of occasionalism as violating PSR.

Wolff's response to Leibniz's critique in the next letter from 15 October 1705 is hesitant and somewhat defensive. He confines himself to saying that he does not understand how embodied minds (*Spiritus corporibus junctos*) could communicate with their bodies unless one appeals to the will of God (*Nutum numinis confugiendum*). Otherwise, he professes not to be familiar with the system of pre-established harmony, and not to have been able to find Leibniz's articles—neither those in the *Acta eruditorum* (*Acta nostra*), nor those in the *Journal des Savants* (*Diarium Gallicum*), nor in the *Nouvelles de la République des Lettres* (*Novellas Reip. litterariæ*) (Gerhardt 1860, 39).[315]

Leibniz replies to Wolff on 9 November 1705. He repeats his suggested readings for Wolff, this time making it clear that as well as the *Journal des Savants* Wolff should consult the *Histoire des Ouvrages des Savants* which Wolff had confused with the *Nouvelles de la République des Lettres*. Furthermore, this time Leibniz introduces Wolff to the basics of his system of pre-established harmony (Gerhardt 1860, 43f). Besides reiterating his earlier critique that occasionalism makes use of perpetual miracles,

314 In his (1993) article dealing with Leibniz's critique of occasionalism, Rutherford points out with great acumen that for Leibniz "within the 'order of nature' it is not enough simply that there be some reason for anything to happen as it does; in addition, there must be what Leibniz calls a 'natural reason': a reason that displays the effect in question as following in an intelligible manner from the nature or essence of some created being" (1993, 142). Occasionalism violates Leibniz's *Intelligibility of Nature Principle:* "within the 'order of nature' it must be possible to conceive how any effect follows in an intelligible manner from the nature of its subject" (Rutherford 1993, 148). According to Rutherford (1993, 141-152), the objection Leibniz ultimately raises against occasionalism is that by abstaining from explaining nature in terms of natures, essences and inherent forces of natural agents, it fails to provide sufficient reasons of natural processes. I agree with the nature of Rutherford's interpretation of Leibniz, and believe it to be in accordance with Leibniz's philosophical view. However, I am not sure Leibniz in contrast to Wolff ever explicitly refers to the violation of PSR by occasionalist authors. Thus, we will see that Wolff develops further rather than simply adopts a critical position vis-à-vis occasionalism whose origin might well be said to be in Leibniz.

315 Specht (2019, 285 n5) is surprised that Wolff claims not to have found anything, since Leibniz's references were fairly detailed. I share Specht's sentiment. Specht (ibid.) points out that Wolff confuses the *Nouvelles de la République des Lettres* and the *Histoire des Ouvrages des Savants*—what Leibniz calls the "Diarium Batavum."

Leibniz includes another argument: occasionalism is built on fallacious Cartesian dynamics. While Descartes correctly believed that the total quantity of forces in the world is conserved, he confused the quantity of motion and the quantity of force. This led Descartes to believe that while the total quantity of motion (including that of the animal spirits, of course) is conserved, minds had the power to change the direction of the animal spirits in the body. Leibniz himself, however, had shown that "also the sum of the direction [of motions] always remains the same no less than the sum of forces [that is to say, the sum of motions]" (Gerhardt 1860, 43).[316] Indeed, Leibniz had argued in his *De ipsa natura* (AG, 157) against the Cartesians in general, and against Sturm in particular, that the total quantity of all living forces is conserved, i.e., the total quantity of motions including their directions.

This time Wolff hits the books, and sees the advantages of the system of pre-established harmony:

> The System of pre-established Harmony pleases [me] to a remarkable extent, in particular because it is both more suitable for the Philosopher than the invocation [*provocatio*] of the immediate will of the divinity [*Nutum numinis*] and because it does the most to illustrate the glory of the divinity, especially its Wisdom, which the very learned Bayle judges correctly, and (to which I add) to promote piety (Gerhardt 1860, 46).[317]

The immediate benefits of the system of pre-established harmony are that it provides a more philosophical explanation and it has religious upshots. I take the former remark to mean that pre-established harmony provides a (more) naturalised explanation of the nomological connections obtaining in the world in terms of the things themselves and their essences rather than explaining these connections in terms of God's decrees and His power. Hence, this seems to mark an acceptance, by Wolff, of Leibniz's argument regarding perpetual miracles properly understood. Wolff then continues to elaborate on the main source of his belief in occasionalism:

> For my part, since everything subsists by means of the will of God [*Dei nutu*], I have not denied that initially I had believed that in the contemplation of secondary causes eventually

316 "Descartes acknowledged that the soul does not give new forces to the body, because the same quantity of forces is always conserved in the world. In that he is correct, although he errs in this that he confused the quantity of motion with the quantity of forces; since he believes that the soul cannot alter the force [i.e., the quantity of motion], he believed that at least the direction of bodies can be altered, and that in this way the course of the animal spirits [can be] directed; [this is] more creative than true, since at that time what I have [later] demonstrated was still unknown that also the sum of the direction [of motion] always remains the same no less than the sum of forces [that is to say, the sum of motions]" (Gerhardt 1860, 43). "Cartesius agnovit animam non dare novas vires corpori, quoniam eadem semper virium quantitas servetur in mundo. Hoc recte, etsi in eo peccaverit, quod quantitatem motus cum quantitate virium confudit; quoniam ergo anima non potest mutare vim, saltem putavit eam posse mutare directionem corporum, atque ita cursum spirituum animalium moderari; ingeniose magis quam vere, nam tunc adhuc ignorabatur quod demonstravi, etiam summam directionis semper eandem manere, non minus quam virium summam." Favaretti (2018) gives a great account of the change of direction of motion doctrine in Cartesian thinkers, and its critique by Leibniz.

317 "Systema Harmoniæ præstabilitæ mire placet, inprimis quod et Philosopho magis dignum quam ad immediatam Numinis nutum provocatio, et ad illustrandam gloriam Numinis, præsertim Sapientiam ejus, recte judicante doctissimo Baylio, pietatemque (quod addo) promovendam plurimum facit" (Gerhardt 1860, 46).

> one must ultimately take recourse to the immediate will of the divinity [*nutum Numinis*] (Gerhardt 1860, 46).[318]

While it is not totally clear what Wolff has in mind here, it seems that he was convinced of occasionalism either because of Malebranche's *conservation is but continuous creation* argument (CCC) or Sturm's *argument from spatio-temporal grounding* discussed in the previous chapter—setting aside the arguments for occasionalism Wolff himself gave in the *Disquisitio philosophica de loquela*. Wolff adds that the invocation of God's will cannot be conceded before it has been shown that "the natures of things perfectly examined do not suffice to explain the effect which is observed to follow from them" (Gerhardt 1860, 46).[319] This is to say that explanations of nature have to make use of the essences of things. In other words, explanations of nature should be confined to the realm of nature. They have to abstain from invoking supernatural agency. In these early stages of Wolff's philosophical thinking about occasionalism, we find the seeds that would later develop into a full-fledged epistemological argument against occasionalism: despite the occasionalists' claims to the contrary, they cannot offer sufficient explanations of nature. By grounding the changes of nature and the nomological connections obtaining in nature in God, they violate the principle of sufficient reason. This is because, according to the occasionalist, sufficient explanations of nature have to take recourse to God and His power, but by doing so (according to Wolff) they transcend the realm of nature, and undermine nature's sufficiency.

On 8 December 1705, Leibniz expresses his contentment concerning Wolff's change of heart. However, he also provides one more remark about occasionalism, claiming that it violates what we would call the principal of physical causal closure: "The laws of bodies are violated by God on the occasion of minds" (Gerhardt 1860, 50).[320] Favaretti (2018, 213-216) shows that this is one of the fundamental differences between Cartesianism and occasionalism on the one hand, and pre-established harmony on the other hand. While "the Leibnizian physical world is causally closed […], the Cartesian-occasionalist world remains to some extent open to causation from without" (ibid., 216). While for Leibniz every physical effect must have a sufficient physical cause, the Cartesians and the occasionalists hold that physical effects can have sufficient extra-physical causes, i.e., God acting on the occasion of minds' volitions. Leibniz thinks that this is intolerable or bad physics.[321] Everything in physics must be explained physically. Wolff does not comment on this point. He seems to accept it. Indeed, he makes it his own in his future critique of occasionalism (section 4).

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318 "Equidem, cum Dei nutu omnia subsistant, non negaverim, ab initio me credidisse, in contemplatione causarum secundarum deveniendum tandem esse ad nutum Numinis immediatum" (Gerhardt 1860, 46).

319 "illa tamen provocatio non ante concessa nunc mihi videtur, quam ubi rerum naturæ perfecte cognitæ effectui explicando non sufficiunt, qui ab iis proficisci observatur" (Gerhardt 1860, 46).

320 "Nam systema causarum occasionalium necesse est statuat leges corporum a Deo violari occasione mentium" (Gerhardt 1860, 50).

321 This idea will recur in Bilfinger's critique of occasionalism. See chapter 4, section 1.1.1 of this dissertation.

Following Leibniz's letter from December 1705, the topic of occasionalism loses some importance in the correspondence. Although Leibniz and Wolff come back to it,[322] Leibniz has achieved his main goal: driving Wolff away from occasionalism.

To conclude, Leibniz raises doubts about occasionalism in his correspondence with Wolff. These doubts not only turn Wolff away from occasionalism which he had previously endorsed, but they will ultimately develop into full-fledged independent arguments against it. As we will see in section 4, the mature Wolff is particularly convinced that occasionalism violates the principle of sufficient reason in that it does not ground explanations in natural philosophy in the essences of natural beings. The mature Wolff, hence, turns his back on occasionalism mainly for epistemological reasons though also for metaphysical and physical reasons, the seeds of which can be identified in Leibniz's critique.

Now, we need to broaden our understanding of developments in Wolff's philosophical project in order to provide the background against which his mature critique and rejection of occasionalism must be placed. Furthermore, Wolff's unfolding scientific method and his rigorous grounding of everything in the world are the source material from which his mature critique of occasionalism is furnished.

2. Scientific Method

Wolff's scientific method cannot be said to be an understudied topic.[323] However, since Wolff's project of grounding the world is based on the rigorous application of his scientific method, the latter needs to be understood in order to comprehend the former. According to Wolff, since philosophy is (the most universal[324]) science (*Discursus præliminaris*, §29), it needs to abide by the standards of science. These standards themselves are universal (Gómez Tutor 2018, 89). Anything worthy of being called 'science' needs to operate in accordance with the rules of science. For Wolff, something qualifies as a science not in virtue of its object, but in virtue of how the object is dealt with; that is, scientifically or according to the scientific method. Hence, every object of human study could in principle serve as the material foundation of a certain science as long as it is dealt with scientifically (see also Gómez Tutor 2004, 36).

At the heart of Wolff's method is the idea of clearly and sufficiently explaining *everything*. Correspondingly, philosophy needs to find the sufficient reason for why things exist and why they

322 Leibniz and Wolff return to the topic of occasionalism when discussing a review article of Wolff's for the *Acta Eruditorum* discussing the *Recherches de Mathematiques et de Physiques* (1705) by Antoine Parent (1666–1726) (letters XXXIX, and XL, Gerhardt 1860, 100-104). Parent had criticised pre-established harmony, and taken the side of occasionalism. Favaretti (2018) gave me the idea of looking at these two letters.

323 The most comprehensive study of Wolff's method is Gómez Tutor (2004). Gómez Tutor (2018, 73-91) analyses the development of Wolff's method over time, and analyses its core concepts (*habitus*, *connexio*, and *certitudo*). Further studies on Wolff's method include Leinsle 1998, §6.2.1; Theis 2013, 10-21.

324 See Gómez Tutor 2018, 75-77. See also Gerlach 2001, 20-25. He characterises Wolff's philosophy as a fundamental philosophy (*Fundamentalphilosophie*) (Gerlach 2001, 22).

exist the way they do.[325] Several times in his works, Wolff expresses his discontent with fellow philosophers who did not live up to the scrupulous and uncompromising standards that proper science has to obey. One of the most prominent sources for this view is his intellectual autobiography (*Eigene Lebensbeschreibung*) where he describes not only his life but his philosophical development and, more specifically, the development of his new method. Here, he criticises the method of the schoolmen, but also voices his discontent with the lack of methodological rigorousness of his sources and teachers such as Sturm, Tschirnhaus, Hebenstreit, Bechmann, and Treuner. According to Wolff, an improper or underdeveloped method impedes scientific progress. Inversely, knowledge and use of the correct systematic method further scientific progress (*Discursus præliminaris*, §§139, 148; *De differentia intellectus systematici* [= DIS], §10).

Wolff's account of the scientific method underwent some changes over time.[326] It is more than likely that the developments of Wolff's method impacted his standpoint on a number of philosophical problems. For our purposes, the most relevant aspect is the relationship between certain developments in Wolff's method and his change of heart concerning occasionalism. I will confine myself to the essentials. One of the most striking developments is Wolff's reconsideration of the role of the syllogism. While Wolff rejected the syllogism as a means to discovering new truths in his early (Cartesian) years, the correspondence with Leibniz made Wolff appreciate and ultimately defend the syllogism as a means of structuring and advancing knowledge (see Corr 1975, 247; Corr 1972, 327-329; Corr 1970, 135).

A second noteworthy development is Wolff's rather late propagation of system-building (Gómez Tutor 2004, 271). In this regard, the DIS (1729) highlights that ideal science aims at integrative knowledge and a concatenation of proven propositions. Thirdly, and most importantly, Gómez Tutor (2004, 19) observes that the mathematical-philosophical method remained "external" to Wolff's earliest philosophical writing, the *Philosophia practica universalis* (1703). That is to say, that Wolff's commitment to the mathematical method remained rather superficial or rhetorical and that he failed to consciously reflect on and spell out the working mechanics of the method itself in his early work. He failed to see the consequences that a scientific method would have for philosophy itself and how the form affects the treatment of the subject matter. This is important, because his endorsement of occasionalism falls in exactly the period where the scientific method was not yet truly applied to philosophy itself. It is only in the *German Logic* (1712) that Wolff presents the mathematical method in a comprehensive manner (Gómez Tutor 2004, 25).

In sum, the development of Wolff's method can be captured by two characteristic traits: (1) "a process of consolidation" (*Prozeß der Vertiefung*) and "a process of clarification" (*Prozeß der Verdeutlichung*) (Gómez Tutor 2004, 278f). The process of consolidation consists in (a) rejecting a merely "external

325 Wolff's ultimate motivation seems to be that every kind of knowledge is useful and contributes to a better life (see e.g., *Discursus præliminaris*, §139, p. 70).

326 Gómez Tutor (2004) provides a very thorough analysis of the development of Wolff's method.

imitation" of the mathematical method, (b) an explication of the identity of the mathematical method with the rules of logic, (c) the assertion and justification of the identity of the rules of logic with the natural way of thinking, and ultimately the identification of the mathematical with the philosophical method (ibid., 279). The process of clarification consists in "a differentiation and systematisation within […] the scientific method" (ibid.). Setting aside Wolff's adoption of the syllogism, I take his developing belief in system-building and his rejection of a merely external application of the mathematical method, i.e., the rejection of a mere structuring of his work in a deductive fashion, to have some bearing on his later rejection of occasionalism.

My hypothesis is that as Wolff's method developed, he realised even more that occasionalism did not fit into a comprehensive system of (natural) philosophy, i.e., that occasionalism failed to prove to be a useful constituent in a philosophical system. If one takes into consideration the context of Wolff's philosophy at the time when he still endorsed occasionalism and at the time when he did no longer do so, the overall change concerns precisely Wolff's attitude towards fully embracing the ideal of systematicity within a comprehensive account of natural philosophy. Therefore, *this* background change in the evolution of Wolff's thought is what I regard as one of the main reasons for his mature rejection of occasionalism. This means that Wolff ultimately came to believe that occasionalism is at odds with the kind of clarity and distinctness insisted on by the mathematical scientific method. While these two important developments of Wolff's account of a scientific method are absent in his early philosophy, where he endorsed occasionalism, they would provide him with motivations to doubt and reject it at a later stage. It is this later stage of Wolff's thought that we will be concerned with in the remainder of what follows.

Let us now turn to the mature formulation of Wolff's scientific method. According to the mature Wolff, science is the skill to demonstrate things asserted and to prove indisputably everything that has been claimed based on indubitable reasons or principles.[327] The rigorousness of science consists in two important aspects: (1) proofs based on definitions, axioms, and experiences that are themselves unambiguous and unquestionable; and (2) proofs accurately and by means of proper logic, that is, syllogistic reasoning. While (1) concerns the soundness of the principles on which a proof is based, (2) concerns the validity of the proof itself. In other words, (1) concerns the material and (2) concerns the form of the proof or demonstration that science intends to establish.

(1) Science starts from common notions abstracted (*reducendæ*) from experience. Common notions need to be distilled into distinct notions, which—once they are given a clear signification—can enter

327 "By *Science* I understand here the skill of demonstrating the [things] asserted, that is, to deduce from certain and immutable principles by means of a legitimate conclusion" (*Discursus præliminaris*, §30, p. 14). "Per *Scientiam* hic intelligo habitum asserta demonstrandi, hoc est, ex principiis certis & immotis per legitimam consequentiam inferendi." See also Wolff's *German Logic*: "Durch *Wissenschaft* verstehe ich eine Fertigkeit des Verstandes alles, was man behauptet, aus unwidersprechlichen Gründen unumstößlich darzuthun" (*German Logic*, preface, §2, p. 1; see also ibid., ch. 7, §1; as well as *German Metaphysics*, §361). For Wolff's understanding of science as a skill (*habitus*), see Gómez Tutor 2018, 74, 77f.

into definitions and general propositions (*DIS*, §11). The distinctness of a notion consists in the ability to specify why a certain notion pertains to the thing it designates by adducing its characteristic traits (*German Logic*, ch. 1, §13). A distinct notion entails its own clarity which is nothing other than that one is able to recognise things to which the notion pertains upon their recurrence (*German Logic*, ch. 1, §9). Once we engage in the enterprise of doing philosophy, where notions are used that exceed the realm of the 'vulgar' (*Discursus prœliminaris*, §146) and the realm of common notions, accurate definitions of terms must be given.[328] Wolff distinguishes between nominal and real definitions (*Wort- und Sach-Erklärungen*) (*German Logic*, ch. 1, §41).[329] While nominal definitions help characterise a thing in order to distinguish it from other things, real definitions show how a thing is possible. Real definitions reveal the essence of things (ibid., ch. 1, §48). When it comes to composite beings, this means that real definitions (ideally)[330] show how a thing can be constructed. They are genetic or causal definitions.[331] By providing a story about the constructability of a thing, a real definition gives a reason how and why the thing defined is possible.[332] They ground the truth of a definition. A real definition of a watch, for instance, shows how it is made from gears and other items (ibid., ch. 1, §41).

What we find in Wolff's discussion of real definitions is that the principle of sufficient reason (PSR)—the principle that everything has a reason for why and how it comes to be—is interwoven in the scientific method. Real definitions, which occupy centre stage in Wolff's doctrine of definitions, employ PSR. They show how a thing can be defined by showing how it can be constructed or come into being. They thereby show how far a thing is possible. I believe that for Wolff constructability is a guide to possibility. I will show in section 3.1 that the kind of possibility at stake in real definitions is not just logical possibility, i.e., non-contradiction, but a narrower kind of possibility which I will call *physical possibility* and that this kind of possibility plays a central role in Wolff's considerations concerning the realisation or actualisation of essences. Besides giving accurate nominal or real

328 "*In philosophy one must not use terms other than [those] explained by an accurate definition*" (*Discursus prœliminaris*, §116, p. 53). "*In philosophia non utendum est terminis nisi accurata definitione explicatis*."

329 I translate 'Erklärung' with 'definition' because Wolff himself provides the Latin term 'definitio' for it in his *first register* at back of the *German Logic* (unpaginated). Wolff follows Leibniz's *Meditations on Knowledge, Truth, and Ideas* (1684) (AG, 23-27) both in his definitions of clear and distinct notions as well as in his distinction between and determination of nominal and real definitions. See Goldenbaum (2011, 38) for some further explanation of the difference between nominal- and real definitions.

330 While giving a real definition of, say, a watch as a composite entity furnished by human craft is feasible, giving a real definition of, say, an angel would exceed the boundaries of human knowledge. However, the fact that in some cases we will not succeed in providing a real definition of an entity does not make real definitions less (or un-)desirable given that the knowledge they supply is more thorough and more useful than that of mere nominal definitions.

331 See Gómez Tutor 2004, 127, 142, 144, 159; Goldenbaum 2011, 38, Leinsle 1988, 259. Specht (2019, 46) and Goldenbaum (ibid.) point out that in conceiving real definitions as genetic Wolff follows Tschirnhaus. Tschirnhaus' influence on Wolff's thinking about method is well-documented. By tracing Tschirnhaus' conception of real definitions back to Spinoza to whom Tschirnhaus claims to be indebted, Goldenbaum makes an interesting case for Spinoza's influence on Wolff. I am not going to pursue this line of thought here.

332 Gómez Tutor (2004, 144) also points out that according to Wolff "we can define things, because we can give their reasons […]. […] a real definition shows, how a thing is possible; for Wolff, this means to show how a thing can come into being."

definitions, all principles, and propositions need to be proven (*Discursus præliminaris*, §§117, 118). Nothing must be left unexplained. What is used in future chains of reasoning or argumentation must have been defined previously (*Discursus præliminaris*, §§118, 119, 120).[333]

(2) Science is demonstrative. According to Wolff, a demonstration is a proof that ultimately contains nothing other than (true) experiences, definitions and empty (self-evident) propositions as its first fundamental premises. However, it usually suffices to prove something in such a way that one terminates the proof at a point where everything on which the inference is *based* has been proven previously (*German Logic*, ch. 4, §21). In addition, Wolff's ideal of science is system-building (see his DIS)[334]: explaining everything one needs to explain and doing so by creating ever-greater chains of doctrines based on sufficiently proven principles, propositions and experiences.

Wolff's scientific philosophical method is identical with the mathematical method. However, at least on one occasion Wolff explains that the mathematical method is ultimately derived from logic. Logic, in turn, is part of philosophy, namely, psychology[335]:

> *The rules of the philosophical method are the same as those of the mathematical method.* […] No one will be surprised about the identity of the philosophical and the mathematical method, except if they do not know from where both of these rules are derived. […] Philosophy does not lend its method from Mathematics, but just as Mathematics, it takes [*haurit*] it from a more proper Logic and therefore acknowledges it as fitting for itself, because by means of it [the right method] alone one can arrive at certain knowledge, which [is] both useful for the progress of the sciences and for life (*Discursus præliminaris*, §139, pp. 69f).[336]

Wolff's praise of the mathematical way of subjecting everything to an uncompromising intellectual scrutiny is a *leitmotif* of his work. He does not confine the application of mathematical reasoning to metaphysics, but wishes to apply it even in theology (*Eigene Lebensbeschreibung*, 121). Wolff's idols of systematicity and mathematical rigorousness are, to some extent, Aristotle but more so Descartes and Kaspar Neumann (1648–1715), a teacher of his in theology. All mathematicians serve as exemplars of the correct use of the method, but especially Euclid (*DIS*, §§6, 7). What is striking about the works of mathematicians is the ordered way in which they proceed, to wit, from definitions and

333 Ideally, the place where things have been shown or explained is referenced (*German Logic*, ch. 13, §4). According to Wolff, this style of referencing is most prominently used in mathematics (*German Logic*, ch. 13, §5).

334 See also Albrecht's introduction to the *DIS*, 13, 19.

335 Wolff designates psychology as the study of the soul (*Discursus præliminaris*, §58). The soul in turn consists of two faculties, the intellectual factual (*facultas cognoscitiva*) and the appetitive faculty (*facultas appetitiva*) (ibid., §60). Logic treats of the use of the intellectual faculty (ibid., §61).

336 "*Methodi philosophicæ eædem sunt regulæ, quæ methodi mathematicæ*. […] Nemo methodi philosophicæ ac mathematicæ identitatem mirabitur, nisi qui ignorat, unde utriusque regulæ deriventur. [...] Philosophia methodum suam non mutuatur a Mathesi; sed perinde ac Mathesis eam ex veriori Logica haurit & ideo eam sibi convenientem agnoscit, quod ea sola perveniatur ad cognitionem certam, quæ cum ad scientiarum progressum, tum ad vitam utilis" (*Discursus præliminiaris*, §139, pp. 69f).

axioms to theorems and further propositions or problems (*Foundations of all Mathematical Sciences*, §1; see also Gómez Tutor 2018, 82). For Wolff, the model scientific character of mathematics lies in its procedure, not in its subject matter (Gómez Tutor 2018, 85).

Although Wolff emphasises the centrality of logical reasoning, that is, of intimately connected concatenations of inferences, he is also well aware of the necessity of content which comes from experience.[337] According to Wolff, experience is a guide to knowing the possibility of a notion, that is, whether what a notion (say, 'pink elephant') picks out could obtain in reality. We look around us, and explore the world, in order to see whether there exists a thing which corresponds to that very notion which we have created (*German Logic*, ch. 1, §34). In this respect, experience (alongside knowledge of constructability alluded to earlier) is another ground of the truth of a notion or a definition. What is more, experience also helps in substantiating knowledge claims. Reason and experience go hand in hand (*German Logic*, ch. 16, §11).[338] One might think of their relation in similar terms as the relation between the Aristotelian-scholastic principles of form and matter. Reason gives shape and structure to experience which serves as content. Just as form and matter, for the scholastics, were *incomplete* substances, in the same way, for Wolff, reason and experience are incomplete without one another. They support one another and require one another in order to exhaust their full potential. The relevance of experience also strengthens Wolff's endorsement of experimental philosophy. Experimentation can confirm an existing explanation of the world:

> In the whole of philosophy you have means of testing [*examina*], if you confirm the same thing *a posteriori* whether by means of observations or by means of experiments that had been demonstrated *a priori* (*DIS*, §12, p. 62).[339]

Despite the fact that the only experimental philosophy Wolff ever published is his *German Experimental-Physics*, he was convinced that an experimental approach could be applied to all parts of philosophy, even (natural) theology—the study of God, His attributes and His operations[340]:

> Experimental philosophy, whose use is not least to confirm *a posteriori* explications of natural things that have been made *a priori*, is not confined to the limits [*pomoeria*] of Physics alone, but extends much farther so that some kind of experimental theology itself

337 Talking about his own education, Wolff criticises the scholastics for their excessive engagement with such questions as *an Logica sit ars an scientia, an habitus et qualis habitus, num instrumentalis?* (whether Logic is an art or a science, or a skill and (if so) what kind of skill, perhaps an instrumental one?), from which nothing can be gained, and the answer to which—although he did indeed learn it—he was happy to forget later (*Eigene Lebensbeschreibung*, 115f., n1).

338 In the Empirical *Psychology* (*Psychologia empirica)* (§497), Wolff even speaks of a "marriage" (*connubium*) between reason and experience.

339 "Habes […] in omni philosophia examina, si idem a posteriori sive per observationes, sive per experimenta confirmes, quod idem a priori fuerat demonstratum" (*DIS*, §12, p. 62).

340 The original title of the *German Experimental-Physics* is *Allerhand nützliche Versuche, dadurch zu genauer Erkäntnis der Natur und Kunst der Weg gebähnet wird* (three vols., 1st edition, 1721–1723). For Wolff's definition of natural theology, see (inter alia) *Discursus præliminaris*, §57.

> can be given […], this, however, has not yet been cultivated [*exculta*] according to its scope (*DIS*, §12, p. 62).[341]

Knowledge of experimentation consists in knowing how to confirm philosophical theses by means of observations and experiments. However, it does not involve knowing the reasons behind philosophical theses nor being able to demonstrate them (*Discursus præliminaris*, §54). Hence, it is located midway between historical knowledge, that is, knowledge of facts (*Discursus præliminaris*, §3), and philosophical knowledge, that is, knowledge of reasons (*Discursus præliminaris*, §6). Someone possessing knowledge of experimentation knows the philosophical theses at stake—albeit in a purely factual manner. This counts as historical knowledge for Wolff as long as that person is not able to demonstrate them (*Discursus præliminaris*, §8). Knowledge of experimentation exceeds mere historical knowledge in that one is able to confirm philosophical theses and show some command over them other than solely being able to state them. Insofar as one possesses a skill of conducting experiments, one is closer to philosophy as the most universal of all sciences. Insofar as one lacks the ability to logically demonstrate philosophical theses, one is closer to history, which is not a science.[342]

Experience and experiments have a double role to play: they provide reason with content, and they serve as checks and balances of reason (Gómez Tutor2018, 89). As to the former, they provide a starting point for scientific scrutiny. As to the latter, experience and the outcomes of experiments set boundaries for philosophical thought. They do so in the sense that any philosophical doctrine has to be compatible with experience and experiments so as not to collapse into idle and unsupported free thinking. It is important to bear this in mind, because Wolff evaluates philosophical doctrines against experiential and experimental data.

Closely connected to experimentation is Wolff's commitment to quantification and measurement. Besides historical and philosophical knowledge, Wolff—inspired by Newton's *Principia mathematica*—emphasises the role of mathematical knowledge, that is, knowledge of quantities (*Discursus præliminaris*, §14). The effects of natural causes can be measured. This in turn serves as another way of confirming philosophical reasoning:

341 "Philosophia experimentalis, cujus haud postremus usus est explicationes rerum naturalium a priori factas a posteriori confirmare, non intra Physicæ solius pomoeria continetur, sed multo latius patet, ita ut ipsius theologiæ experimentalis quædam species detur […], utut hactenus nondum pro sua amplitudine exculta" (*DIS*, §12, p. 62).

342 For experimental knowledge as a fourth kind of knowledge in Wolff alongside (1) historical, (2) philosophical, and (3) mathematical knowledge, and in-between (1) and (2), see also Gómez Tutor 2004, 64f. When it comes to the practical side of experimentation, Wolff stresses the importance of carefully documenting the circumstances under which experiments are conducted so as to guarantee their repeatability and verifiability (*German Logic*, ch. 5, §12). Furthermore, one needs to carefully study the materials used as well as their properties (*German Logic*, ch. 5, §13).

> *If the quantity of the effect is shown* [*demonstratur*] *to be proportionate to the forces of the cause, philosophical knowledge gains* [*haurit*] *perfect certitude from mathematical* [knowledge] (*Discursus præliminaris*, § 27, p. 12).[343]

Wolff's idea here is that effects of underlying causes can be measured. For instance, we can measure the velocity of a moving object. The cause of the velocity of the moving object is a certain motive force. If the velocity of the moving object is proportionate to the moving force attributed to it, then the attributed motive force, which can only be approximated through its effect, gains credibility.[344]

Wolff is well aware of the difficulty of applying his scientific method. Acquiring the skill of proper reasoning takes practice (*German Logic*, ch. 16, § 1). Indeed, Gómez Tutor (2018, 74) points out that insofar as science is a skill, it can both be obtained but also lost if it is not practised. Furthermore, since philosophy covers a vast array of different objects, such as God and his attributes (*Natural Theology*), the soul (*Psychology*), the soul's appetitive faculty (*Practical Philosophy*) as well as its cognitive faculty (*Logic*), bodies in general (*Physics*), bodies insofar as they constitute the world as a whole (*Cosmology*), living bodies (*Physiology*) etc., no one can be a philosopher in everything (*Discursus præliminiaris*, §86). The multitude of things to be studied is simply too vast. This insight motivates Wolff's conception of science as a collective endeavour ("Conjunctis viribus laborandum," *Discursus præliminaris*, §86).[345] Science grows in virtue of the joined works (*conjuncta opera*) of the many put together in an increasingly complex systematic form (*DIS*, §9). Besides a conception of science as a collective endeavour, Wolff shares other (what I call) 'eclectic intuitions,' such as a general anti-authoritarian attitude (*German Logic*, ch. 13, §§13, 15)[346]; a commitment to the importance following one's own judgement (*Discursus præliminaris*, §156); and an emphasis on selecting from other authors what seems true, good and useful.[347]

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343 "*Si quantitas effectus viribus causæ proportionata demonstratur, cognitio philosophica a mathematica haurit omnimodam certitudinem*" (*Discursus præliminaris*, § 27, p. 12).

344 What Wolff seems to omit, here, is that for this to work the cause would need to be quantified as well. The cause, as well as the effect, needs to be measured.

345 Wolff also points that "[*w*]*hen men have started to philosophise by means of the philosophical method, they will promote the development* [*incrementa*] *of the sciences through united forces*" (*Discursus præliminaris*, §170, p. 102). "*Quando methodo philosophica philosophari cœperint homines, collatis adeo viribus incrementa Scientiarum promovebunt*." To some extent, Wolff might also be influenced by the Protestant idea of the feebleness of the postlapsarian human mind, i.e., the epistemic limitation associated by many Protestant, but also some Catholic thinkers with the Fall of Adam. Since the Fall, our minds are said to be corrupted and only a collective effort of the many can restore what was lost after Adam's expulsion from Paradise. I have touched upon this point in chapter 2, section 1. In general, see Harrison 2007.

346 "Those who are endowed with a systematic intellect, are immune to the prejudice of authority, and apt to proceed [*agere*] as eclectics" (*DIS*, §16, p. 76). "Qui intellectu systematico prædíti sunt, ab autoritatis præjudicio immunes, & eclecticos agere apti sunt." For the eclecticism of one of Wolff's main influences, i.e., Johann Christoph Sturm, see chapter 2, section 1.

347 The preceding quote (given in n346) is followed (a few lines later) by the following: "That person is said to proceed as an eclectic, who selects that which is best from [other] Authors, distinguishing what is true from what is false, discerning what is certain from is uncertain" (*DIS*, §16, p. 76). "Eclecticum agere dicitur, qui ex Autoribus optima quæque seligit verum a falso separans, certum ab incerto discernens." Wolff's relationship to eclecticism is more complex than this. Although being surrounded by eclectic philosophers (intellectually speaking), "Wolff initially had not devoted much attention to the topic of eclecticism. Only the controversy with the theologian and philosophical eclectic Budde aroused his [Wolff's] interest in 1724.

What is the aim of Wolff's scientific method? He leaves no doubt that it is certainty (*certitudo*): "*In philosophy one must strive for complete certainty*" (*Discursus præliminaris*, §33, p. 15).[348] It is precisely the absence of a developed comprehensive scientific method that explains why past philosophers have fallen short of truly advancing the sciences.[349] Without a proper method, no certainty can be obtained. Despite the fact that science strives for certainty, Wolff is well aware that knowledge that is certain cannot always be had. Sometimes only probable or hypothetical knowledge is possible. However, probable knowledge is admissible, since it can be practically useful in daily life (*Discursus præliminaris*, §125).[350] Wolff's definition of a hypothesis is the following:

> I therefore define *a philosophical hypothesis* as an assumption [*sumtionem*] of those things which cannot yet be demonstrated [*demonstrari*] as existing [*tanquam essent*] for the sake of providing a reason (*Discursus præliminaris*, §126, p. 60).[351]

Hypotheses serve an explanatory role. They help to make sense of the world under the assumption of 'as if'. They give us some guidance in practical reasoning. Furthermore, they are part of philosophy insofar as they lead the way to finding the truth. However, they have to live up to experience. If they are contrary to experience, they are falsified. If they align with experience, they gain probability (*Discursus præliminaris*, §127). Furthermore, Wolff cautions against the excessive use of hypotheses and makes clear that they cannot be used as principles in the demonstration of a proposition (*Discursus præliminaris*, §128). Insofar as hypotheses constitute explanations of phenomena, such as the mind-body correspondence, that is, the perfect alignment of mental states (thoughts, sense-perceptions, etc.) and physical states (bodily motions), they compete with one another. In this competition, they must be accurately presented and assessed in terms of whether they are compatible with the experiential data, established principles as well as the laws of nature, and how well they fare in rendering intelligible the given phenomena. Wolff demonstrates this assessment in utmost detail in the case just mentioned, i.e., mind-body correspondence. He presents three hypotheses (1) physical

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Wolff now distanced himself from eclecticism, which he pinned down to or reduced to [mere] selection for this purpose. […] Wolff distinguished two forms of eclecticism: an unsystematically collecting [form of] eclecticism, and a selection of what is true [*des Wahren*] proceeding in accordance with the standard of the underlying system which [i.e., the selection] complements the system" (Albrecht, introduction to the *DIS*, p. 20). While rejecting the first form of eclecticism, the second form of eclecticism resolves into Wolff's conception of systematic thinking, and system-building (ibid., 21). Carboncini (2018, 490f) also briefly discusses the case of eclecticism in Wolff. Wolff's relationship to eclecticism, however, deserves an independent and comprehensive examination—one which cannot be given here.

348 "*In philosophia studendum est omnimodæ certitudini*" (*Discursus præliminaris*, §33, p. 15). See also Gómez Tutor 2018, 74, 80f.

349 Leinsle (1988, 254) points out that "in the hitherto existing scholastic philosophy, he [Wolff] misses certitude [*Evidenz*] and practical use [*Nutzen*], the most important traits which a science in the spirit of the Enlightenment must offer."

350 See also, Corr 1970, 140; Corr 1972, 330; Gómez Tutor 2004, 76.

351 "Definio itaque *Hypothesin philosophicam* per sumtionem eorum, quæ esse nondum demonstrari potest, tanquam essent, rationis reddendæ gratia" (Discursus præliminaris, §126, p. 60).

influx, (2) occasionalism, and (3) pre-established harmony, and ends up rejecting (1) and (2), opting for (3) as the best hypothesis (*Psychologia Rationalis*, section three, chapters two to four).[352]

To conclude, Wolff's scientific method seeks nothing less than an explanation of the world around us that is comprehensive, systematic and certain. Explanations need to start from clear and distinct notions, well-defined, *real* definitions; accurate and sufficiently explained principles from which propositions can be derived by means of rigorous syllogistic reasoning. Reason seeks sufficiency (PSR), and it cannot function properly without experience. Real definitions showing the constructability of a thing as well as experience showing the *de facto* existence of a thing connect the mathematical method to truth. They provide reasons, and hence grounds for a thing's existence. They also constrain philosophical reasoning. Experimentation and quantification of phenomena contribute to philosophy. Experience, and experimentation provide the data and serve as correctives for philosophical reasoning. Given the vastness of the phenomena to be enquired, science should be a collective endeavour of the many. One needs to follow one's own judgement not the confinements of authority. Wolff's own work is the lived reality of the stringency and rigour of his scientific method.[353] At the time of his endorsement of occasionalism (section 1), Wolff's method had not yet been fully developed nor thoroughly applied to the philosophical material. Instead, it remained external to it. Wolff's rigorous standard of sufficiency in explanations, his emphasis on real definitions, the idea that philosophical hypotheses have to live up to experience and the most exact natural science of the time as well the importance of system-building bear (directly or indirectly) on his rethinking of occasionalism.

3. Metaphysics and Natural Philosophy

Wolff's project in metaphysics and natural philosophy is the large-scale discovery of the causal relations that constitute this world. Sufficiently understanding and explaining the world guided by the strict scientific method he propagates not only allows for the improvement of the human condition, but Wolff also believes that knowledge of nature leads to knowledge (and, in turn, the veneration) of God.[354]

352 I will analyse Wolff's objections against occasionalism (though not against physical influx) in detail in section 4 below.

353 His various Latin works on different realms of philosophy therefore all carry the subtitle 'modo scientifica pertractata' (treated scientifically).

354 Wolff makes this point on a number of occasions, *inter alia*, in the *German Metaphysics* (especially in his natural theology, i.e., chapter six, e.g., §1045); in the preface to the *German Physics;* in the *German Teleology* (e.g., §§2, 5, 6, 8, 19-22); in the preface to the *Foundations of All Mathematical Sciences* (*Anfangsgründe aller mathematischen Wissenschaften*). For the pervasiveness of physico-theologies, i.e., the idea that knowledge of God can be obtained by means of knowledge of nature in German physics textbooks, see Lind 1992, e.g., 15-22, 76f. For the case of Wolff, see ibid., 19, 104. Lind (1992, 345 n34 and n36) mentions a list of physico-theological works created by Fabricius that includes Wolff among the respective authors.

Wolff's metaphysical and natural-philosophical project comes in two parts: (1) a positive account of how a philosopher should enquire into the world around her. This entails the use of the two fundamental principles of (non-)contradiction (PoC), and sufficient reason (PSR) to explain how things possible become actual and in which relations of dependency and grounding they stand vis-à-vis one another. (2) A critique of previous philosophical projects—mainly those of Aristotelian-scholastic and Cartesian origin—and the failure of their respective natural philosophies to live up to the high standards of philosophy as the most fundamental and universal science. Accordingly, this section is divided into two parts: Wolff's positive endeavour of grounding the world (3.1), and his objections to previous philosophies, and most relevant for our purposes, previous physics (3.2).

3.1 Grounding the World

Wolff seeks a thorough and complete understanding of the world, that is, its ultimate constitutive principles. What are these principles, and what is their connection to causes? To what extent do either of them ground and actualise the world? What role does the principle of sufficient reason play in this? Ito identify Wolff's answer to these most fundamental questions, it is necessary to look at his discussion of the Aristotelian four causes, and the roles they play in grounding the world. Insofar as the actualisation of the world is concerned, it will also be crucial to decide whether or not these causes are *truly* causes. Before venturing into the discussion of Wolff's theory of grounding and causation, I will briefly explain the relation between principles and causes and why it is legitimate to move from discussing principles to discussing causes.

Wolff's chapter on causation in the *Ontology* (§§866-951) begins with a discussion of principles. A principle is defined as "that which contains in itself the reason of another [being]" (*Ontology*, §866, p. 645).[355] The principle's counterpart, the principiate (*principiatum*) on the other hand, is that "which has its reason in another [being]" (ibid.).[356] Principles precede principiates (*Ontology*, §867) and principiates depend on principles (*Ontology*, §868). Finally, if the principle is posited, the principiate is also posited and vice versa (*Ontology*, §§877, 878). The principle explains why the principiate obtains, it antecedes the occurrence of the principiate, and the occurrence of the principiate entails the occurrence of the principle and vice versa. While the dependency of the principiate on the principle seems clear as concerns epistemology and temporality, its ontological dependency might seem less clear. However, I think that insofar as the principle is clearly self-sufficient in a sense that the principiate is not, the same dependency or asymmetry can be shown to hold in the realm of ontology, too. Hence, principles and principiates stand in a relation of epistemological, temporal and ontological dependency.

355 "*Principium* dicitur id, quod in se continet rationem alterius" (*Ontology*, §866, p. 645).
356 "*Principiatum* vero, quod eidem [the principle] opponitur, appellatur, quod rationem sui in altero habet" (*Ontology*, §866, p. 645).

Peter Anstey in his (2020) encyclopaedia entry on the use of principles in early modern philosophy identifies propositional principles and ontological principles as the two main types of principles present during this time. While the former play a foundational role in knowledge acquisition (Anstey 2020, 2-4), the latter refer to manifest "actual entities, whether they be properties, modes, or substances" (ibid., 2; see also 4f). Reading Wolff, it is clear that causes predominantly qualify as ontological principles.[357] According to Wolff, a cause in general is "a principle on which the existence or actuality of another entity distinct [*diversi*] from itself depends both insofar as it exists and insofar as it exists in such a way [the way it does]" (*Ontology*, §881, p. 652).[358] Since a cause is a kind of principle, it behaves in the same way a principle does. That is to say, the cause contains the reason for the occurrence of the effect (Ontology, §883). Furthermore, causes precede their effects (*Ontology*, §906). When the action of a sufficient (efficient) cause is posited the effect is also posited (*Ontology*, §898), i.e., effects ontologically depend on (the action of) their causes. We find here the same epistemological, temporal and ontological dependency between causes and effects as in the case of principles and principiates. Hence, the cause-effect pair is an instantiation of the genus of principle-principiate. Due to the extent of the discussion of causes in a chapter that starts out by defining 'principle,' I take it that they are the most important principles for Wolff. Causes need to be studied to unravel the hidden structure and constitution of the world.

Wolff's order of presentation of causes in the *Ontology* deviates from the common textbook practice. He discusses first the efficient cause, then final cause, the formal cause, and ends with the material cause. I take this to reflect both the descending importance he assigns to each of them, and the (lesser) sense in which they count as causes for him.[359] Here, though, I will stick to the classical order that can be found in most early modern physics' textbooks: material cause, formal cause, efficient cause, final cause.[360] This will also make it more understandable how these causes contribute to grounding the world, from its possibility to its actuality.

The Material Cause & Matter

Wolff treats the material cause or matter as purely passive (*German Metaphysics*, §622), which adds to the composition of a complex thing. In fact, composite beings seem to owe their extension or their materiality to matter. *Qua* passive, matter cannot really count as a cause insofar as the actuality of a thing is concerned. It might be more reasonably regarded as an internal principle (*Ontology*, §880), but

357 Two things in passing: (1) Anstey (2020, 2) seems to identify "principles in both mathematics, and natural philosophy" as a third intermediary type of principles insofar as they are stated in propositional form, but require ontological principles as their truth-makers (ibid., 4). (2) Anstey points out that "the relationship between ontological principles and propositional principles in early modern philosophy is often very close"(ibid., 4). To my understanding, this is true of Wolff's philosophy, too.

358 "*Causa* est principium, a quo existentia sive actualitas entis alterius ab ipso diversi dependet tum quatenus existit, tum quatenus tale existit" (*Ontology*, §881, p. 652).

359 Indeed, the only cause Wolff discusses in his (less scholastic) *German Metaphysics* is the efficient cause.

360 Such an order can, for instance, be found in Sturm's *Physica electiva* (1697). See chapter 2 of this dissertation.

not as a cause. In this, Wolff follows a tendency already present in Sturm's natural philosophy. Sturm, in turn, ascribed this way of dealing with matter to Du Hamel. Without venturing into the intricate discussion of the relation between simple and composite beings, I need to point out, however, that matter itself is a composite being insofar as it has parts (*German Metaphysics*, §§185, 51). Composite beings are grounded by simple beings (*German Metaphysics*, §76). The role matter plays in grounding the world—due to its passivity as much as due to its composite nature—is of lesser importance.

The Formal Cause & Essence

Wolff equates the formal cause with an entity's essential determinations (*determinationes essentiales*) (*Ontology*, §944), or an entity's essence. It is that which makes the thing the very thing it is (*Ontology*, §945). A thing owes its ability to act, which Wolff takes to be a force, to its essence (*Ontology*, §946). Things are hence essentially endowed with a force to act.[361] This will be important for our discussion of the efficient cause to follow shortly. As scholastic as Wolff's conception of essence might sound, it is actually heavily indebted to mechanical philosophy—at least in the case of composite beings. Wolff conceives the essence of a composite being as depending on the structure or arrangement of its parts: "A composite thing has its essence through the composition of its parts" (*German Metaphysics*, §74, p. 35).[362] The study of the essence of composite beings therefore inevitably leads to the study of these beings' composition, i.e., the relation of their parts.[363] Hence, in paragraph 944 of the *Ontology*, for example, Wolff explains that:

> Someone understands the form of the human body, who understands not only the structure, hence, the shapes of [its] organic parts and the way [*modum*] in which they are connected to one another, but also the mixture of similar parts of which organic [ones] are composed (*Ontology*, §944, p. 682).[364]

According to Wolff, the formal cause or essence partially grounds the actuality of an entity. It provides a reason for and precedes an entity's actual existence.[365] However, essence does not provide a reason for the very existence of an entity. According to Wolff, the essence of a thing insofar as it is logically non-contradictory provides a first reason for the actuality of the thing. If the essence contained logically contradictory predicates, the thing whose existence is at stake would not even be possible, i.e., conceivable, and could, hence, never become actual.

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361 Strictly speaking, simple beings are ultimately endowed with a force to act.

362 "Ein zusammengesetztes Ding hat sein Wesen durch die Zusammensetzung der Theile" (*German Metaphysics*, §74, p. 35). See also *Ontology*, §533.

363 See, e.g., *German Physics*, §385 for the case of plants.

364 "Ita e.gr. formam corporis humani intelligit, qui non modo structuram, consequenter partium organicarum figuras & modum, quo inter se juguntur; verum etiam mixtionem partium similiarium, unde organicæ componuntur, intelligit" (*Ontology*, §944, p. 682).

365 École in his (2001, 61) points out that Wolff's conception of essence as possessing primacy over existence is indebted to Suárez.

To put it a little differently, philosophy, for Wolff, is the most universal science whose aim is to sufficiently explain everything: "*Philosophy* is the science of possibles insofar as they can exist" (*Discursus præliminaris*, §29, p. 13).[366] *Qua* science, philosophy abides by the rigorous standards that distinguish science from other human enterprises (section 2). 'Possible' is anything that is not impossible, that is, anything that does not involve a (logical) contradiction (*Ontology*, §85; *German Metaphysics*, §12). This line of reasoning straightforwardly leads to the first of the two indisputable and fundamental principles that Wolff's project is based on: *the principle of (non-) contradiction* (PoC): that which is said to exist cannot at the same time be said not to exist (*Ontology*, §29; *German Metaphysics*, §10). A contradiction arises from the conjunction of the affirmation of something (A) and the negation of the very same thing (¬A) at the same time (A ∧ ¬A) (*Ontology*, §30). So, the non-contradiction of a thing's essential predicates provides part of a sufficient reason for the possibility of the thing's existence, but not for the thing's actuality, i.e., for the fact that the thing really obtains in the world. In this sense, PSR, the second indisputable and fundamental principle stating that everything which exists has to have a sufficient reason why it exists (rather than not to exist), and why it exists the way it does (*German* Metaphysics, §30; Ontology, §56) can be seen as being even more fundamental than PoC.[367]

The logical possibility of an entity's predicates seems to be a first step of an underlying, and therefore somewhat more fundamental, process of identifying a complete set of sufficient reasons for the entity's possibility. Non-contradiction, however, is not the only criterion determining possibility. This is because I believe there to be two senses of possibility in Wolff. A first order logical possibility determined by the principle of non-contradiction, and a second-order physical possibility determined by the constructability of a thing, or the ability to account for the thing's creation.

I will call this *the constructibility criterion of physical possibility* (CCPP):

CCPP = (df.) *If it can be shown how to construct x, then x is physically possible.*

I take physical possibility (PP) to be defined as follows:

PP = (df.) *x is physically possible in world w, if x can obtain in world w.*

CCPP depends on Wolff's understanding of real definitions discussed before (section 2). We have seen that real definitions in contrast to nominal definitions aim at understanding essences or natures of things precisely by understanding how they can be constructed. It should be noted that while something might be logically possible, that does *not* necessarily mean that it is physically possible. The physical possibility of a thing might be called into question due to physical inconsistencies in the thing's structure—either because (a) it cannot be shown how to make it, or else because (b) it fits poorly with other things already established in this world. Wolff defines a world as a "series of

366 "*Philosophia* est scientia possibilium, quatenus esse possunt" (Discursus præliminaris, §29, p. 13).

367 Hence, I am not convinced by readings claiming that for Wolff PSR is derivable or deducible from PoC, e.g., Corr's (1975, 254).

mutable things […], which exist side-by-side or follow one another, but are overall connected to one another" (*German Metaphysics*, §544, p. 332).[368] Constructibility—the idea that one can show how a thing could be made—provides a strong guide in assessing the physical possibility of a thing. Showing how a house can be built provides evidence for the realisability of the house—although it might be the case that no such house exists in the world. Wolff is clearly inspired by the maker's knowledge tradition in this regard.[369] Furthermore, Wolff's mechanical understanding of the essence of composite beings supports CCPP. Since composite beings owe their essence to the composition of their parts, their generation or production becomes intelligible by studying their construction (*German Metaphysics*, §92). With all (ultimately simple) parts at hand, one can show how a composite being can be furnished by arranging the parts properly. Composite beings—Wolff explicitly says —*are* machines (*German Metaphysics*, §560).[370] A definition of 'machine' is given slightly earlier:

> A machine is a composite work, whose motions are grounded in the way of the composition (*German Metaphysics*, §557).[371]

Machines are clear cases of constructible things. A clockmaker can show an amateur both the blueprint and the actual process of making a clock. The constructability of a thing—that is, the structural analysis of things—renders their physical possibility intelligible.

In addition, it must be observed that for things to be physically possible, they do not only have to be constructible, but they also have to be world-fit. I will call this second criterion of physical possibility the *world-fitness criterion of physical possibility* (WCPP):

> WCPP = (df.) *x is world-fit, if it principally agrees with or harmonises with the already existing world*.

A thing might be logically possible, yet not physically possible, because it just does not fit with all the other parts of the world already present. The world in Wolff's sense can be compared to an (almost complete) puzzle. It is a well-constructed harmonious whole. Establishing whether something is

368 "daß die Welt eine Reihe veränderlicher Dinge sey, die neben einander sind, und auf einander folgen, insgesamt aber miteinander verknüpffet sind" (*German Metaphysics*, §544, p. 332).

369 Goldenbaum's (2011) article made this point clear to me. She points out that: "What we can produce [*hervorbringen*] ourselves, we can also understand [*erkennen*] clearly and distinctly. This is the methodological background for Wolff's development of a philosophy of experiment and of technology, or his *Ars inveniendi*, too" (Goldenbaum 2011, 39). I disagree with Goldenbaum, however, in tracing the roots of this idea to Hobbes (ibid.). Pérez-Ramos (1988, ch. 5) shows that the knowledge maker's tradition goes back as far as antiquity, and in any case the most outspoken defender in early modern Europe would undoubtedly be Francis Bacon (1561–1626).

370 Here, Wolff says that "One easily sees that what has been said about the world (§557 & seqq. [of the *German Metaphysics*]) equally applies to all composite things: that is, that they, too, are machines" (*German Metaphysics*, §560, p. 337). "Man siehet leicht, daß, was von der Welt (§557 & seqq.) gesaget worden, auch von allen zusammengesetzten Dingen gilt: nehmlich daß auch sie Machinen sind."

371 "Eine Maschine ist ein zusammengesetztes Werck, dessen Bewegungen in der Art der Zusammensetzung gegründet sind" (*German Metaphysics*, §557, p. 337).

world-fit is like fitting in the last missing piece to finish the puzzle. However, the missing piece is a very particular, determinate one. Not just any part would do.[372]

The upshot of this fairly complicated discussion of essences is two-fold: (1) Essences do provide grounds, but only for a thing's logical and physical possibility, not for its actuality. Physical possibility is assessed by both CCPP and WCPP. (2) Since the actuality of a thing depends on the thing's possibility which is rooted in the thing's essence, the formal cause counts as a cause (*Ontologia*, §944). The formal cause or essence brings us closer in getting from nothing to something.

The Efficient Cause & Existence

The efficient cause is *the cause* in its most proper sense, since it is the cause that brings about the existence of a thing. It is the only cause that is truly productive. Going back to Wolff's conception of philosophy, he makes it clear that philosophy not only studies possibles *qua* possibles, but also *qua* existents. Hence, philosophy seeks reasons why things actually exist and why they exist the way they do: "In philosophy, one must give a reason why possibles attain [*consequi*] reality [*actum*]" (*Discursus prælimininaris*, §31, p. 14).[373] A reason is "that from which it is understood why something else is" (ibid.).[374] We can see that PSR's main function for Wolff is, hence, bridging the possible and the actual, in that:

> What […] cannot come into being from nothing has to have a sufficient reason why it is. It must be in itself possible and must have a cause which can bring it into reality, if we talk about things that are not necessary (*German Metaphysics*, §30, p. 16).[375]

While the formal cause—hinted at in the quote by the claim that the thing "must be in itself possible"—explains a thing's logical and physical possibility as we saw before, it does not account for the thing's actuality—bracketing the case of the *ens necessarium*, or God. According to Wolff, the search after sufficient reasons for a thing's existence becomes the search after sufficient efficient causes that actualise the essences of things, the latter of which are metaphysically necessary (*German Metaphysics*, §576).[376] A sufficient reason is such that when it is posited the thing it grounds is also posited (*Ontology*, §118). Accordingly, "the efficient sufficient cause is that which contains the sufficient reason of some given effect" (*Ontology*, §897, p. 660).[377] The sufficient reason for a thing's

372 What further complicates the image is that Wolff's world puzzle is constantly evolving. A part that would have fit at, say, time t_1, just does not fit the world at, say, time t_{12}.

373 "*In philosophia reddenda est ratio, cur possibilia actum consequi possint*" (*Discursus præliminaris*, §31, p. 14). Leinsle (1988, 272) notes that "Wolff proceeds from the thinkable via the possible (*possibile*) to the real (*existens*) similar to Clauberg, Weigel, and Leibniz in some drafts."

374 "ratio enim id est unde intelligitur, cur alterum sit" (*Discursus prælimināris*, §31, p. 14).

375 "Was […] nicht aus Nichts entstehen kan, muß einen zureichenden Grund haben, warum es ist, als es muß an sich möglich seyn und eine Ursache haben, die es zur Wirklichkeit bringen kan, wenn wir von Dingen reden, die nicht nothwendig sind" (*German Metaphysics*, §30, p. 16). I broke down the sentence into two, in order to improve the readability.

376 École (2001, 62) traces Wolff's conception of essences as eternal and necessary back to Thomas Aquinas.

377 "*Causa efficiens sufficiens* est, quæ continet rationem sufficientem effectus alicujus dati" (*Ontologia*, §897, p. 660).

actual existence is its efficient sufficient cause.[378] The endeavour to understand the actuality of things in this world is thus an endeavour to unravel the structure of efficient causes.

The world, according to Wolff, is defined as the nexus of its spatio-temporally connected parts (*German Metaphysics*, §544). Since the world consists in a multiplicity of interconnected *parts*, it is a composite entity (*German Metaphysics*, §§550, 551). What interests us, here, is the structure of the world, i.e., the connectedness of these parts. Wolff points out "that things are connected with one another, if each of them contains the reason [*Grund*] in itself, why the other [thing] coexists with it at the same time, or succeeds it" (*German Metaphysics*, §545, p. 332).[379] The parts of the world are most importantly causes of one another.[380]

Since everything has a sufficient reason why it exists and why it exists in the way it does, so does every finite, contingent thing. While the necessary being has the sufficient reason for its existence in itself, i.e., it is contained in its essence (*Ontology*, §309), contingent beings owe their existence to another (contingent, or ultimately the necessary) being (*Ontology,* §310). This means that contingent beings are caused (*Ontology*, §908). Therefore, the search for causes leads to the study of causal sequences or concatenations of causes and effects, the latter of which in turn are themselves causes of further effects. Since this line of reasoning would lead to an infinite regress (*German Metaphysics*, §§929, 931), there must ultimately be a self-sufficient necessary being whose essence entails its existence (*Ontology*, §309). The existence of the contingent chain of causes (the world) depends on the necessary being (*German Metaphysics*, §§939, 940). This being is God (*German Metaphysics*, §§945, 946). He is the ultimate ground of the existence of the world. Every being except God is contingent, hence caused, and has the ground of its existence in another being.

But how do efficient causes bring about their effects? By means of what do efficient causes actualise essences? As Wolff shows, they do so in virtue of being essentially endowed with a force. Efficient causes, according to Wolff, are substances, and as such they possess a principle of change or action, that is, a force (*Ontology*, §§869-871).[381] Force is that "which contains in itself the sufficient reason of

378 Wolff makes it clear that in a strict sense every efficient cause is, of course, sufficient. The very efficiency of the cause implies that the effect follows once the cause is given. Strictly speaking, an efficient cause contains the sufficient reason of the (particular, individual) existence of another thing (*Ontology*, §897). However, sometimes only a multiplicity of causes can collectively bring about an effect, and while every partial cause counts as an efficient cause, it is in itself insufficient to bring about the total effect (ibid.). The life and growth of a plant, for instance, depends on the supply of sun light as much as on water. Neither sun light nor water are sufficient to keep the plant alive or make it grow. Take away either water or sun light and the plant dies. Hence, sunlight and water are only collectively sufficient for the plant's life and growth. (This is my own example.)

379 "Ich sage, daß Dinge mit einander verknüpft sind, wenn ein jedes unter ihnen den Grund in sich enthält, warum das andere neben ihm zugleich ist, oder auf dasselbe folget" (*German Metaphysics*, §545, p. 332).

380 They are also enabling and supporting conditions in the same way that a spring and a gear in a clock do not cause one another but enable the proper functioning of the clock. This is so because although causal grounds are the most important kind of grounds, for Wolff, they are not the only kind. Spatiotemporal grounds (contiguity; succession, etc.) also qualify as grounds.

381 Wolff avails himself of a substance-mode ontology. Everything is either a substance or a mode, and nothing is both a substance and a mode. Substances persist and are modifiable or determinable, whereas as accidents or modes modify or determine a substance (*Ontology*, §§768, 779). Furthermore, substances exist

the actuality of an action" (*Ontology*, §722, p. 542).[382] It is in virtue of being endowed with force that efficient causes act, and that essences of things are brought into existence. It is also in virtue of forces inherent in finite beings that change occurs in the world (*Ontology*, §725). Since substances are simple beings (*Ontology*, §794), the force of composite entities (i.e., aggregates of substances) is contingent upon the force(s) of simple substances (*Ontology*, §871). A force, however, is in itself undirected. Forces require ends on account of which they act and direct their power to the production of specific effects. This is the link between efficient and final causes.

The Final Cause & Teleology

Wolff not only accepts final causes, he is convinced of the teleological structure of nature. Final causes are determined in the following way: "That on account of which [*propter quod*] the efficient cause acts is called the *end* [*Finis*] and also *the final cause*" (*Ontology*, §932, p. 678).[383] Briefly put, the efficient and the final causes are mutual causes of one another (*finis & causa efficiens sunt sibi mutuo causæ*, *Ontology*, §935). Insofar as the initiative of the efficient cause is concerned, the final cause can be said to precede and drive the efficient cause. The efficient cause acts for the sake of the realisation of a certain end. The final cause renders intelligible what the efficient cause 'aims at' or what it 'seeks' to bring into being. However, insofar as this end is not yet actually existing but only ideally so, the efficient cause can be said to precede the final cause, that is, the end it strives to achieve. Wolff—most likely inspired by Suárez's considerations in his *Disputationes metaphysicæ* (*XVII* and *XXIII*)—holds that only an intelligent agent acts for the sake of ends which it cognises (*finis præsupponit agens intelligens*, *Ontology*, §936).[384] Wolff is very outspoken about the fact that the whole of nature is full of purpose and that things are created by their creator with a certain intention in mind (*German Metaphysics*, §911; *German Physics*, preface).[385]

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independently of other substances whereas modes depend on substances for their existence. Wolff points out that, in this regard, his conception of substance agrees with the Cartesian conception (*Ontology*, §772). However, Wolff's notion is ultimately metaphysically thicker than the Cartesian notion in that it also contains the substance's simplicity and its force to act. Importantly, following Leibniz, Wolff also takes substances to be simple beings (*Ontology*, §794).

382 "Quod in se continet rationem sufficientem actualitatis actionis *Vim* appellamus" (*Ontology*, §722, p. 542). At this point one might wonder about the ontological status of force. Since substances clearly cannot be predicated of other substances, force is not a substance. It is not a mode either, since modes are mutable (Ontology, §314) and force *qua* such is called a principle of change indicating that it does not depend on something else, and that it itself does not change. Modes also contingently inhere in a substance (*Ontology*, §312), but substances are necessarily endowed with force (*Ontology*, §776). Force could only be of the essence of substance, an *essentialium*, or else an attribute. Attributes depend on or are determined by *essentialia* (*Ontology*, §146). For the following reasons I therefore take force to be part of the essence of a substance. (1) Force *qua* principle of change does not depend on anything else—an attribute does. (2) Force qualifies as an essential property or *essentialium*, in that it is "the first which is understood concerning a being, and without which this being cannot be" (*Ontology*, §144, p. 121). "*essentia primum est, quod de ente concipitur, nec sine ea ens esse potest.*" (3) Force "contains in itself *the sufficient reason* of the actuality of an action" (see above; my emphasis).

383 "Id, propter quod causa efficiens agit, dicitur *Finis*, itemque *causa finalis*" (*Ontology*, §932, p. 678).

384 In contemporary scholarship, this has been referred to as the *cognition condition* (Sangiacomo 2019a, 50).

385 Wolff even dedicated an entire work to a new discipline which he calls *Teleology*. This discipline studies the purposes and ends of things: "The part of natural philosophy, which explains the ends of things and which

For the purposes of understanding Wolff's philosophical project, it is also important to note that understanding formal causes or essences leads to an understanding of final causes. In this regard, van den Berg (2013, 728) remarks that in Wolff "*structure* provides us with a ground for coming to know *purpose* or *function*."[386] As I pointed out earlier, Wolff understands the essences of composite beings in mechanical terms, that is, in terms of structure. Analysing a composite being like a watch in terms of (e.g.) its gears, weights, etc. and seeing in what kind of connection or relation they stand makes intelligible the role they play or the function they serve.

Overall, Wolff's philosophical project (1) rules out matter as a sufficient ground of things' actuality due to matter's passivity and its composite nature. (2) It analyses the logical and physical possibility of things by studying their essences. Physical possibility (PP) is determined by both constructability (CCPP) and world-fit (WCPP). The next step (3) consists in studying efficient causes and forces, as efficient causes account for the actuality of a thing's essence. Efficient causes act in virtue of being endowed with an active principle, that is to say, force. The final step consists in motivating final causes as vital in determining the actions of rational agents.[387] PSR is fundamental to Wolff's philosophical project. It mandates that sufficient reasons be found on all metaphysical planes. The sufficient reason for the logical and physical possibility lies in a thing's essence and its relation to other things. The sufficient reason of a thing's existence lies in the realisation of its essence by an efficient cause and ultimately God. The sufficient reason for the action of an efficient cause lies in an active intrinsic principle, i.e., a force. Matter's sufficient reason cannot lie in itself due to its passivity. It ultimately lies in simple beings.

To conclude, according to Wolff, the science of nature investigates what is possible in virtue of the nature of things, that is, in virtue of their force determined by things' respective essences (*German Metaphysics*, §§628, 631). This is absolutely crucial for understanding Wolff's philosophical project of grounding the world which; a project which, in turn, leads him to rigidly reject occasionalism as we will see in the next section. Philosophy *qua* science is committed to clear, distinct, rigorous and systematic explanations of the world. Explanations need not only abide by the principle of logical non-contradiction (PoC), they are also geared towards understanding the physical possibility of things. Furthermore, they aim at finding sufficient reasons *why* things exist and *in the way they do* (PSR). Seeking reasons amounts to seeking causes. The whole world, as composite and contingent, consists of things that stand in causal relations to one another. The very notion of contingency entails being

has lacked a name up until now, although it is most significant and most useful, can be called *Teleology*" (*Discursus prœliminaris*, §85, p. 38). "philosophiæ naturalis pars, quæ fines rerum explicat, nomine adhuc destituta, etsi amplissimia sit & utilissima [d]ici potest *Teleologia*." I have broken down the punctuation separating the two sentences ("[…] utilissima. Dici potest"). For an analysis of Wolff's teleology and its influence on Kant, see van den Berg 2013.

386 Emphasis in original.

387 I have not investigated the final causes of non-rational beings. According to Wolff, they must ultimately lie in the design given to nature by its creator (see e.g, preface to the *Teleology*). Furthermore, Wolff is very much inclined to think of the purpose of non-rational animate and inanimate beings in terms of their usefulness for human beings (see part two of the *Teleology*).

caused by something other than oneself. Contingency is thus directly opposed to self-causation. Causation in the realm of contingent beings is grounded in the fact that these beings are essentially endowed with a force. The study of nature becomes not only a study of causes, but ultimately forces, i.e., what kind of forces different things have in virtue of their respective natures or essences. That is, in virtue of being the kinds of things that they are. Sufficient explanation of nature revolves around the natures and forces of things. It must not take refuge to supernatural explanations. Wolff defines the supernatural as that which is "neither grounded [*gegründet*] in the essence, nor the force of bodies, that is in their nature, nor in the essence and the force of the world, that is in the whole of nature" (*German Metaphysics*, §632, p. 385).[388] Nature, in contrast, is defined as "nothing other than the effective force [*würckende Kraft*] insofar as it is determined in its way by the essence of a thing" (*German Metaphysics*, §628, p. 384).[389]

According to Wolff, occasionalism (as we will see shortly) is guilty of offering supernatural explanations of mind-body interaction, and of violating PSR. This is because occasionalism grounds its explanations in God's power and His causal intervention rather than in the essences and powers of finite corporeal substances. By depriving finite substances of their causal powers, occasionalism cannot help but turn to the infinite substance to account for the actualisation of essences and to account for the supposed natural effects of finite efficient causes. Hence, occasionalism, for the mature Wolff, obstructs a naturalised project of grounding the world. Based on a Cartesian, that is, an ultimately an incorrect, understanding of the notion and nature of bodies, the kind of (Cartesian) occasionalism with which Wolff was familiar is not compatible with a systematic attempt of explaining the natural world (or so Wolff was led to think). In short, Wolff considered occasionalism to be epistemologically flawed.

In the next section, I will elaborate on a particular element of Wolff's rejection of occasionalism: his frustration with Cartesian physics.

3.2 Criticism of Aristotelian-scholastic and Cartesian Physics

Wolff not only criticises his philosophical predecessors for having based their scientific enterprises on (what he considers) an incomplete and insufficient method, namely, one that lacks clear and distinct notions and is based on defective reasoning (see section 2). He also admonishes them for having based specific scientific disciplines, such as physics, on wrong or incomplete foundations and for lacking a very important philosophical principle, which, according to Wolff, was introduced into philosophy only recently by Leibniz, i.e., the principle of sufficient reason (*Ausführliche Nachricht*, ch. 7, §71). In varying degrees, both Aristotelian-scholastic and Cartesian philosophy are guilty as charged. Wolff's

388 "Was weder im Wesen, noch der Kraft der Cörper, und also nicht in ihrer Natur, noch auch im Wesen und der Kraft der Welt, und also nicht in der gantzen Natur gegründet ist, das heisset *übernatürlich*" (*German Metaphysics*, §632, p. 385).

389 "durch die Natur [wird] nichts anders verstanden als die würckende Kraft, in so weit sie durch das Wesen eines Dinges in ihrer Art determiniret wird" (*German Metaphysics*, §628, p. 384).

rejection of Cartesian physics later in his career bears on his rejection of occasionalism. That is to say, his rejection of occasionalism is (partially) motivated by his rejection of Cartesian physics from which he thinks occasionalism follows.[390]

In the same vein as Bacon, Descartes, and Hobbes, Wolff objects to Aristotelian-scholastic philosophy because it employs empty or indistinct concepts such as the vegetative soul and the temperaments.[391] Instead of giving a sufficient explanation of, say, all the processes obtaining in plants, the schoolmen offered a collective term—that of the vegetative soul—to cover all these effects. Doing so, however, misses the mark. Instead of truly enquiring into the nature of plants, their constitutive parts, their structure, and the interplay between these parts—that is to say, instead of giving a mechanical explanation of nature—as Wolff himself does in the part of his *German Physics* dedicated to living nature, the adherents of 'old physics' offered a mere (re-)description of what actually takes place. Not only that, they were also guilty of confusing words with things, arguing that 'if *x* happens, there must be an *x*-making faculty or power'. More concretely, seeing the formation of leaves and branches of plants (the effect), they 'explained' this in terms of a power for forming leaves and branches (*German Logic*, ch. 9, §3). In addition, Wolff blames Aristotelian-scholastic philosophy for having introduced occult qualities into physics. He defines occult qualities like so:

> In physics, those [qualities] are called *occult qualities* which do not have a reason why they pertain to a thing (*German Physics*, §84, p. 120).[392]

According to Wolff, qualities are obscure not because the reason of their existence cannot be given but because it is assumed that there is no reason *per se* why a thing has a certain occult quality.[393] To make this point, Wolff adduces the case of gravity (*German Physics*, esp., §84). If the gravity of matter is

390 While, for Wolff, there is a clear historical and philosophical causal connection between Cartesianism and occasionalism, this can be and has been contested from the point of view of twentieth- and twenty-first-century history of philosophy. Nowadays, historians of philosophy have become increasingly aware that accepting such claims as substance dualism, or the passivity of matter, which are constitutive of but do not sufficiently describe Cartesian physics and metaphysics, were neither necessary nor sufficient for an adoption of occasionalism. For more discussion of this point, see the introduction of this dissertation.

391 Other empty or ungrounded terms include the Aristotelian four elements (*German Physics*, §33) and physical influx (*Psychologia Rationalis*, §583). Another example, which I discuss below, is gravity. For Wolff's point that scholastic authors used indistinct notions in ontology, but empty notions in physics, see *Ausführliche Nachricht*, ch. 7, §69. For Wolff's critique of the scholastics, see also École 2001, 56f.

392 "Man nennet in der Physick *verborgene Eigenschaften*, die keinen Grund haben, warum sie einem Dinge zukommen" (*German Physics*, §84, p. 120).

393 Wolff's critique targets metaphysically occult not epistemically occult qualities. As Pasnau (2011, §23.6, 543) puts it: "the postulation of such [i.e., occult] qualities is not just an expression of humility in the face of nature's obscurity (an attitude to which one could hardly object), but the invocation of primitive, irreducible powers that could in principle never be made intelligible." Similarly, Hutchison (1982) shows that seventeenth century *novatores* did not take issue with positing occult qualities *qua* insensible—unlike their medieval predecessors—but *qua* unintelligible. They rejected occult qualities insofar as they designate ontological entities, e.g., substantial forms, or real accidents that had become dubious from the point of view of mechanical philosophy in particular. Wolff's critique boils down to the fact that scholasticism leaves open the possibility of fundamental forces in nature that withstand sufficient explanation, and in this he might well have been inspired by Leibniz's critique of Newton's natural philosophy as a return to scholastic occult qualities (for Leibniz's critique, see Pasnau 2011, §23.6, 541-546). In this regard, Pasnau points to (*inter alia*) Leibniz's *Anti-barbaricus physicus*.

explained in virtue of the fact that bodies possess (the quality of) gravity without further explanation as to why gravity occurs in matter, this is to seek refuge in an ungrounded and philosophically dubious occult quality. This scientific practice is particularly problematic, since it violates the principle of sufficient reason. It stands in the way of advancing scientific knowledge. According to Wolff, it is, however, symptomatic of scholastic philosophy—which was notoriously unaware of PSR (*Ausführliche* Nachricht, ch. 7, §71; Wundt 1945, 159)—and of the lack of progress natural philosophy to date has made (see the *preface* to the *German Physics*). Concerning the case of gravity, Wolff points out that it does indeed have a sufficient reason, that is, a sufficient cause (*German Physics*, §85).[394] For Wolff, while Cartesian philosophy, and Cartesian physics in particular, made an effort to eradicate these shortcomings, to wit, to eradicate the empty words and jargon (*Wörter-Kram*) of Aristotelian-scholastic physics (*German Logic*, ch. 9, §3, see also *Ausführliche Nachricht*, ch. 7, §71), it, too, fell short of sufficiency.

According to Wolff, Cartesian philosophy (such as the ontology of Clauberg and other successors of Descartes) also lacked PSR (*Ausführliche Nachricht*, ch. 7, §71). Cartesian physics, which came to replace Aristotelian-scholastic natural philosophy, is itself in dire need of a major overhaul, or so thinks Wolff. His main reasons for thinking so are that Cartesian physics mistakes natural bodies for geometrical bodies, that it holds on to an erroneous conservation principle, that is, the conservation of the total quantity of motion instead of the (correct) principle of the conservation of living force, and that Cartesian physics violates what we would nowadays call the principle of physical causal closure. In his critique of Cartesian physics, Wolff closely follows Leibniz.

Cartesian physics is an ontologically thin mechanist conception of physical reality, and the workings of nature. Cartesian physics abolishes scholastic substantial forms and aims at explaining nature solely in terms of matter in motion. Matter is conceived in a geometrical way; as purely extended in length, breadth and depth. Matter is identified with space and conceived of as merely passive. It is void of any kind of active principle, be it force, substantial forms, a vital principle, appetites, etc. Motion is conceived of as the transfer of one body from the vicinity of one set of bodies to the vicinity of a different set of bodies, that is, in relative terms. The only kind of motion is local motion. Any change of a body *a* happens through contact action with another body *b*. Setting aside the role of the human mind, there are no active principles in nature; there is no world soul (*spiritus mundi*), no hylarchic principle, no plastic nature, no pneumatic matter, no vital principle. The Cartesian takes all such entities to be redundant—and thus to be in violation of the principle of ontological parsimony—and obscure, that is, unintelligible.

Wolff objects to Cartesian physics on the ground that it is based on an incomplete (*unausführlichen*) and ultimately unclear understanding of body (*German Logic*, ch. 1, §15). In determining body as

394 For further discussion of the case of gravity as well as Wolff's solution, see De Angelis 2018, 351-355; as well as Lind 1992, 119f. Wolff's critique of (re-)introducing occult qualities also applies to Newtonianism (see *German Physics*, §82). Leibniz had raised similar concerns (see n394 above).

merely extended, it cannot be distinguished from space. Hence, the Cartesians take two things which are distinct from one another (body and space) to be one and the same thing. According to Wolff, from a logical-epistemological standpoint, the Cartesian conception of a body's essence as mere extension in three dimensions, is nothing but an opinion (*German Logic*, ch. 7, §19). This conception is based on merely probable reasoning rather than indubitable demonstration. It does not qualify as scientific knowledge. *In concreto*, Wolff argues that the Cartesians fail to explain why extension in three dimensions should remain the only attribute common to all bodies once every other property is abstracted (ibid.). Implicitly, Wolff might have thought that it would be just as reasonable to ascribe force alongside extension as essentially pertaining to bodies—and by means of the same line of reasoning as that of the Cartesians. Furthermore, Wolff observes that the Cartesians give only nominal definitions (*Wort-Erklärungen*) of both soul and body, in defining them as *res cogitans* and *res extensa*, instead of providing real definitions (*Sach-Erklärungen*). That is to say, they merely explain the words 'soul' and 'body' by listing some of their characteristics instead of explaining what they really are, and how and why they are possible (*German Logic*, ch. 9, §2).[395]

Cartesian physics fails not only from a methodological point of view because it does not fulfil the standards of demonstrative certainty, clarity and distinctness that must be met by science *qua* such (section 2), but it also falls prey to the same 'unworldliness' characteristic of scholastic physics—although it is a more intelligible unworldly physics. According to Wolff, Cartesian physics is purely *a priori*. Rather than enquiring into the real nature of bodies, it confines itself to armchair reasoning and speculation. That is because Descartes and his followers conceived of nature in purely geometrical terms:

> Descartes, of course, took natural and geometrical body to be the same, and therefore, required nothing other for the essence of body except that it is extended in length, breadth and thickness [Wolff then gives a reference to Descartes' *Principles of Philosophy*, part II, §4 & seqq.] however, in this […] he jumped the gun (*German Physics*, §4, p. 12).[396]

The Cartesians treated matter as uniform and homogeneous—mathematically abstracting from the real differences of bodies in nature. However, Wolff points out that "[i]n nature, no body can be encountered a part of which would be identical [*ähnlich*] to the other" (*German Physics*, §4, p. 12).[397]

395 According to Wolff, while nominal definitions explain names in terms of a few outstanding properties of a thing, real definitions enquire into the structure and composition of things and their parts. Real definitions are genetic definitions (see section 2). A real definition of a circle would, for instance, render intelligible how it could be created by means of a fixed point and the motion of a line equidistant to this fixed point (the centre of the later circle). Admittedly, a genetic definition of, say, the soul would seem hard to give.

396 "Cartesius hat freylich den natürlichen Cörper mit dem geometrischen für einerley gehalten und daher zu dem Wesen des Cörpers weiter nichts erfordert, als daß er in Länge, Breite und Dicke ausgedehnet sey [Wolff then gives a reference to Descartes' *Principles of Philosophy*, part II, §4 & seqq.]: allein hat er sich eben hierinnen […] übereilet" (*German Physics*, §4, p. 12). Admittedly, Wolff's own natural philosophy will oftentimes strike the reader as quite *a priori* in similar respects.

397 "In der Natur aber kan kein Cörper angetroffen werden, da ein Theil dem andern ähnlich wäre" (*German Physics*, §4, p. 12). I am aware that the German *ähnlich* unlike *gleich* or *identisch* would naturally be translated as 'similar' rather than identical. However, due to the fact that Wolff was only establishing a

In fact, treating bodies as (internally) uniform violates Leibniz's Law, i.e., the principle of the indiscernibility of identicals. Wolff's point is that the mere extrinsic individuation of bodies in Cartesian physics is insufficient (ibid.).[398] Furthermore, a purely *a priori* geometrical-arithmetical composition of bodies is nothing like the true composition of bodies in reality (ibid., p. 13). Overall, Wolff laments that a merely mathematical view of nature is insufficient:

> Therefore, the mathematical proofs can by no means be transferred to matter as it is encountered in nature. In nature—as becomes abundantly clear from what has been said before—one can grant no status to parts other than that whose presence experience shows or reason also proves in connection with the former [that is, the parts] (*German Physics*, §4, p. 15).[399]

For Wolff, Cartesian physics is disconnected from experience which is an unalienable part of studying nature (section 2). Geometrical bodies as imagined by the Cartesian simply do not exist in this world (*German Physics*, §4, 17f). Descartes and his peers conflated natural and geometrical bodies (*German Physics*, §8, p. 24; De Angelis 2018, 347). They took natural bodies to be nothing other than geometrical bodies. Hence, a fully mechanised natural philosophy such as that of the Cartesians reduces physics to geometry which is part of mathematics. Contra Descartes, Wolff thinks that mathematics is not a sufficient guide in physics. A true investigation into the real nature of bodies reveals, for the mature Wolff, that they are endowed with a force (*German Physics*, §§11, 12). Furthermore, Wolff argues that Cartesian mechanism is a rash generalisation, unjustified by empirical reality which it leaves by and large understudied: "One cannot think in terms of mechanical causes earlier than until one has arrived at the correctness of the physical ones" (*German Physics*, §32, p. 59).[400]

Not only does Wolff draw on Sturm's *Physica conciliatrix*, he was also familiar with Sturm's main work, the *Physica electiva*, the second volume of which he edited (and wrote a preface for) in 1722. My preceding chapter on Sturm's natural philosophy supports the thesis that one of Wolff's immediate targets of Cartesian mechanical philosophy is clearly Sturm.

German philosophical language step by step doing the best he could to find German terms for the technical Latin—oftentimes scholastic—vocabulary, a vernacular philosophical language which was by and large inexistent prior to his works, he does not always use the term one would expect more than 250 years later in contemporary German philosophical discussions. For instance, 'definition' (Latin: *definitio*) appears in the *German Logic* as 'explanation' (*Erklärung*) (see the *Register* to the *German Logic*), whereas nowadays we would expect simply *Definition* or *Begriffsbestimmung*.

398 In his discussion of the natural philosophy of Johann Christoph Sturm in the *De ipsa natura*, Leibniz raises similar concerns about the merely extrinsic individuation of bodies in Cartesian natural philosophy.

399 "Es lassen sich demnach die mathematischen Beweise keineswegs auf die Materie, wie sie in der Natur angetroffen werden [sic!], deuten. Und kan man, wie aus dem, was bishero gesaget worden, überflüßig abzunehmen, in der Natur keinen Theilen stat vergönnen, als deren Gegenwart entweder die Erfahrung zeiget, oder auch die Vernunfft durch die Verknüpfung mit diesen ersteren erweiset" (*German Physics*, §4, p. 15).

400 "Nemlich man kann nicht eher auf die mechanischen Ursachen dencken, biß man vorher mit den physicalischen zur Richtigkeit kommen" (*German Physics*, §32, p. 59).

Along Cartesian lines, Sturm argued that the essence of matter lies in extension. He reduced Aristotelian substantial forms to mere modes of matter which are just as passive as matter, although these 'passive forms' (as Sturm calls them) are meant to fulfil an explanatory function. The only conservation principle Sturm accepts is that of the total quantity of (undirected) motion. Finally, the fact that natural bodies *qua* substances subsist while being inherently disconnected from one another made Sturm opt for an occasionalist account of the causal connection between things and of change in nature.

Against this background, the later Wolff's critique of Cartesianism that we have analysed here appears to be a frontal attack on Sturm's natural philosophy. Sturm's conception of natural bodies must have struck Wolff just as purely geometrical as Descartes'. The passivity Sturm ascribes to matter clashes with Wolff's mature intuitions about forces inhering in bodies. The conservation of the total quantity of motion principle already struck Leibniz as outdated and false in his controversy about nature with Sturm (see Leibniz's *De ipsa natura*). As we will shortly find, Wolff agrees with this critique. Furthermore, insofar as bodies are endowed with a force that belongs to them essentially (section 3.1), they are endowed with a principle that can account for causal connections in nature just as much as for change. This rejection of the merely passive nature of bodies must have made the mature Wolff also doubt Sturm's occasionalist conclusion.

4. Critique and Rejection of Occasionalism

Before analysing Wolff's mature critique and rejection of occasionalism, we need to familiarise ourselves with its philosophical context, and how Wolff defines occasionalism. In the *Rational Psychology* (1734) (section III), as in the *German Metaphysics* (1720) (chapter five, §§760-782), Wolff—following Leibniz's *New System*—introduces occasionalism[401] alongside physical influx and pre-established harmony as a solution to a particular problem: the astonishing harmony between the soul and the body:

> We need to investigate how it happens [*woher es kommet*] that [the] soul and [the] body agree with one another, and why all the time a thought is produced by the soul which corresponds to the present condition of the body (*German Metaphysics*, §760, p. 470f).[402]

It is an indubitable fact of everyday experience that sense-perceptions in the mind arise from changes in the body, and that voluntary motions arise in the body from the mind's positive and negative volitions (*volitiones ac nolitiones*) as well as from the mind's appetitions and aversions (*Rational Psychology*, §§539, 540). This phenomenon needs to be and can be explained (*Rational Psychology*, §539). Wolff makes it clear that the experiential mind-body harmony is not a hypothesis, and that it

401 Also called the "system of assistance" (*systema assistentiæ*) (*Rational Psychology*, §589, p. 513).

402 "so müssen wir untersuchen, woher es kommet, daß Seele und Leib mit einander übereinstimmen, und warum eben allezeit von der Seele ein Gedancke hervorgebracht wird, der sich zu dem gegenwärtigen Zustande des Leibes schicket" (*German* Metaphysics, §760, pp. 470f).

must not be confused with pre-established harmony which is one of the models used to render the former intelligible (*Rational Psychology*, §541).

Hypothetical systems have been developed to explain the experiential mind-body harmony. Insofar as they are hypotheses, they are not certain but pave the way for understanding this phenomenon (see section 2). Wolff understands mind-body systems as follows:

> By *systems to explain the mutual interaction* [*commercium*] *between the mind and the body*, we understand hypotheses of philosophers, which they have thought out to give a reason for the mutual interaction that happen between the soul and the body (*Rational Psychology*, §530, p. 451).[403]

With regard to the historical development of the three mind-body systems, the system of physical influx has until recently been 'the only game in town' (*Rational Psychology*, §553). It is the system endorsed by Aristotelian-scholastic philosophers dominating university teaching (*Rational Psychology*, §§553, 563).[404] Wolff defines it as follows:

> The *system of physical influx* is called that by which the interaction [*commercium*] between the mind and the body is explained through a physical influx of the body into the soul and of the soul into the body, or, which is the same, through an action of the body on the soul, by means of which the body flows into the soul and through an action of the soul on the body, by means of which the soul flows into the body (*Rational Psychology*, §560, p. 481).[405]

Following the system of physical influx, the mind and the body truly act on one another. They do so by means of a so-called 'physical influx'. Earlier, Wolff had characterised this physical influx as the transfer of some real ontological property from one substance to another: "A substance is said to *physically inflow* into another, if some reality, which was in one [i.e., the former] substance is transferred to another [substance], which [i.e., that reality] was not in it before" (*Rational Psychology*,

403 "Per *Systemata explicandi commercium inter mentem & corpus* intelligimus hypotheses philosophorum, quas excogitarunt ad reddendam rationem commercii inter animam & corpus intercedentis" (*Rational Psychology*, §530, p. 451). I believe that Wolff uses 'mind' and 'soul' interchangeably at least insofar as the mind-body context is concerned.

404 The only exemplary thinker Wolff mentions is Jean Baptiste Du Hamel (*Rational Psychology*, §563, p. 483). O'Neill (1993) offers a splendid discussion of possible sources of Leibniz's conception of the system of natural or physical influx. Ultimately, she believes that Leibniz took Suárez as a principal supporter of physical influx. I agree with O'Neill. Indeed, passages such as the following from Suárez's *Disputationes metaphysicæ* seem to corroborate this view: "an efficient cause is […] a principle from which the effect *flows* forth, or on which it depends, through an action" (Freddoso 1994: DM 17.1.6, p. 10). My emphasis. I will not analyse Leibniz's conception of physical influx. What is important here is that Wolff follows Leibniz in the characterisation of physical influx, and that he follows Leibniz in identifying it with the dominant causal theory in scholastic thought. Wolff differs from Leibniz in that he is more explicit about whom he takes to be an influxionist thinker.

405 "*Systema influxus physici* dicitur, quo commercium inter mentem & corpus explicatur per influxum physicum corporis in animam & animæ in corpus, seu, quod perinde est, per actionem corporis in animam, qua corpus in animam influit & per actionem animæ in corpus, qua anima in corpus influit" (*Rational Psychology*, §560, p. 481).

§558, p. 480).[406] For the sake of brevity, I will not discuss Wolff's objections to the system of physical influx. It seems obvious, however, that this system in its current formulation is not only vague, but given the alleged transfer of ontological reality—for Wolff, this could only be a substance or a mode—metaphysically dubious.[407]

Lately, progress has been made and new systems have been developed. According to Wolff, Descartes—abandoning physical influx in the body-body as much as in the mind-body case—invented occasionalism:

> This system [i.e., the system of occasional causes] is due to Descartes as its author, who since he had rejected physical influx in the motion of bodies, and in the Principles of Philosophy, part 2, art. 36 and what follows had invoked [*provocasset*] the general will [*voluntatem*] of the divinity [*Numinis*] bound in the most liberal way to certain laws; he also did the same in explaining the interaction between the soul and the body [*commercio animæ & corporis*] (*Rational Psychology*, §589, p. 513).[408]

His followers, such as Cordemoy, Malebranche and even Sturm—despite his eclectic convictions—made it their business to further refine occasionalism (ibid.). To this list of occasionalists, we can add the young Wolff himself (section 1.1). Eventually, Leibniz came up with the system of pre-established harmony and presented it to the public in 1695 in an article published in the *Journal des Savants* (*Rational Psychology*, §612; see section 1.2). Wolff defines pre-established harmony as follows:

> The *system of pre-established harmony* is called that by which the interaction [*commercium*] of the soul and the body are explained through the series of perceptions and appetitions in the soul and the series of motions in the body which are by nature harmonious or in agreement (*Rational Psychology*, §612, p. 542).[409]

In contrast to physical influx, pre-established harmony maintains that there is no real causal relation between mental and physical states. Rather, these are *naturally* so constituted that they are in perfect unison. Certain bodily motions perfectly mirror the mind's volitions and certain sense-perceptions of the mind perfectly mirror the body's motive state.

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406 "Substantia una dicitur *physice influere* in alteram, si quædam realitas, quæ inerat uni substantiæ, transfertur in alteram, cui ante non inerat" (*Rational Psychology*, §558, p. 480).

407 Similar concerns as those discussed in the case of transfer of motion—whether conceived as substance or as mode—equally apply here. See ch. 3, sect. 1.1; ch. 2, sect. 3.2; and ch. 1, sections 2.1 and 2.2. In opposition to the system of physical influx, Leibniz, too, points out that "it is not possible for the soul or any other true substance to receive something from without" (AG, 143). Whether Wolff (and Leibniz) are correct in formulating the system of physical influx in terms of a transfer of something ontologically real, and to ascribe the endorsement of this system to Aristotelian-scholastic authors, is questionable. See n20 above.

408 "Systema [i.e., the *systema causarum occasionalium*] hoc *Cartesio* debetur autori, qui cum influxum physicum in motu corporum rejecisset, & ad voluntatem Numinis generalem certis legibus liberrime adstrictam provocasset Princip. part. 2. artic. 36 & seqq.; idem quoque in explicando commercio animæ & corporis fecit" (*Rational Psychology*, §589, p. 513). For the whole passage, see n281.

409 "*Systema harmoniæ præstabilitæ* dicitur, quo commercium animæ & corporis explicatur per seriem perceptionum atque appetitionum in anima & seriem motuum in corpore, quæ per naturam animæ ac corporis harmonicæ sunt, seu consentiunt" (*Rational Psychology*, §612, p. 542).

Let us now turn to occasionalism. Wolff defines it in the following way:

> The *system of occasional causes* is called that by which the mutual interaction [*commercium*] between the mind and the body are explained through the harmonious modifications made immediately by God or through the general volition of God and most freely constrained by certain laws (*Rational Psychology*, §589, p. 513).[410]

Put this way, Wolff's definition of occasionalism is both compatible with Leibniz's and Arnauld's reading of (Malebranche's) occasionalism (see Jolley 2018, 127).[411] Leibniz is usually thought to have understood occasionalism in terms of immediate interventions of God into nature on a case-by-case basis, that is, based on God's particular volitions. Arnauld, in contrast, is usually thought to have understood occasionalism in terms of God's actions as based on general law-like volitions that would not require a direct intervention of God for every effect in nature to obtain. Rather, on this view, God's force is automatically channelled towards creatures, except in the case of miracles.

Occasionalism is not limited to explaining the mind-body problem but has been extended to account for the communication of motion between bodies:

> The system of occasional causes does not stop in merely explaining the interaction between the mind and the body, but is also extended to the communications of motions in explaining the actions of bodies (*Rational Psychology*, §611, p. 541).[412]

Hence, although Wolff focuses on the mind-body case, he is aware that occasionalism is a comprehensive system striving to solve not only particular forms of communication problems, but the problem of the communication of substances in its most general form. How does Wolff then characterise substances in occasionalism?

Wolff takes finite substances—both minds and bodies—in occasionalism to be void of active force (*anima destituitur vi activa… corpus destituitur vi activa*) (*Rational Psychology*, §592, p. 515). Hence, they are merely passive beings. The respective modifications of minds and bodies causally depend solely on God's will (*Rational Psychology*, §593). In the absence of a causal power to act, minds and bodies qualify as merely occasional, rather than physical causes:

> *Occasional causes* are said to be that which are stripped [*destituuntur*] of a proper force to act [*vi agendi propria*], though they give God an occasion to act. The occasional cause is

410 "*Systema causarum occasionalium* dicitur, quo commercium inter mentem & corpus explicatur per modificationes harmonicas immediate a Deo factas, seu per voluntatem Dei generalem & certis legibus liberrime adstrictam" (*Rational Psychology*, §589, p. 513). See also *German Metaphysics*, §763. The 'system of occasional causes' designates what is nowadays called occasionalism, which must not be confused with occasional causation. For the distinction between occasionalism and occasional causation, see the introduction of this dissertation.

411 See also the introduction of this dissertation, section 3.2.

412 "Systema causarum occasionalium non in solo explicando commercio inter mentem & corpus subsistit, sed ad communicationes quoque motuum in actionibus corporum explicandis extenditur" (*Rational Psychology*, §611, p. 541).

> opposed to the physical cause, which is endowed with a proper force to act [*vi agendi propria*] (Rational Psychology, §590, p. 514).[413]

As we will see later, this pushes minds and bodies dangerously close to the status of mere instruments.

We are now in a position to answer the decisive question of this entire chapter: Why did the mature Wolff reject occasionalism, which he himself had endorsed earlier, and how is this related to his scientific method as well as his metaphysical-physical project? My answer is that Wolff rejected occasionalism because it ultimately violates one of the (probably *the*) most important principle(s) of philosophy: PSR. Wolff's other explicit and implicit objections are natural consequences of this fundamental conflict. He launches his fundamental attack on occasionalism in §606 of the *Rational Psychology*:

> *The system of occasional causes is contradicted* [*contrariatur*] *by the principle of sufficient reason.* This is because in the ordinary system of occasional causes, in the way it is commonly defended by the occasionalists a sense-perception [*perceptio sensibilis*] originates in the organ of the agent in the soul in the presence of a material idea in the brain in virtue of the bare divine will (§591), such that nothing is given in the body or the soul, by means of which it could be understood why when this material idea is present in the brain this perception originates in the mind, whether you only asked why it originates, or whether [you asked] why this [sense-perception] rather than another originates (p. 532).[414]

As we saw in sections 2 and 3, philosophy, as the most universal science, seeks clear and distinct notions and sufficient explanations in terms of causes. According to Wolff, occasionalism fails to live up to these standards. Deprived of their causal efficacy, finite natural or secondary causes are no longer apt to provide sufficient reasons for why things are the way they are. We have seen that, for

413 "*Causæ occasionales* dicuntur, quæ vi agendi propria destituuntur, Deo tamen agendi occasionem præbent. Opponitur causa occasionalis causæ physicæ, quæ vi agendi propria instructa est" (*Rational Psychology*, §590, p. 514). I need to point out one complication: Wolff thinks that the essence of the soul implies not only its substancehood but also its endowment with a force to represent the world to itself (*vis repræsentandi*) (*German Metaphysics*, §§743, 744). According to Wolff, every mind-body system accepts that the soul has a representative force (*Rational Psychology*, §547). This leads Wolff at a certain point (*Rational Psychology*, §598) to believe that even in occasionalism God concurs with the mind's force and steers it as is necessary. While this 'slip' of Wolff has lead Favaretti (2017) to argue that Wolff ultimately offers a 'rational reconstruction' of a modified or corrected occasionalism wherein substances have forces, I do not think that Wolff eventually does so. Besides the fact that inconsistencies with Wolff's prior definition would arise—and definitions do not change for Wolff—Favaretti's reading renders less intelligible how to understand Wolff's critique of occasionalism at the end of chapter three (section three) of the *Rational Psychology*. Furthermore, Wolff himself also did not attribute a force to the soul in occasionalism when discussing this system in the *German Metaphysics* (§764). I agree with Specht (1985, 205) that Wolff's suggestion of a possible emendation of occasionalism is "a mere theoretical figure"; an *ens rationis* that answers to a different problem (ibid., 206).

414 "*Systema causarum occasionalium contrariatur principio rationis sufficientis*. Etenim in systemate causarum occasionalium communi, quale vulgo ab Occasionalistis defenditur, perceptio sensibilis in organum agentis in anima oritur ad præsentiam ideæ materialis in cerebro vi nudæ voluntatis divinæ (§.591), adeoque nihil datur in corpore & anima, per quod intelligi possit, cur præsente in cerebro hac idea materiali hæc jam in mente oriatur perceptio, sive quæsiveris tantummodo cur oriatur, sivë [sic] cur hæc potius oriatur, quam alia" (*Rational Psychology*, §606, p. 532).

Wolff, a sufficient reason is a sufficient efficient cause, and causes are efficient in virtue of the fact that they are endowed with a force. In dispossessing natural beings of their force, in making them occasional rather than physical causes, occasionalism severs the unity of force, cause and reason. Finite beings without force are not true causes any longer and hence are not sufficient reasons, either. This has drastic consequences: in the absence of the essential bond between force, cause and reason, occasionalist explanations in natural philosophy are no longer natural, but supernatural, explanations.

An explanation of natural events must be grounded in the nature of beings and we have seen before (section 3.1) that activity in virtue of a force is part of the essence or nature of natural things. In the example that Wolff provides in the passage cited above, nothing except the material substructure of the body could account for why a certain state of the body (the presence of what Wolff calls a material idea) makes it such that the mind has the precise sense-perception it has. A further complication is that Cartesian physics—endorsed by Wolff's occasionalist opponents—with its austere ontological foundations does not even give a very plausible story of the divergence and variety of bodies other than matter in motion (section 3.2). Bodies and different bodily states would need to be distinguished purely in terms of matter and motion, and given that matter is itself absolutely uniform, the principle of individuation is motion alone. Hence, only the particular state of motion or rest could render intelligible why a certain sense-perception arises in the mind, and why this sense-perception rather than any other comes about. According to Wolff, this is not enough.

While Wolff thinks that Cartesian mechanical physics *qua* mechanical is the right kind of physics—setting aside its incorrect dynamics—it is the metaphysical underpinning of this view with which Wolff takes issue. He argues that the reducibility of matter to extension is implausible and precipitate (section 3.2). In a Cartesian framework, nothing in matter except motion explains, why based on some states of matter, certain mental states arise or why certain other bodily states follow. Motion, however, is not intrinsic to matter, but purely extrinsic. It does not properly *belong* to matter.

An immediate consequence of this is that occasionalism is said to make use of (perpetual) miracles, i.e., miraculous or supernatural explanations. In agreement with Leibniz, Wolff defines miracles as follows:

> He [Leibniz] takes the term of miracle in this sense, which we also attribute to it, that 'miraculous' must be called that whose sufficient reason is not contained in the essence or nature of a being (§510, *Cosmology*). A miracle is to be opposed to the natural (*Rational Psychology*, §603, p. 528).[415]

The miraculous, in contrast to the natural, is not grounded in the nature of beings. Thus, insofar as occasionalism postulates that the course of nature is not grounded in the nature of beings, but in God's

415 "Vocabulum miraculi in eo sumit significatu, quem nos eidem tribuimus, ut miraculosum dicendum sit, cujus ratio sufficiens in essentia & natura entis non continetur (§510 *Cosmol.*), miraculum naturali opponendo" (*Rational Psychology*, §603, p. 528). I broke down the sentence into two.

actions (be they general or on a case-by-case basis), it does not offer *natural* explanations and takes refuge in God. Strictly speaking then, occasionalism invokes perpetual miracles, since nothing can ever be understood through the nature of things themselves:

> *In the system of occasional causes, the modifications of the soul made for the sake of the body and the modifications of the body made for the sake of the soul are perpetual miracles; if you wish to speak rigorously* […]. In the system of occasional causes, God produces sensual ideas [*ideas sensuales*] at the presence of material ideas in the brain, and motions of the body's organs at the soul's will (§.591); especially because they cannot be harmonious through the nature of the body and the soul (*Rational Psychology*, §603, p. 526f).[416]

Occasionalism is consequently charged with providing explanations that are ungrounded (as explanations of nature need to be grounded in the realm of nature) and ultimately unintelligible. Given the congruence of reasons and efficient causes and the absence of the latter in the realm of nature, occasionalism falls short of providing the former. Depriving nature of efficient causes means depriving it of reasons that make it intelligible. The occasionalist's counterplea against the accusation of invoking perpetual miracles is that occasionalism nonetheless views nature as orderly. This, however, is of no avail, or so thinks Wolff. This is because:

> in philosophy we only distinguish between the natural and the supernatural, but we do not separate the ordinary-supernatural from the extraordinary-supernatural, and indeed we call both of them [the ordinary-supernatural and the extraordinary-supernatural] a miracle in the realm of nature (*Rational Psychology*, §603, p. 529).[417]

While the occasionalist might want to introduce a distinction between supernatural events that happen regularly, or in a predictable way, and events that happen irregularly and are in no way predictable, according to Wolff, this does not make them any less supernatural insofar as they are equally grounded in divine intervention. Furthermore, the distinction between the natural and the supernatural does not come down to a difference between what is orderly and what is disorderly. Instead, the distinction should be understood in terms of the *grounds* of natural processes. If explanations of nature transcend the realm of natural beings to acquire sufficiency, they do not qualify as natural any longer. For Wolff, occasionalism is guilty as charged.

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416 "*In systemate causarum occasionalium modificationes animæ in gratiam corporis & modificationes corporis in gratiam animæ factæ perpetua sunt miracula; si rigorose loqui volueris* […]. In systemate causarum occasionalium Deus producit ideas sensuales ad præsentiam idearum materialium in cerebro, & motus organorum corporis ad nutum animae (§.591); adeoque per naturam corporis ac animæ harmonicæ fieri nequeunt" (*Rational Psychology*, §603, pp. 526f).

417 "in philosophia nonnisi inter naturale & supernaturale distinguimus, non vero supernaturale ordinarium ab extraordinario separamus, atque adeo utrumque miraculum in regno naturæ appellamus" (*Rational Psychology*, §603, p. 529)

Another consequence of occasionalism's conception of secondary causes as lacking force is that this seems to push them into the vicinity of instrumental causes in accordance with Wolff's own distinction:

> If the action of an efficient cause proceeds from a force, which resides in [the efficient cause] itself, and does not depend for that very action on another [force], it is called *a principal efficient Cause*. But if the action proceeds depending on another force, *an efficient Cause* is called an *instrumental* [cause] (*Ontology*, §890, p. 657).[418]

To avoid any unnecessary confusion, we need to be clear that the efficiency of an instrumental cause is a borrowed efficiency. According to Wolff, an instrumental cause is not efficient in virtue of itself, since it lacks any intrinsic force, but in virtue of someone or something else. This becomes clear from Wolff's definition of an instrument as "a being [*ens*], which [is] endowed with a capacity [*potentia*] to act, but which lacks the force to act towards the effect."[419] Given the underlying Cartesian mechanism, the world of the occasionalist would then seem like a clock, but a clock that never runs on its own.[420] Given how important physical possibility is to Wolff's project of grounding the world, the occasionalist would oftentimes seem to provide real definitions of things, i.e., genetic or causal definitions that stand very little chance of making intelligible the possible realisability of the thing at stake. A clock with no internal motive force, so to speak, would be faulty.

Interestingly, when discussing instrumental causes in the *Ontology*, Wolff points out that they do figure in causal explanations. However, I believe that for Wolff occasional or instrumental causes do not ultimately figure in the right *kind* of causal explanations. While truly efficient causes figure in causal answers to 'why-questions' (which is evident from PSR), instrumental causes with their derivative efficacy only figure in causal answers to 'how-questions'. More precisely, causal

418 "Si actio causæ efficientis proficiscitur a vi, quæ eidem inest, nec in ipsa actione aliunde pendet, *Causa efficiens principalis* dicitur. Si vero actio proficiscitur a vi aliunde pendente, *Causa efficiens* dicitur *instrumentalis*" (*Ontology*, §890, 657). Freddoso (1988, 84f), however, points out that for a scholastic philosopher "an *occasional* cause is not an *instrumental* cause, at least not if the notion of instrumental causality is explicated plausibly. An instrumental cause is a genuine causal contributor—more specifically, a genuine *efficient* or *active* cause. It does have active causal powers that are exercised under the right sort of conditions to produce an effect whose specific characteristics derive in part from the nature of those powers. […] By contrast, a merely occasional cause is such that there just is no direct natural connection between its causal properties (if any) and the specific character of the effect." Wolff seems not to distinguish carefully between occasional and instrumental causes though.

419 "Instrumentum est adeo ens, quod potentia agendi instructum, sed vi agendi destituitur ad effectum requisita" (Ontology, §891, p. 657).

420 This might be the reason why Leibniz (in a letter to Basnage de Beauval in 1696) in his analogy of how to synchronise two clocks (standing in for the mind and the body) and discussing ways to do so, called the clocks that the system of occasional causes tries to harmonise "faulty" (AG, 148). Interestingly, Georg Friedrich Meier (1718–1777), Baumgarten's student, would later make this precise point, i.e.: "The body of the general psychological [i.e., mind-body] occasionalist is similar to a clock, which possesses all the wheels and the remaining pieces that are necessary for a clock, but which lacks the spring, the life of the whole clock, in whose stead the infinite being has to step in. Truly, a miserable body!" (*Proof of the Pre-established Harmony*, 1752, 122f). "Der Körper des allgemeinen psychologischen Occasionalisten ist einer Uhr ähnlich, die zwar alle Räder und übrige Stücke besitzt, die zu einer Uhr nothwendig sind, der es aber an der Feder, dem Leben der gantzen Uhr, fehlt, und deren Stelle das unendliche Wesen vertreten muß. In Wahrheit ein elender Körper!"

explanations invoking instruments respond to the question of 'in what way' (*quomodo*) or 'why in such a way' (*cur tale*) (*Ontology*, §894). While this might seem like a weak spot open for the occasionalist to try to undermine Wolff's critique by pointing out that occasionalism is explanatorily useful—after all, it does provide some kind of explanations, i.e., *how* things happen—ultimately this will not be an successful strategy. In spite of the fact that Wolff accepts the relevance of *knowledge how*—as well as *knowledge that* or historical knowledge—*knowledge why* occupies the centre stage of Wolff's philosophical project. This is obvious from his definition of philosophy, i.e., that "in philosophy, one must give the reason *why* possibles obtain [*consequi*] reality [*actum*]" (*Discursus prælimi*naris, §31, p. 14). The why, here, is unqualified. While occasional causes might account, to some extent, for how things happen, any explanation of why something happens in nature will lead the occasionalist to God as the only truly efficient cause. This, however, is what Wolff believes the explanatory shortcoming of occasionalism consists in. It gives transcendental or supernatural explanations of matters that need, and in fact can be given, immanent and natural explanations.

An additional consequence is that according to Wolff, occasionalism allows for motions in a body that are not grounded in the previous states of that very body, but instead come about due the mind's volition which serves as an occasion for God to bring about these motions in the body. Instead of being determined by its previous states, a body can be sufficiently determined otherwise by the mind in virtue of God's power:

> The *system of occasional causes goes against the order of nature*. […] in the system of occasional causes, the direction of animal spirits is altered for the sake of the soul by the power of the divine will [*vi voluntatis numinis*] (§.597), indeed without any collision of bodies, the new direction not originating from a previous motion. This system therefore opposes the laws of nature (*Rational Psychology*, §607, p. 534).[421]

Insofar as the mind can (indirectly) bring about new motions it not only disturbs the natural course of events in the realm of bodies pushing and colliding, but also violates the Leibnizian conservation principle, that is, the *principle of the conservation of the total quantity of living force* (*Rational Psychology*, §607). This is a fundamental pillar of the most current and accurate physics of Wolff's time (or so he thinks).

This conservation principle states that $M_{total} \times V_{total}^2 = F_{living} = c$. *M* designates the total quantity of mass in the world. *V* designates the total quantity of motion as a vectorised size (not in terms of speed, i.e., as the absolute value of velocity as in Cartesian physics). To guarantee the conservation of living force (F_{living}), the product of M_{total} and V_{total}^2 must remain constant (= c). This requires the constancy of both the total quantity of mass as well as the constancy of the total quantity of the total velocity squared.

421 "*Systema causarum occasionalium ordini naturæ adversum*. […] in systemate causarum occasionalium mutuatur directio spirituum animalium in gratiam animæ vi voluntatis numinis (§.597), adeoque absque conflictu corporum, directione nova ex motu anteriore non nascente. Systema igitur hoc legibus naturæ repugnat" (*Rational Psychology*, §607, p. 534).

While occasionalism accepts the former—or so Wolff implicitly thinks—it violates the latter by allowing what looks like a creation *ex nihilo* of new velocity on the occasion of a mind's volition. Wolff then charges occasionalism with disregarding the order of nature (*Systema causarum occasionalium ordini naturæ adversum*, ibid.). Specifically, occasionalism violates another fundamental pillar of a reasonable physics, that is, a physics that lives up to Wolff's standards of intelligibility.

To this Wolff adds that occasionalism contradicts the *principle of physical causal closure*. The possible disruption of the realm of bodies by minds' 'activities' carried out by means of God's efficacy means that the physical realm is not causally closed. Furthermore, insofar as bodies 'influence' minds (albeit indirectly, i.e., with the help of God), occasionalism posits a causal system that is open in two directions: mind-to-body and body-to-mind. This in turn would make it impossible to establish either a proper, self-contained physics, or a proper, self-contained psychology. Occasionalism could only offer a messy, hybrid psycho-physics or physico-psychology (or so it would seem to follow for Wolff). Occasionalism would, hence, violate the independence of physics from psychology and vice versa. Furthermore, the fact that occasionalism, according to Wolff, conflicts with the course of nature makes it improbable:

> The *system of occasional causes is not probable*. This is because it is against the order of nature (§.597). It is, however, not probable that the wisest author of things has established the order of nature in such a way that it should be continuously disturbed for the sake of the soul (*Rational Psychology*, §608, p. 535).[422]

It seems unlikely that nature owing its existence and order to God, a most perfect and wise being, should be governed by physical laws which are continuously violated on the occasion of minds' volitions. Keeping the physical and the mental realm separate, and conceiving the former as governed by mechanical laws and the principle of the conservation of living force, makes for a simpler, and hence, better world-design.

This set of objections brings to light the dubious scientific value of occasionalism, as Wolff would see things. Insofar as science, for Wolff, is system-building, occasionalism would have seemed to him a very problematic building block.

In sum, Wolff charges occasionalism with (1) violating PSR, (2) providing non-naturalised, or super-natural explanations, (3) likening secondary causes to mere instruments which makes them redundant in why-explanations (or *knowledge why*), which are at the heart of holistic scientific explanations, (4) ignorance of the latest developments in dynamics, i.e., violating the *principle of the conservation of the total quantity of living force*, and (5) violating the *principle of physical causal closure*. (1), and its

422 *Systema causarum occasionalium probabile non est*. Est enim ordini naturæ adversum (§.597). Probabile vero non est autorem rerum sapientissimum ita constituisse naturæ ordinem, ut in gratiam animæ continuo sit turbandus (*Rational Psychology*, §608, p. 535).

immediate consequences (2) and (3) clash with Wolff's project of sufficient explanation and grounding the world. This is because occasionalism severs the link between force, secondary efficient causes, and reason. (4) and (5) show that occasionalism squares poorly with a reasonable scientific physics. For all these reasons, Wolff gave up occasionalism and endorsed Leibnizian pre-established harmony as the most plausible option.

5. Conclusion

Oftentimes underestimated or decried as boring and unoriginal, I have shown that Wolff has his own philosophical project which aims at establishing a rigorous scientific method and grounding the world. The former leads him to seek clear, distinct and exact real definitions, and axioms upon which to base proofs. Giving proofs works in terms of syllogistic logic. Wolff's scientific ideal, however, is not confined to *a priori* 'rationalism' as is often thought to be the case. He stresses the importance of experience, experimentation and makes room for probabilistic, hypothetical reasoning. His philosophical project aims at grounding the world, sufficiently and systematically explaining everything. Studying genetic, real definitions of things makes their logical and in particular their physical possibility intelligible. Real definitions study essences *qua* constructible. However, studying essences in terms of real definitions also opens the gap between possibility and actuality. The principle of sufficient reason is what bridges the gap. Sufficient explanation (PSR) is causal. The cause that accounts for the actuality of a thing and the only cause that is truly productive is the efficient cause. Efficient causes themselves are essentially characterised by an intrinsic force in virtue of which they act. Hence, the study of nature *qua* actual is ultimately the study of forces.

Wolff takes issue with his philosophical predecessors, since, he thinks, they philosophised unsystematically on the basis of an incomplete method availing themselves of dubious concepts and lacking or disregarding PSR. In the case of the Cartesians, they confused natural and geometrical bodies. While Wolff in his younger years accepted Cartesian philosophy, and even occasionalism (and can, at this stage in his career, be characterised as a second-generation occasionalist like Sturm), he gave up occasionalism once his own philosophical project got off the ground. The mature Wolff argued that occasionalism violates fundamental principles of philosophy and physics, in particular PSR. Realising that philosophy is a systematic enterprise, Wolff must have ultimately considered occasionalism a poorly fitting constituent of a comprehensive philosophical system. That does not mean, however, that he did not take occasionalism seriously. He did. He discussed it thoroughly and took it to be a serious competitor to his ultimately preferred causal model of pre-established harmony.

Occasionalism denies the existence of intrinsic forces in natural beings. According to the mature Wolff, this denial of forces in nature abolishes at the same time the possibility of finding sufficient grounds of natural beings. A severe consequence of this is that without sufficient grounds nature becomes utterly unintelligible despite the occasionalist's assertions to the contrary. While Malebranche

and other French occasionalists claimed that scientific explanations could be had in the absence of forces intrinsic in nature, Wolff shows that this is not so. Hence, Wolff not only dismisses occasionalism on metaphysical or physical grounds, but also on scientific and epistemological grounds. Wolff's epistemological objections against occasionalism can be thought of as a game-changer, which shift the focus of the discussion. Given Wolff's tremendous influence on eighteenth-century German philosophy, we can anticipate strong reservations against occasionalism in later philosophical discussions.

We will see in the next chapter that Wolff's critique of occasionalism will lead future interlocutors in the German causation debate to devote less and less attention to the discussion of occasionalism. Indeed, many will see it as a non-starter in metaphysics and natural philosophy.

CHAPTER 4

THE EIGHTEENTH-CENTURY GERMAN DEBATE ABOUT OCCASIONALISM

Introduction

In the second half of the seventeenth century, occasionalism had reached the zenith of its popularity and was seen as a promising model to account for inter-substantial causation. Leibniz identified it as the main and most dangerous competitor to his own causal model of pre-established harmony. However, by the second half of the eighteenth century—indeed, after than a hundred years—occasionalism seems to have played no role in the causation debate other than that of the common punching bag (formerly played by the system of physical influx) for philosophers endorsing either pre-established harmony or the eighteenth-century variant of physical influx.[423] While Wolff notes in his *German Metaphysics* (1720) that Cartesianism and occasionalism are widely accepted , Knutzen in his *System of Efficient Causes* (*Systema causarum efficientium*) (1745) has it that "nowadays there are few who embrace it [the system of assistance, i.e., occasionalism]" (Knutzen 1745, §36, p. 121).[424] One can, of course, be sceptical of Wolff's assertion about the popularity of occasionalism at the beginning of the eighteenth century—and indeed Specht (1985, 201) shows that one of Wolff's contemporaries, Johann Georg Walch (1693–1775), challenged Wolff on precisely this point. However, there can be no doubt that the major works of occasionalism[425] all appeared in the second half of the seventeenth century and that Leibniz singled out occasionalism as the main target of his critique.[426] Thus, Wolff's statement can plausibly be thought to attest to the *zeitgeist*.

Nonetheless, it is clear and well-documented that the causation debate in eighteenth-century Germany[427] revolved around the adoption of either pre-established harmony or physical influx, where the latter system eventually outmanoeuvred the former.[428] The fact that occasionalism was once a

423 In a similar vein, Dyck (forthcoming, 10) notes that "while Leibniz had clearly viewed the occasionalist system as the most obvious competition to his own system, the critics of the harmony uniformly opted instead for the system of natural, or physical influx."

424 "hodie pauci sint, qui illud [i.e., the system of assistance] amplectuntur" (Knutzen 1745, §36, p. 121). Wolff repeats his own take on the matter in the later *Psychologia rationalis* (1734, §589).

425 I.e., Cordemoy's *Six Discourses on the Distinction between the Mind and the Body* (1666)*;* La Forge's *Treatise of the Human Mind* (1666) ; and Malebranche's *The Search After Truth* (1674/75).

426 *Inter alia* in his *New System* (1695) and *On Nature Itself* (1698). See the Introduction, section 2 of this dissertation.

427 'Germany' functions here as an abstract conceptual aid to designate the patchwork of kingdoms, duchies, free imperial cities (*Freie Reichsstädte*) etc. that were 'united' by one language, but politically divided, and that were to later constitute the territory of Germany.

428 See Watkins 2005, ch. 1; Watkins 1998; Watkins 1995; Specht 1985, 207; Fabian 1925, 49, 224-230; Bornstein 1898, 16; Erdmann 1876, ch. 3. I do not mean to suggest here that the history of philosophy should be seen as an uncomplicated, straightforward story. Quite the contrary. What I would like to

successful and popular, albeit unorthodox, approach to the problem of inter-substantial causation, only to see itself increasingly abandoned by future generations of intellectuals and ultimately to fade into oblivion of the history of philosophy requires explanation. Explanation that has not yet been given. Indeed, Dyck notes: "it is a peculiar, and as yet unexplained, feature of the German discussion that no widely influential proponent of the occasionalist system emerged" (forthcoming, 10f). Hence, we need to enquire: (1) Why was occasionalism no longer regarded as a sound option? (2) What are the internal and external historical and philosophical factors that led to its demise?

As a solution to this puzzle, I propose the following hypothesis: If occasionalism reached a peak of popularity from approximately 1666 to 1703,[429] and then slowly faded away until 1781,[430] then this might reflect fundamental changes in how the protagonists of the debate thought about philosophy itself. More concretely, the eighteenth century saw a rise in a sceptical or critical attitude towards metaphysics or speculative philosophy in general, and towards how natural philosophy, the home terrain of the topic of causation, should be conducted in particular. The rise of a more sceptical attitude might then be seen as an enabling condition of less metaphysically committal theories of causation.[431] Naturalised theories of causation operating with a less 'extravagant' ontological machinery—fewer and naturalised ontological entities—would hence be favoured. Furthermore, while seventeenth-century philosophers were interested in the very underlying dynamics of causation from an ontological and metaphysical point of view, the eighteenth century saw an increase in humbler, perhaps more descriptive, theories of causation.[432] This point might also be captured by the thought that debates shifted from metaphysical accounts of causation to causal *explanation*. Philosophers would hence have seemed more concerned with a reasonable epistemology rather than a worked-out metaphysics. Some eighteenth-century thinkers might have come to realise that (at least) some metaphysical discussions have been going on for centuries and have often turned in circles. In this respect, it might have become questionable how fruitful metaphysical engagement with some questions would ultimately be, and whether it should not be concluded that they can never be settled.[433] This is, of course, not to say that eighteenth-century philosophers completely lost the appetite for metaphysical speculation, but rather that they were wearier of it in the realm of natural philosophy.

Given that occasionalism stresses the importance of God as the only truly efficient cause to explain change in this world, this *epistemological turn* would have left occasionalism discredited.

emphasise, however, is that there are tendencies in history that need to be accounted for and that the marginalisation of occasionalism is a case in point.

429 The years of the publication of its first full-fledged early modern defence by Cordemoy *via* endorsement by Sturm (in 1697) to Wolff (in 1703). See chapters 1, 2 and 3 of this dissertation on the respective authors.

430 The publication date of Kant's *Critique of Pure Reason*—a reasonable end-point to pick due to its game-changing character in the causation debate. The *Critique of Pure Reason* as well as Kant's other Critical works are, by and large, outside the scope of this chapter.

431 While the gradual process of secularisation that we associate with Enlightenment would only add to a sentiment of discomfort vis-à-vis occasionalism, it is surely too vague a factor to account for the phenomenon as such.

432 Hume's 'regularity theory' might be the very best example, albeit one that will not concern us, here.

433 The antinomies of Kant in the *Critique of Pure Reason* can perhaps best be seen as a case in point.

Occasionalism might have seemed somewhat epistemologically mono-perspectival. What is more, occasionalism would consequently have appeared ever more fantastical, 'un-natural' given its exclusive reliance on a supernatural being to bring about change in the natural world, and eventually unphilosophical or unscientific. Ironically perhaps, occasionalism prided itself with getting the explanatory story right. While occasional causes have no strong metaphysical role to play—they do not exert causal 'oomph,' so to speak—since they are purely passive, they are surely relevant in accounting for *how* (though not for *why*) natural processes come about. They serve as a reliable basis on which to grasp and predict the nomological connections obtaining in this world. Hence, occasionalism itself might have even tragically contributed to its own end. Occasionalism shifted the emphasis from metaphysical accounts of causation to causal explanation, but, as causal explanations were sought in terms of 'why' and not 'how' something happened, it was ultimately overturned.

My hypothesis gains *prima facie* support from the start and end-points of the causation debate. In brief, seventeenth-century participants were much interested in how the arrangement of the world and the set-up of causal processes reflected on the world's designer, God. Earlier critics of occasionalism, like Arnauld, would point out that occasionalism misconstrues the divinity and His relation to the world. A philosophical position like Malebranche's that postulates God's ruling the world by general volitions independent of the individual merit or sin of people would disconnect God from his creation. It would make him an unworthy ruler, and call into question the status of miracles—or so Arnauld argued. Furthermore, the exclusive ascription of causal power to God would make the problem of evil ever more pressing. Who, one might ask, is responsible not only for the *malum physicum* (suffering), but, even more, for the *malum morale* (sin): God or man?[434]

Sturm, we might recall, pointed out that occasionalism provides a compelling solution to the problem of the origin and transfer of motion that mechanism faces, as well as to the problem of life, i.e., what distinguishes living from non-living beings. Interestingly and perhaps ironically, Sturm maintained that occasionalism does provide convincing explanations. In beginning to shift the focus towards causal explanation, Sturm (and others) might, therefore, have contributed to occasionalism's own demise. We need to bear in mind, however, that, for Sturm, explanations did not require naturalisation through and through. In challenging the kind of explanations given by occasionalists such as Sturm, the eighteenth-century thinkers that will concern us in this chapter pushed more consequently in a direction, i.e., that of explanation, whose foundation was laid at the turning point of the century.[435]

434 For a more detailed engagement with such problems, see Nadler 2008.

435 For the sake of clarity, I should point out that when I speak of different ways of doing philosophy in the seventeenth and eighteenth century, there is, of course, nothing particular about the century *qua* century that accounts for any change. I do not believe that history is governed by some kind of overarching principle. Rather, historical events and positions need to be contextualised and seen against the background of individual, material, cultural, social, and psychological circumstances. Hence, insofar as I employ formulations such as 'in the eighteenth century,' they supervene on these circumstances.

At the other end of the causation debate, we find Hume arguing that causation merely consists in the regular connection of two events, where, when an event regularly precedes another, the former is called 'cause,' the latter 'effect'. For him, causality consists, in fact, in nothing other than (a) regularity, (b) temporal succession, and (c) spatio-temporal contiguity. Kant is also notoriously critical of some of the metaphysical questions his predecessors were fond of asking. According to Kant, metaphysical questions would hence need to be confined to what can be answered from a human point of view, given our perceptual-intellectual abilities. Furthermore, in his *Prolegomena zu einer jeden künftigen Metaphysik (Prolegomena to Any Future Metaphysics*) (2016 [1783], §44, p. 202), Kant holds that "[f]inally, following a correct maxim of natural philosophy, we have to abstain from all explanation of the institution of nature drawn from the will of the highest being, since this is not natural philosophy anymore but the confession that it [natural philosophy] has come to an end."[436] While none of this proves our hypothesis, it lends sufficient preliminary support to justify further exploration.

Once we have confirmed the decrease in support and even lack of attention that occasionalism received as time passed, we might ask: how might this hypothesis be tested? Lack of support and lack of attention in themselves are measurable by whether or not occasionalism was still the main target of polemics and philosophical critique, as it was for Leibniz. Furthermore, if the hypothesis holds true, we will find philosophers lamenting the explanatory insufficiency of occasionalism. In addition, the theological and metaphysical tenets underlying occasionalism, questions, for instance, about how God acts, which fascinated philosophers like Arnauld, Malebranche and Leibniz (see Nadler 2008), will no longer be discussed. Occasionalism would then perhaps be rejected on more philosophical or scientific grounds rather than on the grounds of sketching an implausible or heretical view of the divinity.

The focus of this chapter will be on a set of eighteenth-century German philosophers that can plausibly be thought of as the most influential prior to the Critical Kant: Georg Bernhard Bilfinger, Ludwig Philipp Thümmig, Johann Christoph Gottsched, Martin Knutzen, Alexander Gottlieb Baumgarten, Gottfried Ploucquet, and in terms of an end-point, the *pre*-Critical Kant. They are all more or less of Wolffian descent, since this was generally speaking the most powerful and influential academic camp in eighteenth-century German philosophy.[437] What unites these thinkers is that they were all university professors, with universities being where the philosophy of these days was still by and large carried out. They were all well-respected, influential, well-connected and successful academics and

436 "Endlich müssen wir, nach einer richtigen Maxime der Naturphilosophie, uns aller Erklärung der Natureinrichtung, die aus dem Willen eines höchsten Wesens gezogen worden, enthalten, weil dieses nicht mehr Naturphilosophie ist, sondern ein Geständnis, daß es damit bei uns zu Ende gehe" (Kant, *Prolegomena zu einer jeden künftigen Metaphysik*, §44, p. 202)

437 This is admittedly most questionable in the case of the pre-Critical Kant himself.

researchers.[438] They not only influenced each other, but shaped the next generation of (German) philosophers.[439]

However, research on these figures remains scarce. Scholars like Louis White Beck (1969, 276) have relegated them to the status of mere "epigoni" of Wolff and Thomasius, to the status of mere steppingstones in a history of philosophy that inevitably leads from genius to genius (specifically, from Leibniz to Kant). In making such claims, scholars like Beck must have clearly discouraged future studies engaging with these so called 'non-canonical' thinkers. Even when philosophers like Gottsched and Baumgarten have received more attention, analyses of their philosophy remain somewhat mono-perspectival. Gottsched, for instance, is perhaps better known to scholars of German literature than philosophy, and Baumgarten seems to have attracted most attention due to his role in the founding of aesthetics (together with his student G. F. Meier; see Klemme and Kuehn 2010/2012, 161). In addition, insofar as these philosophers have been dealt with, we are speaking of mostly nineteenth- and early twentieth-century German scholarship that, despite its merits, needs to be reconsidered and updated. The recent works of Eric Watkins and Corey Dyck are exceptions. Finally, bracketing Specht's (1985) general survey, the particular fate of occasionalism in early modern Germany has been entirely overlooked. Therefore, this chapter will also help to fill a lacuna in existing academic research.

This chapter is structured as follows: I will first study the particular positions and arguments of our selected philosophers and the gradual decline of occasionalism (section one). I will then prove and substantiate my hypothesis by showing that the afore-mentioned *epistemological turn* accounts for the fall from grace of occasionalism (section two). I will end with a conclusion (section three).

1. Eighteenth-Century Positions on Occasionalism

Before studying the philosophical stance of our seven authors, let us briefly revisit the *status quaestionis* of the causation debate, that is to say, where Leibniz and Wolff had left it: Leibniz himself had set the tone for the ensuing causation debate. In his *Système nouveau* (1695), he pointed out that three systems of inter-substantial causation can be conceived: the system of physical influx, the system of occasional causes, and the system of pre-established harmony. While the first posits a real influence of causally efficacious substances on one another, in the physical as much as in the psycho-physical realm, the other two do not posit such an influence. In contrast to physical influx, occasionalism and preestablished harmony maintain that finite substances do not interact with one another. Occasionalism and pre-established harmony thus accept the consequences of the metaphysical principle that accidents or modes do not migrate from substance to substance, as this violates the very notion of accident or mode. While occasionalism places causal efficacy or power solely in God, pre-

438 This will become clear from the appendix to chapter 4, α.

439 To give only two examples: (1) Knutzen famously taught Kant. (2) Ploucquet taught Schelling's father, and set up the metaphysical theses which were discussed in Hegel's and Hölderlin's master's dissertations

established harmony situates causal efficacy or power in finite substances. Indeed, the very notion of substance, according to Leibniz, mandates that they are or have a principle of activity. Ruling out physical influx straightaway and with not much ado, Leibniz identifies occasionalism as the main competitor to his own system of pre-established harmony. In the debates to follow, however, occasionalism becomes the principal target of critique. Leibniz by and large argues that occasionalism —as it is based on Cartesian physics—violates the physical laws of the conservation of living force recently discovered by Huygens and himself; that it does not provide a sufficient ground for the identity of substantial beings; and that by invoking a continuous causal engagement of God in the natural world it takes refuge in what Leibniz calls "perpetual miracles."[440]

As we saw in the previous chapter, Wolff was an occasionalist in his younger years until Leibniz convinced him to rethink the matter. In his subsequent works, especially the *German Metaphysics* (1720), the *Ontology* (1729), and the *Rational Psychology* (1734), Wolff presented a thoroughgoing project of grounding the world alongside a rigorous scientific method which led him to reject occasionalism. Building on Leibniz, while also thinking the matter through for himself, Wolff objected to occasionalism on the basis that it violates what he considers to be the most fundamental principle of philosophy, i.e., the principle of sufficient reason (PSR). Insofar as occasionalism equates the ground for change in the world with God, it conflicts with the idea that the epistemology of natural philosophy demands that natural change must be explained in terms of natural agents. As we will see, this shift in focus will have strong repercussions for later thinkers inspired by Wolff. However, occasionalism still represented the main opponent for Wolff, as it did for Leibniz.

In opposition to Leibniz—something that has been well-noted by Wolff-scholars—Wolff somewhat limited the scope of the causation debate. While it is clear that Wolff's case against occasionalism could be extended to all inter-substantial causation, it is mostly confined to mind-body interactions.[441] Finally, Wolff—in my view, mostly for strategic purposes to safeguard himself from further attacks by his numerous critics—emphasised that no matter which of the three systems is adopted, this will not have any impact on matters of theology, morality and politics. To some extent, he thereby opened up the possibility of choosing more freely between the given systems (see Specht 1985, 199). To conclude, the transition from Leibniz to Wolff shows both stability and change. This is captured by *Table 1* (below).

440 A more detailed exposition of Leibniz's relation to occasionalism, and his reaction to occasionalist authors is given in the introduction (section 2) of this dissertation.

441 The pre-established harmony versus occasionalism debate (setting aside physical influx) takes place in the field of (rational) psychology, that is, chapter five of the *German Metaphysics*, and the *Rational Psychology* itself.

Philosopher (life)	System adopted	Main target of critique	Scope of the debated system	Title and publication date of main work(s)
Leibniz (1646–1716)	**PH**	**OCC**	Inter-substantial causation	*Système nouveau/De ipsa natura* 1695/1698
Wolff (1679–1754)	(OCC→) **PH** (change)	**OCC**	Rational Psychology/mind-body causation	*German Metaphysics/Ontology/ Rational Psychology* 1720/1729/1734
Bilfinger (1693–1750)	**PH**	**PI**	Rational Psychology/mind-body causation	*De harmonia animi et corporis humani maxime præstabilita/ Dilucidationes philosophicæ* 1723/1725
Thümmig (1697–1728)	**PH**	**PI**	Rational Psychology/mind-body causation	*Institutiones philosophiæ Wolffianæ* 1725-26
Gottsched (1700–1766)	**PI**	(OCC)/**NONE**	Rational Psychology/mind-body causation	*Erste Gründe der gesamten Weltweisheit* 1733/34
Knutzen (1713–1751)	**PI**	**PH**	Rational Psychology/mind-body causation	*Commentatio philosophica de commercio mentis et corporis/ Systema causarum efficientium* 1735/1745
Baumgarten (1714–1762)	**PH**	**PI**	Inter-substantial causation	*Metaphysica* 1739
Ploucquet (1716–1790)	**OCC→PI** (change)	**PH**	Inter-substantial causation	*Principia de substantiis et phænomenis/ Institutiones philosophiæ theoreticæ* 1753/1772
(pre-Critical) Kant (1724–1804)	**PI** (suitably qualified)	**PH**	Inter-substantial causation	*Principiorum primorum cognitionis metaphysicæ nova dilucidatio/De mundi sensibilis atque intelligibilis forma et principiis* 1755/1770

Table 1) Mapping the positions of philosophers on causation in eighteenth-century Germany: Main participants of the eighteenth-century causation debate. Each column represents (from left to right): the system they adopted; the system they took to be the main competitor; the scope of the debated system: whether inter-substantial causation in general or just mind-body causation in particular; the title and the publication date of their principal and most important work concerning the causation debate. Abbreviations are as follows: PH = Pre-established Harmony; OCC = Occasionalism; PI = Physical Influx.

At this point, the seven authors that we are discussing in this chapter enter the stage. They can be divided into two sets. The first set consists of Wolff's earliest disciples or the first generation of German textbook authors 'after' Wolff: Georg Bernhard Bilfinger, Ludwig Philipp Thümmig, and Johann Christoph Gottsched. What should be noted, however, is that their works were still published during Wolff's lifetime. Their textbooks on philosophy appeared when Wolff himself had almost finished his *German series* of philosophical textbooks.[442] What becomes immediately clear, in these writers, is that occasionalism is no longer at the heart of philosophical debates. Bilfinger and Thümmig —the first prominent students of Wolff—see themselves as defenders of Leibnizian-Wolffian pre-established harmony against the physical influx adopted by the Pietists—Wolff's most acrimonious opponents in Halle (see Erdmann 1876, ch. 3). The discussion of occasionalism in both authors has shrunk to a few pages. They mostly adopt Leibniz's and Wolff's critique in a more condensed form. Gottsched follows suit, but with one noteworthy exception: he cautiously endorses physical influx "in an unofficial way" (Watkins 1995, 303, 305; see also Watkins 1998, 173f). Gottsched, however, also does not completely break away from his fellow Wolffian partisans meaning that we find no serious critique of pre-established harmony, either. While occasionalism unexpectedly turns out to be the main target of critique, this is not because Gottsched perceived it as a particularly convincing and hence competitive position but rather because he grants himself some leeway to doubt that physical influx has been refuted, and is left with no other philosophical position to criticise. Even though Gottsched offers a certain twist on an argument against occasionalism, i.e., that it threatens human agency (turning humans into marionettes) which will be picked up by Knutzen later, he should not be seen as disproving the historical unfolding of events. Rather, Gottsched is the exception that proves the rule. Furthermore, he is something of a turning point in that we find him endorsing physical influx but not yet providing much argumentation for it (Erdmann 1876, 82; Watkins 1998, 172f). What unites these first three authors is that they discuss causation and the three causal systems within the scope of rational psychology.

The second set of authors we are dealing with continues a pathway of which we have seen Gottsched laying the foundation: Knutzen, the later Ploucquet and Kant, though not Baumgarten,[443] commit themselves to physical influx and argue mostly against pre-established harmony.[444] More to the point,

442 The works I will be focusing on here are Bilfinger's dissertation *De harmonia animi et corporis humani maxime præstabilita ex mente illustris Leibnitii, commentatio hypothetica* (*Hypothetical Commentary on the Most Pre-established Harmony of the Soul and the Body as Defined by the Illustrious Leibniz*) (1723) as well as his main work, the *Dilucidationes philosophicæ (Philosophical Elucidations*) (1725); Thümmig's *Institutiones philosophiæ Wolffianæ* (*Foundations of Wolffian Philosophy*) (1725/26), and Gottsched's *Erste Gründe der gesamten Weltweisheit (First Grounds of the Whole of Philosophy*) (1733/34).

443 Interestingly, Erdmann (1876, 95) holds that "the pre-established harmony that they [Baumgarten and his student G. F. Meier] teach is identical to the Leibnizian one only in name, in terms of the subject matter, however, [it is identical] with the physical influx as it had been established by Reusch and especially Knutzen." Fabian (1925, 81f) (correctly, in my view) objects to Erdmann's reading. Fabian emphasises that Baumgarten (and Meier) vehemently reject any kind of real influx between monads (substances).

444 The texts we will engage with are Knutzen's *Systema causarum efficientium* (*System of Efficient Causes*) (1745)—basically the second edition of his *Commentatio philosophica de commercio mentis et corporis* (*Philosophical Commentary on the Interaction of the Mind and the Body*) (1735); Baumgarten's

in terms of the aims of this chapter, however, is that no one except the early Ploucquet seems to think of occasionalism as a serious alternative: physical influx or pre-established harmony are the only games in town. Even in the case of Ploucquet, Specht (1985, 207) notes that neither his contemporaries nor he himself referred to him(self) as an occasionalist. The authors of this second set treat occasionalism as a non-starter, more the relic of a handed-down way of writing a history of philosophy in terms of the Leibnizian-Wolffian 'three-systems-approach' than as a position that merits serious discussion.[445] Interestingly, most authors of this second set extend the scope of the discussion to that of inter-substantial causation. Hence, they return to a more Leibnizian understanding of the field of application of causation. Both sets of authors and their respective philosophical positions are again captured by *Table 1* (above). Let us look now take a closer look at each of the two sets.

1.1 Early Eighteenth-Century Positions

1.1.1 Bilfinger

In terms of chronology, Bilfinger is the first of our seven authors to have attended to the topic of causation. Both his inaugural dissertation, the *Hypothetical Commentary on the Most Pre-established Harmony of the Soul and Body as Defined by the Illustrious Leibniz* (1721), which was published in an extended form in 1723, and the *Philosophical Elucidations* (1725) are cases in point.[446] Although Bilfinger is aware that the problem of causation is not confined to the mind-body case (*Hypothetical Commentary*, §7), he restricts it to the scope of mind-body interactions. As far as the *Hypothetical Commentary* is concerned, this follows intuitively from its title as well as its goal and design. Here, Bilfinger is particularly interested in defending pre-established harmony as the most convincing system of psycho-physical causation.

To do so, he presents the only three conceivable (simple) systems: physical influx, occasionalism, and pre-established harmony. He rules out the first two and neutralises objections made against pre-established harmony by a set of prominent philosophers (Foucher, Bayle, Lamy, Tournemine, Newton, Clarke, and G. E. Stahl). As far as the *Philosophical Elucidations* are concerned, the discussion of causation is situated within the scope of psychology, to wit, the interaction between the mind and the

Metaphysica (*Metaphysics*) (1739); Ploucquet's *Principia de substantiis et phænomenis* (*Principles concerning Substances and Phenomena*) (1753) and in order to trace his change of heart his *Institutiones philosophiæ theoreticæ* (*Foundations of Theoretical Philosophy*) (1772); as well as the pre-Critical Kant's *Principiorum primorum cognitionis metaphysicæ nova dilucidatio* (*New Elucidation of the First Principles of Metaphysical Cognition*) (1755), and the *De Mundi sensibilis atque intelligibilis forma et principiis (On the Form and Principles of the Sensible and Intelligible World*) (1770).

445 We must closely observe and analyse the peculiar case of Ploucquet, especially in light of the hypothesis we entertained in this chapter, in order to explain the marginalisation of occasionalism.

446 A general account of the *Hypothetical Commentary* is given by Kintrup (1974). A general account of Bilfinger's *Philosophical Elucidations* is given by Liebing (1961). A rather general presentation of Bilfinger's philosophy can also be found in Kapff (1905) as well as Wundt 1945, 214-216, and Leinsle 1988, 289-300. A very brief discussion of Bilfinger's solution to the mind-body problem is given by Fabian 1925, 55-59. I will use the 1741 edition of the *Hypothetical Commentary*. For the *Philosophical Elucidations*, I will use the 1725 edition.

body (*Philosophical Elucidations*, section III, ch. iv). Hence, Bilfinger shows himself to be in agreement with the restricted scope of Wolff's discussion.

Unlike Leibniz and Wolff, Bilfinger identifies physical influx rather than occasionalism as pre-established harmony's main competitor. This becomes clear from three facts. First, seen against the background of the most recent events, to wit, Wolff's expulsion from Halle in 1723, effected by his Pietist rivals and the ongoing quarrel about pre-established harmony, Bilfinger quite naturally takes the side of his promoter Wolff. It is worth recalling that Wolff's philosophy had been attacked by his Pietist colleagues in Halle, all of whom firmly supported physical influx (Watkins 1998, section 2). Pre-established harmony—albeit in an attenuated form—on the other hand constitutes part of Wolff's overall system. Bilfinger himself alludes to the quarrel in the preface of the *Philosophical Elucidations*: "[This] is the year from which onwards a certain *More Recent* Philosophy, whose innocence and splendid utility I seemed to have observed, had been attacked by various writings" (unpaginated preface).[447] Second, in his main work, the *Philosophical Elucidations*, Bilfinger spends ten paragraphs and more than twenty pages discussing and refuting physical influx, while he spends only three paragraphs and just four pages on occasionalism. I take space dedicated to a certain issue to reflect its relative importance. The more pages, the greater the attention physical influx receives, the greater its estimated importance compared to occasionalism. Third (and most importantly), from a philosophical perspective, physical influx and pre-established harmony share a naturalised explanation, and this is what makes them convincing approaches, for Bilfinger. He argues that this means they qualify as *philosophical* while occasionalism does not. Bilfinger points out that: "Ultimately that system [pre-established harmony] is *most Philosophical* since it assigns natural producing causes to natural effects" (*Philosophical Elucidations*, §322, p. 316).[448] While this statement is meant to refer to preestablished harmony, it also implies that physical influx qualifies as a philosophical system. The difference between pre-established harmony and physical influx will then revolve around where the principle of change is located: within the very substance whose change is concerned (pre-established harmony) or in another substance causing the former's change (physical influx) (ibid., §322). Setting aside the debate between these two systems, let us now enquire into Bilfinger's refutation of occasionalism.

In arguing against occasionalism in the *Hypothetical Commentary*, Bilfinger closely follows Leibnizian considerations. Oftentimes, he even cites Leibniz's position on the matter rather than diving into the philosophical discussion himself. While this in itself reflects, to some extent, Bilfinger's lack of interest in occasionalism, he does nonetheless consider it a well-received system (as

447 "Annus est, ex quo variis impugnata fuit scriptis Philosophia quædam *Recentior*, cujus ego innocentiam & utilitatem mihi videbar deprehendisse luculentam" (*Philosophical Elucidations*, unpaginated preface). All translations of Bilfinger are my own. Emphases and capitalisations are in the original.

448 "Ultimum hoc Systema esse *maxime Philosophicum;* assignat enim effectibus naturalibus caussas [sic] producentes naturales" (*Philosophical Elucidations*, §322, p. 316).

did Wolff) both by Cartesian, and even eclectic authors, like Sturm.[449] Furthermore, Bilfinger does make a choice in that he only presents physical and epistemological considerations on the subject matter. That is to say that occasionalism, according to Bilfinger—citing Leibniz's *Theodicy* (§61)—takes refuge in perpetual miracles and does not take precautions against violating the laws of nature: "despite that in bringing about the interaction of both of these substances [i.e., the mind and the body] it [occasionalism] introduces *perpetual miracles*, *it does not take precautions against the perturbation* of the natural laws that will be constituted in each of these substances" (*Hypothetical Commentary*, §74, p. 83).[450] For Bilfinger, this raises two intimately connected problems. In basing explanations in natural philosophy on the intervention of the divinity—that is, in introducing supernatural rather than naturalised explanations—occasionalism promotes bad physics and violates the principle of sufficient reason.[451] Providing explanations without a sufficient reason eventually makes occasionalism a system that qualifies as *unphilosophical*. More specifically, according to Bilfinger, occasionalism involves

> *this inconvenience* that you will involve *God*, as it were, as the perpetual interpreter of the soul and the body who speaks to the soul for the body and insinuates the soul's volition to the body, that is, that you adduce only a supernatural cause of a natural effect (*Hypothetical Commentary*, §80, p. 92).[452]

In the realm of physics, this amounts to a circumvention of the laws of nature in that, e.g., motion is due more to God than to the previous state of a body.[453] Employing extra-natural rather than natural causes, however, is, for Bilfinger, a sign of a bad physics.[454] Instead of explaining why a certain physical state of a body comes about in terms of the relevant antecedent state of another body, occasionalism adduces what it takes to be the only truly efficient cause, i.e., God. This, however, makes the realm of physics, in itself, unintelligible. Moreover, this violates the principle of physical

449 "It [i.e. occasionalism] is nowadays well-received, not only by Cartesians, but also by those who want to be seen as following no opinion of a sect among all of which we refer first and foremost to *Johann Christoph Sturm*, the most meritorious man in the field of a more reasonable physics" (*Hypothetical* Commentary, §72, p. 81). "Estque id [i.e., the *systema occasionale*] hodie satis receptum, non inter Cartesianos modo, sed & eos, qui videri volunt, nulla sectæ placita sequi, quorsum omnino referimus præ ceteris, IO. CHR. STURMIUM, virum de saniori physica meritissimum."

450 "præterquam, quod ad conciliandum huius vtriusque substantiæ commercium *miracula perpetua* introducit, *non cauet perturbationi* legum naturalium in vtraque substantia constitutarum" (*Hypothetical Commentary*, §74, p. 83). The paragraph from Leibniz's *Theodicy* refers to the French edition.

451 We have seen Wolff argue in a similar way in the previous chapter, section 4.

452 "Non euitabis tamen *hoc inconveniens*, quod DEVM animæ atque corpori perpetuum quasi interpretem alliges, qui & pro corpore ad animam loquatur, & animæ voluntatem corpori insinuet, hoc est, quod effectuum naturalium supernaturalem tantum caussam [sic] alleges" (*Hypthothetical Commentary*, §80, p. 92).

453 According to Bilfinger, occasionalism has it that "in the present moment, motions exist which through no law of motions [sic] originate in the previous state [of a body], but [which] are introduced into the corporeal realm only by the immediate power of *God* on the occasion of this volition [of a soul]" (*Hypothetical Commentary*, §75, p. 86). This is an addition made by Bilfinger which is not in the 1723 edition. "in præsenti momento motus existant, qui per nullam motuum legem ex priori statu orti, sed occasione huius volitionis demum ab [sic] DEI immediata vi orbi corporeo intrusi sunt."

454 "This is a vice in physics when for the *specific* (and the same single) effects of nature a cause is sought outside nature" (*Hypothetical Commentary*, §82, p. 95). "id vitium est in physicis, si effectibus naturæ *specificis*, (iisdemque singulis) caussa [sic] quæretur extra naturam."

causal closure. Rather than following the causal chain in natural phenomena leading from like causes to like effects, occasionalism attributes to any natural effect the most *dissimilar* cause conceivable, i.e., the divinity. The idea of moving beyond the realm of nature in providing causal explanations leads Bilfinger directly to the idea that in so doing the occasionalist violates the principle of sufficient reason:

> The Cartesians make these general laws [of nature], in virtue of which *God* effects [*operatur*] perceptions on the occasion of motions and vice versa, entirely unconstrained and altogether arbitrary. Of course, a *philosophical* man can *never bring this to bear*: that something is given, exists, happens without a reason whether one speaks of spirits or of bodies (*Hypothetical Commentary*, §76, p. 86).[455]

Bilfinger charges occasionalism with failing to provide a sufficient reason why a certain state (here: a perception) comes about. Instead of finding a finite sufficient efficient cause in nature, occasionalism produces the infinite cause. On each individual occasion, a natural effect is brought about by a supernatural cause. This comes at an even greater collectivised cost. If the occurrence of any singular event in nature is explained in terms of the divinity's action to this effect, then on a larger scale the totality of regularities in nature captured by the laws of nature is based on God's "unconstrained and arbitrary" governing of nature rather than on the concatenation of natural causes and effects. Instead of explaining the laws of nature by means of sequences of natural events, the occasionalist must appeal to God's arbitrary will. In doing so, Bilfinger sees an imminent danger of abandoning the nomological structure of the natural world altogether. In addition, Bilfinger believes that "nothing shows the imperfection of any philosophy more prominently than when a philosopher is forced to confess that *something* in their system is found *for which no reason* exists" (*Hypothetical Commentary*, §74, p. 84).[456] At the end of the day, occasionalism, according to Bilfinger, is not only ungrounded but even unphilosophical.

Bilfinger's main work, the *Philosophical Elucidations*, does little more than rehash what he had spelled out in the earlier *Hypothetical Commentary*. The charges that occasionalism provides supernatural explanations of natural phenomena and is hence unphilosophical remain at the foreground (*Philosophical Elucidations*, §335). The fact that the length of the discussion of occasionalism shrinks from twenty-six to four pages from the *Hypothetical Commentary* to the *Philosophical Elucidations*, while the discussion of physical influx shrinks from fifty-three to twenty pages shows that physical influx, rather than occasionalism, is still identified as the key competitor. In absolute terms, the discussion of physical influx is a lot longer, and even in relative terms the discussion of occasionalism

455 "Cartesianos plane liberas atque omnino arbitrarias facere istas leges generales, quarum vigore DEVS occasione motuum perceptiones operatur, & vice versa. Scilicet id *nunquam ferre* potuit vir *philosophus:* dari, existere, aut fieri aliquid sine ratione, siue id de spiritibus dicatur, siue de corporibus "(*Hypothetical Commentary*, § 76, p. 86).

456 "Nihil enim philosophiæ alicuius imperfectionem luculentius indicat, quam si philosophus fateri cogatur, *aliquid* in systemate suo reperiri, *cuius ratio nulla* existat" (*Hypothetical Commentary*, §74, p. 84).

is reduced by eighty percent, while the discussion of physical influx is only reduced by sixty-three percent. To conclude, occasionalism plays an ever more marginalised role in Bilfinger's philosophical thought on causation.

1.1.2 Thümmig

Thümmig, who, like Bilfinger, studied with Wolff in Halle, addresses the topic of causation in his *Foundations of Wolffian Philosophy* (1725/26).[457] In line with Wolff's *German Metaphysics* as well as Bilfinger's *Philosophical Elucidations*, Thümmig's *Foundations*, a compendium for teaching Wolffian philosophy at university level, treats of the three causal systems within the scope of rational psychology (volume I, part iii (of metaphysics), section iv). Thümmig confines himself to reporting Leibniz's objections against occasionalism, but as was the case with Bilfinger, he makes a choice what to discuss.

First, occasionalism is said to violate the laws of nature, to wit, the conservation of the direction of motion law. Thümmig reports the discovery of this law of conservation in collisions of bodies (*conflictu corporum*) by Huygens, and claims that this has led Leibniz to dismiss occasionalism, since this system takes God to redirect bodies on the occasion of collisions with other bodies (and volitions of minds) (*Foundations*, "Rational Psychology," §250). Second, Thümmig reports Leibniz's rejection of occasionalism on the basis of its invocation of perpetual miracles—a notion that was wide-spread.[458] Interestingly, Thümmig believes Leibniz to be taking the cue from Augustine's claim (*Augustini sententiam secutus*) in that in the natural world one should not look for miracles (*in naturalibus miracula quærenda non esse*). To this is added the claim that occasionalism is not able to distinguish between the actions of finite creatures and God (*nec actiones creaturarum ab actionibus Dei satis distingui*) (*Foundations*, "Rational Psychology," §251).

Thümmig seems to have thought that occasionalism muddles the realm of the natural and the supernatural since it strips finite substances of any causal efficacy or activity whatsoever, thus reducing them to mere occasions for God's actions. He might even have had in mind Leibniz's charge that occasionalism collapses into Spinozism due to the fact that, by robbing finite substances of their essential property, i.e., activity or force, they would no longer be substances but rather modes of the divinity. The name of Spinoza is, however, absent from Thümmig's discussion. Eventually, both occasionalism and physical influx are dismissed because, in contrast to pre-established harmony, they violate the order of nature.[459] In the case of occasionalism, this is because it violates the conservation

457 The scarce scholarship on Thümmig includes Fabian 1925, 59-63; Wundt 1945, 212-214; and Leinsle 1988, 283-288.

458 We have found the claim in Leibniz, and Wolff (chapter three, sections 1.2 and 4) as well as in Bilfinger (*supra*).

459 "the systems of physical influx and assistance [i.e., occasionalism] are against the order of nature (§244, 250) and the system of pre-established harmony alone is consistent with it [the order of nature]" (*Foundations*, "Rational Psychology," §260, p. 195). "systemata influxus physici & adsistentiæ ordini naturæ adversantur (§.244, 250), atque systema harmoniæ præstabilitæ solum eidem sit conforme."

of the direction of motion law. In the case of physical influx, this is because new motions are thought to be introduced into the realm of bodies by minds and motions of bodies seem to vanish as they affect minds (*Foundations*, "Rational Psychology," §244).

Thümmig commits himself to pre-established harmony and refers the reader to Bilfinger's *Hypothetical Commentary* for an extended treatment of the subject matter (*Foundations*, unpaginated preface). As Watkins (1998, 143) points out, Thümmig "does weaken his adherence to Pre-established Harmony somewhat." This is true insofar as Thümmig ends his discussion of causation by stressing that "no system is supported by a rigorous demonstration," and that this allows people to choose the position they find most probable (*Foundations*, "Rational Psychology," §264, p. 197).[460] Influenced by Thümmig's textbook, which he used for teaching philosophy courses, we will find Gottsched take up this idea, and push further for loosening party alignments, in particular with respect to pre-established harmony and physical influx.

While Thümmig's position is less easy to identify than Bilfinger's, I take it that his considered opinion is the same as Bilfinger's, to wit, adopting pre-established harmony and treating physical influx as the main target of critique. After all, the historical context, i.e., the Pietist attack on Leibnizian-Wolffian philosophy, was the same for both figures. Furthermore, the treatment of physical influx in Thümmig's *Foundations* is longer than that of occasionalism.[461] Finally, unlike in his more self-reliant argumentation against physical influx, Thümmig merely reports Leibniz's opinion on the shortcomings of occasionalism, which suggests a lack of interest concerning occasionalism. Thümmig does, however, *select* which of Leibniz's numerous objections to report and this constitutes a *choice*. Thümmig focuses on the explanatory deficiencies occasionalism seems to face in natural philosophy, that is, he charges occasionalism with providing supernatural explanations of the workings of nature that are inconsistent with the newly-found laws of motion. Thümmig's *Foundations* were a highly influential textbook (Wundt 1945, 213f). In this regard, Thümmig's choice should not be underestimated. In addition, as textbooks are written material to be elaborated by the teacher in class, we can also assume that Thümmig had more to say on the subject matter than what was penned down, although this is not accessible to us.

1.1.3 Gottsched

In his *First Grounds of the Whole of Philosophy*, Gottsched follows Bilfinger and Thümmig in situating the topic of causation in the scope of rational psychology (*First Grounds*, Vol. I, part iv.2,

460 "Since indeed no system is supported by rigorous demonstration, it will be the same to us whether someone, according to whether this or that system will have seemed more probable, agrees with the parties of the *Influxionists*, or the *Occasionalists*, or, finally, the *Harmonists*, or whether they want to defend no party." "Cum enim nullum systema rigorosa nitatur demonstratione, nobis erit perinde, sive aliquis, prout hoc vel istud systema probabilius visum fuerit, *Influxistarum*, sive *Occasionalistarum*, sive denique *Harmonistarum* partibus accedere, sive nullas tueri velit" (*Foundations*, "Rational Psychology," §264, p. 197f).

461 The difference is, however, not as plain as in Bilfinger's case. Thümmig dedicates four pages to physical influx, yet only three to occasionalism.

section v).[462] Instead of reporting either Leibniz or Wolff's argumentation against occasionalism, however, Gottsched condenses the treatment of occasionalism to two remarks. The first is the now common objection that occasionalism turns the union of the soul with the body in to a series of infinite miracles (*eine Reihe von unendlichen Wunderwercken*) (*First Grounds*, §1073). This is because God is said to constantly intervene either on behalf of the body or on behalf of the soul to 'synchronise' them.[463] The second remark is that occasionalism diminishes God's wisdom—which I assume follows from the conception of God's alleged constant interventions. Rather than having God do 'a good job' *once* (i.e., the creation of the world), occasionalism would seem to require God to have to constantly fix His 'faulty' design so as to make it work. Gottsched does not spell out this point.[464] However, he adds an interesting twist in maintaining that "thereby the whole of mankind was turned into a puppet show [*Marionettenspiel*]" (*First Grounds*, §1073, p. 558).[465] This suggests that Gottsched took occasionalism to undercut a notion of true agency with regard to finite creatures and that this would be particularly problematic in the case of human beings who take themselves to be free at least in some respects. In line with Gottsched, one might ask: If everything is done by God, what is left to be done by creatures? Are they not reduced to merely dependent, passive beings? Are they not like marionettes obeying their puppet-master? If so, how can they be taken to be morally (and legally) responsible for their actions? Are they worthy of blame and praise? Gottsched does not pursue his idea further but some of the questions raised might have been entailed in his reasoning and his choice of the analogy of the puppet show. The analogy itself is influential: in the second edition of his *System of Efficient Causes* (§12, p. 55), Knutzen picks up on it—he had been corresponding with Gottsched since 1740 (Erdmann 1876, 82).

Gottsched's own position is a careful endorsement of physical influx, "albeit in a somewhat weaker and unofficial way" as Watkins points out (1998, 170; see also Watkins 1995, 303, 305). Gottsched emphasises that "none of them [the three prominent ways of explaining mind-body interactions] is perfectly explained or demonstrated; each of them still has its difficulties. Hence, everyone can stick to the one, which they like best" (*First Grounds*, §1077, p. 560).[466] While something very similar was said before by Thümmig, whose textbook Gottsched himself acknowledges to have used, the latter cashes this in. Gottsched admits that he prefers to stick to physical influx (*First Grounds*, §1077) and

462 He chooses to call this part 'pneumatology'. I will be using the second edition of Gottsched's *First Grounds* (1736). A general account of Gottsched's philosophy can be found in Wundt 1945, 216-219. Fabian 1925, 63-67 discusses Gottsched's solution to the mind-body problem.

463 At least this is what I take Gottsched to have in mind given the historical background of this allusion.

464 However, my interpretation gains support from Leibniz's critique of occasionalism in the *Système nouveau*—a work known to all of the protagonists of the eighteenth-century causation debate here studied—where Leibniz insinuates that the occasionalist world-design (illustrated by the synchronisation of two clocks) is faulty. See the introduction to this dissertation; and chapter 3, section 1.2.

465 "dadurch das ganze menschliche Geschlecht in ein Marionettenspiel verwandelt wurde" (*First Grounds*, §1073, p. 558).

466 "Keine derselben [i.e., the 'three opinions of the philosophers'] ist vollkommen erkläret oder demonstriret; eine iede [sic] davon hat noch ihre Schwierigkeiten: Es kan sich also ein jeder an diejeinige halten, die ihm am besten gefällt" (*First Grounds*, §1077, p. 560).

offers a humble argument in favour of it.[467] Given that Gottsched remains rather positive vis-à-vis pre-established harmony, his main target of critique can only be occasionalism. However, taking into account that the presentation of occasionalism including its critique has shrunk to one (!) paragraph occupying only half a page, I suggest that occasionalism is not the main target of critique for Gottsched, either, but that there is rather no target of critique at all. This underscores that Gottsched deserves the merit of neutralising party alignments regarding theories of causation. Despite being a Wolffian, he opened up the pathway for what we might call a *realignment*.[468] Even thinkers that still work with mostly Leibnizian-Wolffian metaphysics will soon choose a system of causation not explicitly endorsed by either Leibniz or Wolff. For the most part, this will be the system of physical influx. What is noteworthy for our focus on occasionalism is that Gottsched questions it on epistemological grounds insofar as he selects the argument from perpetual miracles. In line with his more practical interest in philosophy,[469] he is also worried about the status of human agency.

To conclude, the first set of our seven authors all reject occasionalism on epistemological grounds. That is, they charge occasionalism with providing supernatural rather than naturalised explanations. At the same time, however, occasionalism is not in the centre of the philosophical debate any longer. Unlike Leibniz and Wolff, Bilfinger, Thümmig, and Gottsched are mainly concerned with pre-established harmony and physical influx. Occasionalism receives ever less attention and is marginalised—a trend that we will continue with regard to the second set of authors dealt with in this chapter. Finally, while Bilfinger and Thümmig stick to pre-established harmony, Gottsched—encouraged by Thümmig, perhaps ironically—offers a humble endorsement of physical influx.

1.2 Later Eighteenth-Century Positions

1.2.1 Knutzen

Knutzen is certainly aware that the extension of any theory of causation is not confined to the mind-body case. However, he chooses the mind-body case as the framework for his discussion of causation. While Knutzen realises that "these three systems are not only employed to explain the interaction [between the mind and the body], but also to disentangle the communication of finite simple substances" (*System of Efficient Causes*, §14, p. 64f), the first eight paragraphs of his *System of Efficient Causes* confine the scope of the discussion to the mind-body case.[470] Before presenting the three causal systems of physical influx, occasionalism, and pre-established harmony, the

467 For an analysis of Gottsched's "tentative arguments in favour of Physical Influx" (Watkins 1998, 173), see Watkins 1995, 300-307.

468 The term 'realignment' originates in political science and can be defined as "a marked change in voters' political allegiances that results in a different prospect on the political scene" (Bealey and Johnson 1999, *The Blackwell Dictionary of Political Science*, 279). I use the term to designate the change in philosophers' allegiances to philosophical ideas, in particular, which causal theory they endorse.

469 Marti (2014, 284) mentions that practical concerns such as rational competency, moral edification, and the improvement of living together in a society were at the heart of Gottsched's teaching goals as a university professor. Poser (2002, 60) points out that Gottsched's more practically oriented conception of philosophy as the science of happiness diverges from Wolff's conception while reconnecting with Leibniz's.

communication between the mind and the body as well as their mutual dependence are at the heart of the investigation. Similarly, the full title of Knutzen's work is *System of Efficient Causes or A Philosophical Commentary on the Interaction of the Mind and the Body To Be Explained through Physical Influx* (*Systema causarum efficientium seu commentatio philosophica de commercio mentis et corporis per influxum physicum explicando*).

Knutzen's engagement with occasionalism is relatively brief and dismissive.[471] He avails himself of five counter-arguments against occasionalism. All of these are borrowed, however. First, Knutzen paraphrases Leibniz's objection that occasionalism violates the recently discovered law of the conservation of the direction of motion (*System of Efficient Causes*, §12, p. 54). Second, due to the alleged invocation of perpetual miracles, occasionalism is said to be hardly worthy of the divine wisdom (*nec continua in eodem miracula sapientia diuina satis digna videntur*; ibid.). Instead of creating a world where no such interventions are needed, God would seem to have chosen to constantly mend this work, which is not befitting God's role as an infinitely wise artificer. Third, and most importantly for our investigation, is the argument that "[it] is not very philosophical to immediately summon the will of God when explaining phenomena of natural things."[472] Here, Knutzen effectively charges occasionalism with providing the wrong kind of explanations. Rather than appealing to natural agents to account for natural events, occasionalism takes recourse to the transcendental. Rather than providing naturalised explanations, occasionalism gives supernatural explanations. Fourth, Knutzen accuses occasionalism of making God complicit in moral evil and thus of questioning the sanctity of God (*imo in eodem systemate Dei T.O.M. eum ad malum esse concursum, qui diuinæ sanctitati aduersetur*; ibid.). The fifth and final argument is the one we found Gottsched putting forth. This is the idea that occasionalism is incompatible with an account of genuine human agency. Making God the only efficient cause, and constantly summoning Him on the occasion of the 'action' of finite creatures, renders the whole of human life a satire, or, as Gottsched (whom Knutzen cites here) put it, a puppet show (*Marionettenspiel*) (*System of Efficient Causes*, §12, p. 55).[473] Overall, the third objection strikes me as the most significant one. Following his predecessors,

470 "Vnicum hic adiiciam: tria hæc systemata non modo explicandum commercium, verum etiam ad enodandam substantiarum finitarum simplicium communicationem adhiberi" (*System of Efficient* Causes, §14, 64f). Watkins (1998, 183) correctly notes that "one of the significant features of both Knutzen's and Reusch's discussions is that they consider the issue [of causation] not only in its specific mind-body form, but also in complete generality, namely how it is possible for one being to act on another at all." I agree with Watkins; and with Fabian (1925, 100) who had pointed out the same. However, insofar as the scope of a discussion and the outreach or potential applicability of a discussion are concerned, I would like to suggest that these do not immediately coincide in Knutzen's main work, the *System of Efficient Causes*. While the scope of the discussion is the communication between the mind and the body, it is clear, for Knutzen,—and he shares this view with Ploucquet, Baumgarten and Kant—that the issue of causation is a global matter, i.e., that it concerns the interaction between substances as such.

471 Knutzen discusses and dismisses occasionalism in one paragraph (§12) that makes up only four pages (pp. 51-55).

472 "parum philosophicum esse in explicandis rerum naturalium phænomenis statim ad omnipotentis Dei voluntatem prouocare, plerique existimant" (*System of Efficient Causes*, §12, p. 54).

473 Knutzen not only cites Gottsched but also a polemical passage from De Crousaz's (1663–1750) *Système des Reflexions* to the same effect. Furthermore, Knutzen maintains that the emendation to occasionalism offered

Knutzen charges occasionalism with providing the wrong kind of causal explanations. Insofar as the philosopher's task is to render the world around her intelligible, occasionalism, for Knutzen, fails to live up to it.

Knutzen's own position is an unmistakeable, self-confident defence of the system of physical influx. Making use of the liberty to choose between the (only) three causal systems available, Knutzen goes beyond philosophers like Gottsched in that he provides a substantial positive argumentation for physical influx.[474] In this, Knutzen as much as Johann Peter Reusch (1691–1753) "represent[s] a turning point in the debate" (Watkins 1998, 183).[475] Knutzen is among the first to make physical influx the main subject of his treatise, and his *System of Efficient Causes* strikes me in many ways as the counterpart to Bilfinger's *Hypothetical Commentary* of 1723.

Both Knutzen and Bilfinger present a tripartite treatise on the subject matter of mind-body causation. Their respective first parts introduce the problem and elaborate on the *status quaestionis*. These first parts also both contain brief refutations of the two causal systems that are ruled out. However, while Bilfinger rejects physical influx and occasionalism, Knutzen rejects pre-established harmony and occasionalism. Part two and three of their respective works set forth the system they endorse and defend it against objections. While Bilfinger defends pre-established harmony, Knutzen chooses physical influx. What remains constant is that they both dismiss occasionalism and identify the remaining other causal system as the main target for attack: physical influx in the case of Bilfinger, and pre-established harmony in the case of Knutzen. That pre-established harmony is seen as the main competitor by Knutzen becomes clear from the more independent and lively discussion of it and the fact that Knutzen (as others before him had done) devotes more space and care to the rejection of (here) pre-established harmony compared to occasionalism.[476] Furthermore, he points out that

by Wolff, could not solve the encountered difficulties (*System of Efficient Causes*, §12, p. 55).

474 In the preface of his *System of Efficient Causes* (p. 8f), Knutzen indicates that "after so many labours have been carried out until now, no one has achieved anything except hypotheses not yet demonstrated." "post exantlatos tot labores nemo hucusque præter hypotheses nondum demonstratas quidquam protulerit in medium."An analysis of Knutzen's argumentation for physical influx can be found in Watkins 2005, 50-73; Watkins 1995, 307-328; Fabian 1925, 100-106; and Erdmann 1876, ch. 4 (84-97). Knutzen's philosophy, more generally, is presented by Erdmann 1876, chs. 4 to 7; Fabian 1925 , 98-107; and Wundt 1945, 208-210.

475 Erdmann (1876, 83, 85) has also pointed out the importance of Knutzen in the eighteenth-century causation debate. He argues that it is with Knutzen's *System of Efficient Causes* that the system of physical influx becomes the dominant one. Similarly, Fabian (1925, 228) had also called attention to Knutzen's and Reusch's "positive justification" in favour of physical influx in their respective main works, i.e., the *System of Efficient Causes*, and the *Metaphysical System* (*Systema metaphysicum*) which were both initially published in 1735.

476 Knutzen's arguments against pre-established harmony can be found in §13 of his *System of Efficient Causes*, pp. 58-60. They boil down to the following: (1) the mechanical way in which pre-established harmony accounts for voluntary motions seems to some not very comprehensible; (2) pre-established harmony goes against human freedom; (3) the origin and alteration of perceptions in the soul without bodily influence seems hardly intelligible; (4) pre-established harmony is not actual, but merely possible, and in any case not very probable; (5) the charges against the Cartesian beast-machine equally apply to pre-established harmony; (6) pre-established harmony does not provide a sufficient reason for the creation of the physical world. For the sake of brevity, this summary of Knutzen's objections against pre-established harmony must suffice.

"nowadays there are few, who embrace it [the system of assistance, i.e., occasionalism] and I am mainly concerned here with the more recent [thinkers] and with the Leibnizians" (*System of Efficient Causes*, §36, p. 121).[477] At the end of the day, according to Knutzen, occasionalism is a system that can be disregarded,

> since it is not only incompatible with divine wisdom, because it indeed ascribes to Him continuous miracles in the reign of nature, but it also absolutely does not do justice to the sanctity of the threefold greatest and best God; at worst, the way of explaining the phenomena is most unworthy for a philosopher, as it indeed invokes without necessity a *Deus ex machina* in the style of the poets in the investigation of natural things; […] it is little probable (*System of Efficient Causes*, §36, p. 117f).[478]

This once again underscores that Knutzen dismisses occasionalism mainly for the way it attempts to account for natural processes. He argues that by appealing to God, occasionalism fails to provide philosophically adequate, that is, naturalised explanations.

1.2.2 Baumgarten

Baumgarten returns to a more global and Leibnizian understanding of the issue of causation. The primary source in this regard is his very influential *Metaphysica*—a textbook on metaphysics used and cherished by no less than Immanuel Kant.[479] More precisely, Baumgarten considers the problem of causation in its inter-substantial dimension, or as Watkins puts in its "more general, cosmological form" (2005, 74).[480] Accordingly, Baumgarten engages in a discussion of the three causal systems of pre-established harmony, physical influx, and occasionalism in both the second part on cosmology (chapter II, section 2) and the third part on psychology (chapter II, section 2) of his *Metaphysics*.

In the realm of cosmology, occasionalism is presented as one of the three so called "SYSTEMS FOR EXPLAINING THE INTERACTION OF THE WORLD'S SUBSTANCES" (FH: *Metaphysics*, §448, p. 185).[481] Not inadequately, occasionalism is then characterised as positing a *real influence* of the infinite

477 "hodie pauci sint, qui illud [i.e., the system of assistance] amplectuntur, ac potissimum cum recentioribus ac Leibnitianis hic mihi sit negotium" (*System of Efficient Causes*, §36, p. 121).

478 "Similiter Systema causarum occasionalium, cum non modo sapientiæ diuniæ repugnet, quippe quod continua eidem in naturæ regno adscribit miracula; verum etiam in Dei T.O.M. [Ter Optimo Maximo] sanctitatem prorsus sit iniurium; denique modus sit phænomena explicandi, philosopho maxime indignus, quippe sine necessitate in rerum naturalium inuestigatione Deum ex machina, poetarum more, arcessens; […] parum esse probabile" (*System of Efficient Causes*, §36, p. 117f).

479 I will be using the fourth edition of the *Metaphysica* from 1757 which happens to be the one used by Kant. I will stick to the (2013) translation given by Fugate and Hymers abbreviated 'FH: *Metaphysics*' followed by the respective paragraph and the page number. Kant's usage and appreciation for Baumgarten's *Metaphysics* is by now more or less common knowledge, see for instance Wundt 1945, 220; Watkins 2005, 74; Fugate and Hymers 2013, 3, 22, 54. Fugate and Hymers provide Kant's annotations and cross references to his other works throughout the main body of the *Metaphysica*. Analyses of Baumgarten's account of causation can be found in Watkins 2005, 74-78; Watkins 1998, 183-191; and Fabian 1925, 77-82. An overview of Baumgarten's philosophy is given by Wundt 1945, 220-223.

480 See also FH: *Metaphysics*, 13; and Casula 1975, 412.

481 The capitalisation is in Fugate and Hymer's edition as well as in Baumgarten himself.

substance, i.e., God, on finite substances where real influence is the opposite of the merely *ideal influence* posited by pre-established harmony (FH: *Metaphysics*, §§452, 448). *Influence* is defined by Baumgarten as "the action of a substance upon a substance outside of it" (FH: *Metaphysics*, §211, p. 139). Ideal and real influence, in turn, are defined as follows:

> "If the suffering of a substance that is influenced by another is at the same time the action of the very substance that suffers, then the SUFFERING and INFLUENCE are called IDEAL. But if the suffering is not the action of the suffering substance, then the SUFFERING and INFLUENCE are called REAL" (FH: *Metaphysics*, §212, p. 139).

What Baumgarten has in mind here is that when two substances interact, one of two scenarios can occur, but not both[482]: either the substance acted on, call it S_P (= passive substance), receives a true modification, i.e., is truly modified, by the substance that acts on it, call it S_A (= active substance), or not. That is to say, either S_A really does something to S_P or not. If S_P receives a true modification from S_A, or if S_A really does something to S_P, then this is properly speaking an instance of real influence. If not, it is an instance of ideal influence. While the notion of real influence corresponds to true efficient transeunt causation, the notion of ideal influence corresponds to intra-substantial or immanent causation prompted by some outside substance.[483] I believe that part of the reason Baumgarten avails himself of this kind of language was to evade some of the criticisms against pre-established harmony by influxionists and to strengthen the idea of a dependency relation (if only ideal) between created substances in pre-established harmony, i.e., to present pre-established harmony in more influxionist clothing. However, I also believe, this conceptual distinction is important for understanding Baumgarten's account of causation.[484]

According to Baumgarten, in positing a real influence, occasionalism finds itself in alignment with physical influx. The difference between the two systems is that occasionalism posits a real influence of the infinite substance on finite substances, but no real influence between finite substances, whereas physical influx posits a real influence between finite substances (possibly allowing for some real influence of God, the infinite substance, on finite substances) (FH: *Metaphysics*, §456). Insofar as occasionalism is endorsed to account for all inter-substantial causation *qua* such, one can speak of the "UNIVERSAL SYSTEM OF OCCASIONAL CAUSES" (FH: *Metaphysics*, §§452, 457). Baumgarten will later

482 Watkins (2005, 79), too, has noted that Baumgarten (as well as his student G. F. Meier) treat inter-and intrasubstantial causation as mutually exclusive.

483 Indeed, we might ask whether Baumgarten's conception of pre-established harmony in terms of ideal influence does not in fact involve an element of occasional causation. This must not be mistaken for occasionalism, however. While a substance does not truly act on another substance, it does seem to prompt the latter's action, or serve as an occasion for the latter's action.

484 The idea that Baumgarten dresses up his own philosophy in influxionist clothing gains support from his own rhetoric: in §449, Baumgarten maintains that "Not only does it [pre-established harmony] not deny that spirits can act upon bodies, and bodies upon spirits, but it even maintains that bodies and spirits mutually influence each other in this world (§408, 434), and that they can mutually touch one another (§223, 409)" (FH: *Metaphysics*, §449, p. 185). §448, however, made it clear that this influence is only ideal. Baumgarten's distinction between real and ideal influence will be important for understanding the terminology of Ploucquet, who talks about real influence when developing his occasionalist account of causation.

explain that accepting one of the three "UNIVERSAL SYSTEMS FOR EXPLAINING THE INTERACTION OF MUNDANE SUBSTANCES" (§457) logically entails accepting the same system for the mind-body case, that is, as a "PSYCHOLOGICAL SYSTEM" (FH: *Metaphysics*, §§762, 761). In a word, cosmological occasionalism, for instance, entails psychological occasionalism, but not vice versa.

Baumgarten leaves no doubt that he rejects occasionalism as false both as a system of explaining inter-substantial causation (FH: *Metaphysics*, §452) and as a psychological system (FH: *Metaphysics*, §§767, 769). However, he does not produce a lot of arguments. What he does say against occasionalism as a cosmological model is that it "contradicts §400 and 408" (FH: *Metaphysics*, §452, p. 186). The latter paragraph (§408) deals with the monadic structure of the world and claims that monads "mutually influence each other (§211)" (FH: *Metaphysics*, §408, p. 176). Since the occasionalist is neither committed to a monadic worldview nor to real efficient causal relations between finite substances (here: monads), Baumgarten begs the question. The former paragraph (§400) discusses the "universal nexus" of all monads "of this world" (FH: *Metaphysics*, §400, p. 175). According to Baumgarten, the world is constituted by simple substances, i.e., monads (FH: *Metaphysics*, §§395, 406, 230), and "each and every monad is either the ground or consequence, or both, of every other single monad (§14, 48)" (FH: *Metaphysics*, §400, p. 175). A ground (*ratio*) in turn, for Baumgarten, "is that from which it is knowable why something is" (FH: *Metaphysics*, §14, p. 102). Hence, grounds are, in a sense, conditions of intelligibility. Since monads *qua* substances are or have powers (FH: *Metaphysics*, §199) "for representing [their] *own universe*" (FH: *Metaphysics*, §400, p. 175; emphasis in original), and since they are universally connected with one another—i.e., stand in ground-grounded relations—the whole universe can be known in principle from one monad doing the required representative work. Representing something distinctly, in turn, is what is called understanding (*intelligere*) (FH: *Metaphysics*, §402).

While all of this might seem like a detour into Leibnizianism, the unpacking we have done here allows us to see what Baumgarten's cryptic objection against occasionalism consists in. Given that the occasionalist "denies all power and energy in finite beings (§451)" (FH: *Metaphysics*, §452, p. 186), she also denies the representative, or (speaking more precisely) intellectual power constitutive of finite beings. In doing so, the occasionalist undermines the intelligibility of the world. Only *active* finite substances—something ruled out by the occasionalist—can comprehend the universal connectedness in which consists this world. If the occasionalist were to go even further and deny the universal harmony or the universal nexus of substances serving as grounds (i.e., conditions of intelligibility) for one another—something Baumgarten does not charge the occasionalist with but which one might think remains a daunting possibility (see FH: *Metaphysics*, §453, p. 187)—then the intelligibility of the world would be entirely gone for good.

While this objection of Baumgarten's is again based on a monadic worldview and (as I pointed out) on the universal nexus of finite substances—two premisses the occasionalist is not required to accept—

Baumgarten does have a point in challenging the compatibility of occasionalism with the intelligibility of the world. He does so by pushing the occasionalist commitment to passive finite substances to its utmost consequences, i.e., depriving substances of their intellectual capacities, since the execution of a substance's intellective powers requires an active principle. Raising doubts about the compatibility of occasionalism with the intelligibility of the world is something we have seen before in Baumgarten's predecessors. While they emphasised supernatural explanations to which occasionalism is said to appeal to, Baumgarten devotes more attention to the role finite cognitive agents play in understanding the world. Making them purely passive beings means questioning their role as cognisers, since cognition is surely an action. Baumgarten does, however, allude to the problem that "[i]n the system of occasionalism every suffering of a finite substance is supernatural (§474, 453)" (FH: *Metaphysics*, §490, p. 195). A supernatural event, in turn. is defined as "an event in the world not actualised by the nature of any contingent being" (FH: *Metaphysics*, §474, p. 191). Supernatural events can be ordinary, i.e., they can follow fixed rules, or extraordinary (FH: *Metaphysics*, §474, 384). Only the latter qualify as miracles. While Baumgarten does not wish to accuse occasionalism of making use of 'perpetual miracles' (as did his predecessors), the core of this criticism remains nonetheless the same, to wit, that occasionalism does not provide naturalised explanations (as a reasonable system of natural philosophy should).[485]

Another objection to global or cosmological occasionalism follows from Baumgarten's conception of the best of all possible worlds. According to him, "*[i]n the most perfect world there is the greatest universal nexus* (§437, 94)" (FH: *Metaphysics*, §441, p. 183; emphasis in original), and "the more and greater grounds there are, the greater is the nexus (§160)" (FH: *Metaphysics*, §167, p. 131). As I mentioned earlier, grounds, according to Baumgarten, are "that from which it is knowable why something is" (FH: Metaphysics, §14, p. 102). That which a ground grounds or that which follows from positing a ground is "its CONSEQUENT" (ibid.). The connection between a ground and its consequent is what Baumgarten calls "the NEXUS" (ibid.).[486] It is worth noting that grounds thus not only play an ontological but an even more important epistemological role in making the world intelligible. A ground explains why something else is and why it is the way it is. Now, in comparison with pre-established harmony and physical influx, it is clear, for Baumgarten, that the austerity of grounds in occasionalism puts it at a disadvantage with the other two systems. God is the real (in contrast to ideal) sufficient ground of the suffering of the passive substance, S_p, that He acts on. He is also the real sufficient ground of the action of the acting substance, S_A, i.e., Himself. After all, only

485 'Naturalised' in our sense of the term. For Baumgarten, to be a 'naturalist' is an undesirable position since he equates naturalism with the denial of "every supernatural event in the world" (FH: *Metaphysics*, §493, p. 195). Even atheism can follow from naturalism, though Baumgarten is careful enough to point out that while atheism is a kind of naturalism not every naturalist is an atheist (FH: *Metaphysics*, §999). Pre-established harmony explicitly allows for miraculous interventions by God, and hence does not count as 'naturalist' in Baumgarten's sense. However, insofar as explanations of pre-established harmony are based solely on natural agents, they do count as naturalised in our sense of the term.

486 In this, Baumgarten seems to follow Wolff's distinction between a principle and its principiate. See chapter 3 section 3.1 of this dissertation.

God truly acts and He sufficiently determines Himself to action, for the occasionalist. Hence, in occasionalism, we count one (universal) ground. What is the situation in the case of physical influx? The real sufficient ground for the modifications that S_P undergoes lies in S_A, which is another finite substance (in contrast to the case of occasionalism). S_A has the real sufficient ground for its action either in yet another substance or in itself. Either way, we count two grounds:

> Through the influence attributed to infinite substance alone upon really suffering substances posited in interaction, whatever they suffer, the suffering substance is not more fecund[487] [in occasionalism] than through physical influence (§453). However, the other finite part of the interaction is still less fecund (§453, 166) (FH: *Metaphysics*, §460, p. 188).

Hence, while physical influx posits two different grounds in a case of interaction between two substances, occasionalism only posits the self-same one, God. In pre-established harmony, however, we find that an even "greater nexus is actualised" than in physical influx (FH: *Metaphysics*, §459, p. 188). This is because S_P "has a sufficient ground (1) in its own powers and (2) in the substance ideally influencing [it]" (ibid.). By the same token, S_A ideally influencing S_P has at least a sufficient ground in itself or in another finite substance. Baumgarten concludes that "in pre-established harmony, the influencing substance is equally as fecund as in physical influence, while the suffering substance is however more fecund than in physical influence (§166)" (ibid.). One can identify at least three grounds in pre-established harmony. Assuming that the acting substance has as many grounds as the passive substance, that is, its own powers and yet another substance ideally influencing it, there might even be four grounds. In this hierarchy of systems measured by the number and connectedness of grounds, we find that (unsurprisingly) pre-established harmony scores best, physical influx gets second place, and occasionalism finishes last. Baumgarten's underlying assumption is that in this, the best of all possible worlds, the harmony between substances is the greatest (FH: *Metaphysics*, §§935, 936). Harmony in turn is maximised by virtue of the greatest possible nexus or connectedness between substances which are *grounded in* one another and *ground* one another (FH: Metaphysics, §§441, 48, 33). This hierarchy of systems thus demonstrates Baumgarten's conviction that the real competitor to pre-established harmony is physical influx.

The problem with this objection is that it seems almost entirely based on Baumgarten's own system and it is not clear why the occasionalist would need to share Baumgarten's conviction that a system with more grounds which are more intimately connected (i.e., a greater universal nexus) should be preferred to a simpler conception of the universe. After all, Malebranche, who indefatigably insists on the simplicity of God's ways would surely just dig in his heels and maintain that Baumgarten's preference for multiplicity over simplicity must be argued for on independent grounds. The

487 The fecundity of a ground is characterised in terms of the number of things that follow from it (FH: *Metaphysics*, §166).

influxionist, in turn, could argue (against the defender of pre-established harmony) that counting ideal grounds as grounds in order to gain the upper hand is like counting pipe dreams. In which case, the influxionist might argue, the pre-established harmonist begs the question. For all these reasons, I think that Baumgarten's argument from the intelligibility of the world is the strongest one and the one we should keep in mind.

Baumgarten returns to the problem of causation in his rational psychology. Here, he adds to his earlier critique of occasionalism the remark that it "goes against freedom" (FH: *Metaphysics*, §767, p. 269). This is because occasionalism conceives only the infinite substance as acting and finite substances as purely passive, or suffering. Insofar as finite substances are only acted upon, or suffer, they are devoid of freedom which requires causal power or activity.[488] Free choice, Baumgarten explains, is "actualised through the power of the soul for representing the universe according to the position of my body in it (§712, 667)" (FH: *Metaphysics*, §720, p. 255). The representative power which Baumgarten attributes to the soul is, of course, absent in occasionalism, as is free choice. Interestingly, we find here a connection to the role of human beings as cognitive agents to which I have referred earlier. Baumgarten would argue that insofar as human beings are merely passive beings in occasionalism, they are not cognitive agents. Since cognition is necessary for the execution of one's freedom, occasionalism, according to Baumgarten, fails to make room for human freedom. While Baumgarten does not reference possible sources for this idea, we have seen it feature in both Gottsched's and Knutzen's earlier reflections.

It is clear that pre-established harmony is Baumgarten's preferred option because he calls it "a true doctrine" in contrast to both physical influx and occasionalism which are qualified as "false" (FH: *Metaphysics*, §463, p. 189). Interestingly, Baumgarten has gained even more confidence in pre-established harmony over time. Hence, in the preface to the second edition of the *Metaphysics*, he notes that he has upgraded the status of pre-established harmony "in both its universal and psychological sense […] from a hypothesis to a theorem" (FH: *Metaphysics*, 90).[489] The textual

488 This reading gains support from a passage in Georg Friedrich Meier's (1743/ 2nd edition: 1752) *Beweis der vorherbestimmten Harmonie* (*Proof of Pre-established Harmony*). Here, Meier—Baumgarten's student and protegé, who is oftentimes a good source to better understand Baumgarten's own views—notes that in the system of occasionalism "the soul retains no freedom, because it is a necessary antecedent part of free actions that they are proper determinations of free creatures [*Wesen*]," and "if it [the soul] does not act at all [as is the case for some occasionalists], it has no force, hence, it is not an acting and efficient creature" (*Proof*, part one, section 3, §66, p. 121). "Die Seele behält gar keine Freyheit, weil es ein notwendiges vorläuffiges Stück der freyen Handlungen ist, daß sie eigene Bestimmungen der freyen Wesen sind." "Handelt sie [the soul] gar nicht, so hat sie keine Kraft, sie ist also kein thätiges und würcksames Wesen." In Meier's text the second quote precedes the first. N.B.: Some occasionalists like Sturm and (possibly) Cordemoy did not extend occasionalism to the realm of the soul itself at least insofar as its intramental actions are concerned.

489 Without providing further proof, Watkins (2005, 78) attributes this 'novelty' to Baumgarten's student G. F. Meier referring to the latter's *Beweis der vorherbestimmten Harmonie* (*Proof of Pre-established Harmony*). While I do not wish to diminish Meier's philosophical independence, I deem it more likely that he took the cue from Baumgarten. Meier's *Beweis* was published in 1743, the same year that the second edition of Baumgarten's *Metaphysica* appeared. Since Meier was Baumgarten's protegé and met Baumgarten on numerous occasions, Baumgarten would certainly have communicated his change of heart vis-à-vis pre-

evidence also indicates that he views physical influx as the main competitor of pre-established harmony. For a start, physical influx receives slightly more attention than occasionalism.[490] Furthermore, when discussing different accounts of mind-body causation, Baumgarten has it that "[n]one are possible aside from the psychological systems of pre-established harmony, physical influence, and *perhaps* [*fortasin*] occasional causes" (FH: *Metaphysics*, §761, p. 267; my emphasis). While Baumgarten does not express doubt (indicated by the term 'perhaps') about the possibility of physical influx, he doubts the possibility of occasionalism. What is, the influxionist language, the distinction between ideal and real influence used by Baumgarten can be seen as an attempt to silence some of his influxionist critics, or else to make pre-established harmony more compatible with contemporary trends in philosophy. No such effort is made in the case of occasionalism. To conclude, according to Baumgarten, occasionalism does not pay due respect to the role of cognitive agents and does not render the world intelligible.

1.2.3 Ploucquet

The case of Gottfried Ploucquet is an interesting deviation from the other thinkers dealt with in this chapter. Not only does his oftentimes unorthodox[491] metaphysics textbook, the *Principles concerning Substances and Phenomena* (*Principia de substantiis et phænomenis*) (1753), combine elements of Descartes, Malebranche, Leibniz and Wolff in ways that do not always sit well together, he also commits himself to occasionalism and Malebranche's *Vision in God* doctrine.

Surprisingly, Bornstein and Aner, the two main interpreters of Ploucquet, have tended to overstress either the Cartesian-Malebranchean side of Ploucquet's philosophy (Bornstein 1898) or its Leibnizian-Wolffian side (Aner 1909), to the exclusion of the other. Furthermore, while Ploucquet's endorsement of Malebranche's *Vision in God* doctrine—this disproves Pessin's (2006, 36) unsubstantiated claim

established harmony. Noteworthy is also that Meier dedicates the *Beweis* to his 'benefactor' Baumgarten, and it seems hardly conceivable that the student would have made the change without the master's assent. Finally, Meier himself confesses that "I borrowed most of it [what he is dealing with in the *Proof*] from the *Metaphysics* of *Professor Baumgarten*" (*Proof*, unpaginated preface of the first edition). "Das allermeiste habe ich aus der *Metaphysic* des *Herrn Professor Baumgarten* entlehnt."

490 This reading, too, is supported by a remark by Meier (*Proof*, part one, section 3, §59, p. 111) to the effect that "They [the occasionalists] can be regarded as much weaker enemies than are the influxionists." "Sie [the occasionalists] können als viel schwächere Feinde angesehen werden, als die Influxionisten."

491 In contrast to his predecessors, Ploucquet dismisses dividing his textbook in sections on ontology, cosmology, psychology and natural theology. Instead, he omits ontology as it "is not part of metaphysics" but more of a first philosophy anteceding metaphysics and other disciplines (*Principles*, preliminary remark). "Ontologiam plane prætermisi, quia non est pars Metaphysices, sed eidem, uti & aliis disciplinis præstruenda" (*Principles*, preliminary remark). Realising that there is a lot of overlap between the different disciplines of the Wolffian framework, Ploucquet then prefers to structure purely on the basis of chapters, not parts. "I did not deal with Natural Theology, Cosmology and Psychology in their sections as is common; indeed, I consider the one part to intersect with the other in such a way that none can be set forth fully and systematically on its own" (*Principles*, preliminary remark). "Theologiam naturalem, Cosmologiam, ac Psychologiam non suis sectionibus, uti fieri solet, absolvi; Vidi enim, unam partem alteram ita permeare, ut nulla seorsim plenarie ac systematice exponi possit." Ploucquet's own structure oftentimes comes at the cost of lack of stringency. Discussions of philosophical topics are pushed back to a later stage leaving the reader wondering. Furthermore, the topics dealt with in one chapter seem at times only loosely connected.

that "it [the *Vision in God* doctrine] won no converts"—has been recognised in the relevant literature, neither Ploucquet's version of the *Vision in God* doctrine nor its role in his occasionalism have been analysed in detail.[492] Specht's (1985) article is an insightful exception in that it places Ploucquet in the as yet unwritten history of the reception of occasionalism in early modern Germany. Importantly, in assessing Ploucquet's causal theory, Specht (1985, 207) points out that neither Ploucquet himself nor his contemporaries considered him an occasionalist nor did he ever have to protest against being labelled as such. I agree with Specht. Nevertheless, I think that Ploucquet's (1753) causal theory should be understood as occasionalism. Therefore, it might in this respect be better to refer to Ploucquet as a *crypto-occasionalist*. This means that his theory is clearly occasionalist in content, and intention, but refrains from drawing attention to an alliance with the occasionalist camp and avoids 'traditional' occasionalist language.[493] Ploucquet's crypto-occasionalism together with the relatively poor reception of his textbooks provides an explanation of the limited impact of his causal theory.[494] Furthermore, scholars have noted a change of heart in Ploucquet. Like Wolff before him (chapter 3), Ploucquet gave up his occasionalist leanings. In his later career, Ploucquet endorsed a version of the more commonly accepted causal theory of physical influx.[495] I will first analyse Ploucquet's crypto-occasionalism in his *Principles* (1753), before looking at the later *Foundations of Theoretical Philosophy* (*Institutiones philosophiæ theoreticæ*) (1772) as evidence of Ploucquet's ultimate rejection of occasionalism.

492 Ploucquet's occasionalism itself has been noted by scholars of eighteenth-century German philosophy. See Sommer 1892, 86; Bornstein 1898, 20, 42, 51f; Aner 1909, 55f; Fabian 1925, 156-158; Wundt 1945, 336. Besides Aner (1909, 49f) and Bornstein (1898, 34-42), Sommer (1892, 78-80) and Pozzo (2005) engage with Ploucquet's *Vision in God* theory. Malebranche's influence on Ploucquet is documented by Sommer 1892, 78f, 84, 87; Bornstein 1898, 3, 21, 28f, 37; Aner 1909, 15; Wundt 1945, 335f, and Pozzo 2005.

493 For instance, Ploucquet does not use terms such as 'occasional causes' or 'occasion' when talking about secondary causes.

494 Only the *Principles* (1753) went through a second a edition (Bornstein 1898, 12). In fact, few libraries nowadays seem to possess copies of Ploucquet's works and the ones that do are relatively close to the University of Tübingen, where Ploucquet worked as a university professor. This might suggest a rather restricted, local diffusion.

495 Ploucquet's change of heart vis-à-vis occasionalism has been noted by Bornstein (1898, 21 (n3), 55), Aner (1909, 56), Dessoir (1902, 168f), Fabian (1925, 158, 167), Specht (1985, 210f) and Pozzo (2005, 270f). However, different points in time and different works of Ploucquet have been suggested as the place(s) where this philosophical shift occurred. While Bornstein gives the *Dissertatio de hylozoismo veterum et recentiorum* (1775), Aner locates Ploucquet's change of heart somewhere between the publication of the *Fundamenta philosophiæ speculativæ* (1759) and the *Institutiones philosophiæ theoreticæ* (1772). Dessoir and Pozzo adduce the *Expositiones philosophiæ contemplativæ* (1782). Fabian suggests the *Institutiones philosophiæ theoreticæ* (1772). Specht (1985, 210) points out that Ploucquet speaks of a "refutation of [Malebranche's] occasionalism" as early as the *Fundamenta* (1759), to wit, in the index of this work. Furthermore, "between 1759 and 1773, Ploucquet, in opposition to his previous conventions, arrives at attributing a force to body […] a *motive force* [*vis motrix*]" (ibid., 211). I can confirm that Ploucquet's *Fundamenta* (1759) contain a refutation of Malebranche's occasionalism and that this refutation is carried over to the *Institutiones philosophiæ theoreticæ* (1772). However, in the *Fundamenta* (1759), Plocuquet still endorses body-body occasionalism (see the chapter *De Origine & Communicatione Motûs*, esp. §850) and still retains part of the representationalist argumentation in favour of occasionalism (in terms of the *Vision in God* doctrine) that we will look at shortly. Ploucquet drops body-body occasionalism in favour of a realist-influxionist account in the *Institutiones* (1772) (see the chapter *De Motu*, esp. §191, p. 347). The anti-occasionalist stance from the *Institutiones* (1772) remains stable across the *Elementa philosophiæ contemplativæ* (1778), and the *Expositiones philosophiæ contemplativæ* (1782). After all, Aner and Specht were going in the right direction.

In his *Principles* (1753), Ploucquet (like Baumgarten before him) treats of inter-substantial causation rather than limiting his discussion to the mind-body case specifically. The most relevant chapters for the subject matter of causation are chapters X and XVIII, i.e., *On the Actions of Substances on Substances* (*De actionibus substantiarum in substantias*) and *On the Interaction between the Mind and the Body* (*De commercio mentis & corporis*), respectively. However, since Ploucquet himself claims that discussions about the origin of motion and sensations or sense-perceptions are immediately relevant in order to understand mind-body interactions, passages that cover this ground need to be considered as well.[496] Ploucquet's argumentation in favour of occasionalism is twofold. On the one hand, he—like his occasionalist colleagues—eliminates other explanatory accounts that attempt to solve the problem of inter-substantial causation. One the other hand, Ploucquet positively tries to establish his own occasionalist account of inter-substantial causation by availing himself of a version of Malebranche's *Vision in God* doctrine. I will address Ploucquet's negative case first and his positive case second.

Ploucquet's Negative Case for Occasionalism

Ploucquet's ontology admits of only three kinds of entities: the infinite substance or God, mind-like finite substances essentially characterised by a principle by which they manifest themselves, that is, self-consciousness,[497] and phenomena. While the human soul qualifies as a substance (*Principles*, §124), bodies do not. Instead they are reduced to mere phenomena (*Principles*, §§27, 73). Insofar as phenomena existentially depend on substances to which they appear, and given that Ploucquet treats of inter-*substantial* causation, immediate interactions between bodies seem to be immediately excluded. Bodies do not have a force and hence qualify as merely passive. Ploucquet puts this as follows: "I concede that a body has no force to act in itself, because it is not a self-manifesting substance, and an idea of an action cannot be found [*videri*] in the idea of body" (*Principles*, §470, p. 301).[498] This also

496 "When the body acts on the soul, sensation originates; when the soul acts on the body, motion originates. Therefore, the origin of sensations and motions are to be dealt with" (*Principles*, §457, p. 288). "Cum corpus agit in animam; oritur sensatio; cum anima agit in corpus; oritur motus. Agendum igitur est de origine sensationum & motuum." I take Ploucquet to use the terms *sensatio* and *perceptio* synonymously.

497 "every substance is an active principle. But what is acting? I answer that acting viewed in its first source can be nothing other than to express something in oneself, or to form some image, or to be manifest to oneself. Hence, every substance is manifest to itself. Hence, substance can be defined by a principle to manifest itself or by the real unity manifesting itself" (*Principles*, §20, p. 8). "omnis substantia est principium activum. Sed quid est agere? Respondeo, quod agere in radice primitiva spectatum nihil aliud esse possit quam aliquid in se exprimere, seu formare aliquam imaginem seu sibimet ipsi esse manifestum. Ergo omnis substantia sibi est manifesta. Ergo substantia definiri potest per principium sui manifestativum, seu per unitatem realem semet manifestantem." The interpretation of this principle of self-manifestation in terms of self-consciousness seems justified based on Ploucquet's Cartesian outline in the first chapter. According to Ploucquet, the first truth we come to know is the *ego cogito* (ibid., §1) or our own *egoitas* (ibid., §12). This *egoitas*—the fact that the first thing "observable in me is the perception or manifestation of myself" (ibid., §18, p. 7)—cannot be removed without removing the certainty of my own existence (ibid.). "primum in me observabile est perceptio seu manifestatio mei ipsius." Bornstein (1898, 43) as well as Dessoir (1902, 166) make the same connection between self-consciousness and self-manifestation.

498 "Concedo corpus in se nullam habere vim agendi, quia non est substantia sui manifestativa, neque in idea corporis videri potest idea actionis alicujus" (*Principles*, §470, p. 301).

disqualifies bodies as potential causes of sense-perceptions—plausibly the standard case of body-mind interactions. However, sense-perceptions or representations of bodies do not depend on our minds either, since we are simply not in charge of them:

> Whatever does not flow from my [own] manifestation, or from a representative principle that is in me has its ground [*rationem*] outside of my manifestative principle [*principium manifestativum*]. Many phenomena in the world, which is called corporeal, do not flow from my [own] manifestation. The minor [premise] of this syllogism is apparent, since no reason [*ratio*] can be thought out why I should refer external phenomena to my egoity [*egoitatem*]. […] Hence, such [bodily] phenomena do not pertain to the form of my egoity [*egoitatis*] or my internal principle, or my soul. […] Since if more were to follow from my [own] principle, [then] the effect would be greater than its cause; something were to follow from a principle which is not intelligible from [that principle] itself. But since external phenomena and ideas excited by them contain in themselves more perfection or greater composition and distinguishability [*distinguibilitas*] than the likes of which I could form by means of all the power of ingenuity and by means of meditations applied to the most extreme, it is most evident that such ideas do not proceed from my [own] principle (*Principles*, §167, pp. 94f).[499]

What Ploucquet is arguing here is that sense-perceptions, with all their complexity, do not depend on us. That is to say, they cannot be understood if we solely reflect on ourselves and our own self-consciousness. They exceed what could be the possible results of our own self-contained thinking. Since the effect cannot be greater than its cause—Ploucquet avails himself here of the causal containment axiom—sense-perceptions cannot be the effects of our own mind. Effects are made intelligible by their causes, but no principle of our mind could possibly make intelligible the appearance of sense-perceptions. Besides, the regularity of sequences of sense-perceptions, e.g., of light and darkness, cannot be understood from our own isolated standpoint, either (*Principles*, §168). Moreover, Ploucquet points out that if sense-perceptions were to depend on us, we could bring them about or manipulate them at will. However, this is not the case. To motivate this point, Ploucquet uses the following vivid example:

499 "Quicquid non fluit ex mei manifestatione, seu ex uno, quod mihi inest, principio repræsentativo, illud sui rationem etiam habet extra principium mei manifestativum. A. plurima phænomena in mundo, qui corporeus dicitur, non fluunt ex mei manifestatione. E. Minor hujus syllogismi propositio patet, quia nulla ratio excogitari potest, cur phænomena externa ad meam egoitatem referam. […] Ergo talia phænomena non pertinent ad formam meæ egoitatis seu mei principii interni, seu meæ animæ. […] Si enim ex meo principio plus sequeretur, effectus potior esset sua causa; sequeretur aliquid ex principio, quod in ipso non est intelligibile. Cum autem externa phænomena & ideæ ab iisdem excitatæ vel plus perfectionis, vel plus compositionis & distinguibilitas in se contineant, quam ut ego simile quid formare possim per omnem ingenii vim & ad extremum usque applicatas meditationes: evidentissimum est, tales ideas non a meo procedere principio" (*Principles*, §167, pp. 94f).

> And yet I am tormented by hunger, thirst, pains and other perceptions. I cannot make it such that other representations coinciding with these come about—those I have through satiated hunger, quenched thirst, numbed pains. On the other hand, when I do not have certain representations, when I am sitting in the dark, when I do not perceive the scent of flowers etc., I can by no means make it such that that which I desire comes about, that I see light, that I smell flowers (*Principles*, §170, p. 97).[500]

Ploucquet concludes that "the principle of sensations or rather [the principle] of the efficient cause of sensations is outside the soul" (*Principles*, §170, p. 98).[501] As becomes clear later, these passages serve a double function. On the one hand, they serve to prepare the reader for what I am calling Ploucquet's crypto-occasionalist solution to the problem of causation. On the other hand, they argue against the main competitor to Ploucquet's account, that is, they argue against pre-established harmony (*Principles*, §494). Turning bodies into well-founded phenomena and grounding the regular sequence of sense-perceptions in the representative force of minds, Leibniz claimed that the principle of sense-perceptions needs to be located in the mind. We have seen Ploucquet argue, however, that this cannot be so, since the principle of mere (self-)manifestation that he ascribes to the soul as well as the fact that we are not in charge of our sense-perceptions make it difficult to understand how sense-perceptions could originate from within ourselves. However, these are not 'knock-down' arguments, especially because they are based on different fundamental assumptions. For instance, Ploucquet, abolishes the Leibnizian distinction between perceptions and apperceptions returning instead to a Cartesian-Lockean standpoint of the transparency of the mind (*Principles*, §31). Nevertheless, these arguments might at least shift the burden of proof. In pressing the Leibnizian to provide a sufficient ground for changes in the sequence of our sense-perceptions, Ploucquet also finds himself in good company. In the *Nova Dilucidatio*, Kant makes a similar point.[502]

Ploucquet rules out not only body-to-mind causation but also mind-to-body causation: "I do not see a real proportion between my will and the motion of a body, i.e., I do not see how—having posited the

500 "Atqui cum fame, siti, doloribus, & aliis perceptionibus torqueor, efficere non possum ut aliæ oriantur repræsentationes coincidentes cum iis, quas habeo fame expleta, siti restincta, doloribus sopitis, & vicissim, cum quasdam repræsentationes non habeo, cum sedeo in tenebris, cum florum odorem non percipio &c. nulla ratione efficere possum, ut, quas expeto, nascantur, ut videam lucem, ut odorer flores" (*Principles*, §170, p. 97). To improve the readability, I broke the sentence down into two. Representations are here to be taken as synonymous with perceptions. Insofar as perceptions represent that which they are about, Ploucquet seems entitled to this move.

501 "principium sensationum seu potius sensationum causæ efficientis esse extra animam" (*Principles*, §170, p. 98).

502 Watkins (2005, 114) summarises the thrust of the first of Kant's arguments against pre-established harmony, and in favour of physical influx by means of Kant's *principle of succession* as follows: "any causally isolated substance cannot change because change would require a new determination and thus a new ground [in the substance that changes], but such a new ground is nowhere to be found, given that the isolation of the substance [in pre-established harmony] rules out external grounds and all of its internal grounds have already been posited [since they are pre-established]." I will come back to this when discussing the case of Kant below.

will—a certain body should be moved" (*Principles*, §473, p. 303).[503] Ploucquet's point builds on the heterogeneity of the mind and the body. Since the mind and the body are very different not only ontologically—the mind is a substance, while the body is a phenomenon—but also concerning their essential characteristics, it seems difficult to understand how the mind could act on the body and produce its alterations. The mind *qua* substance is simple, indivisible and in itself one (*Principles*, §§23, 25, 124) while the body *qua* phenomenon is a plurality and divisible (*Principles*, §§73, 77, 216). Since the mind does not cause the motions of bodies we perceive, the only remaining possible *interaction* we need to investigate is the one between (finite) substances. However, Ploucquet also denies this kind of interaction, this time on the basis of the radical disparity between substances. Time and again, Ploucquet points out that:

> with regard to existence, one substance is independent from another finite [substance], and by means of its powers [*viribus*] flowing from its proper source it neither alters realities in another [substance], because from its own manifestation does not flow the manifestation of another, nor does the positing [*positio*] of one substance bring about [*infert*] the actual interaction with another (*Principles*, §71, p. 35).[504]

Substances *qua* substances are independent of one another. Bracketing God, they do not rely on other substances for their existence. Furthermore, the essence of a substance, the power to manifest itself, or a substance's self-consciousness is confined to the very substance that is conscious of itself. There is no spill-over. Since the existence of one substance neither logically nor metaphysically entails the existence of another substance, positing the existence of one substance does not require one to posit another substance, let alone any possible interaction between the two. To conclude, neither from the existence of one substance nor from its essence can we derive the existence of another substance or any sort of inter-substantial causation.

A second reason, for Ploucquet, that speaks against the idea that finite substances are immediately connected with one another and could interact is their contingency:

> Based on the contingency [of a finite substance] as such, however, I cannot argue for the existence of other equally contingent substances, but the existence of multiple things needs to be proven from a different source (*Principles*, §164, p. 92).[505]

In line with both Leibniz and Malebranche, Ploucquet holds here that the nexus of finite substances *qua* contingent owes its *raison d'être* to something outside this nexus itself. Every contingent

503 "Inter voluntatem meam & motum corporis non video proportionem realem, h.e. non video, quomodo, posita voluntate, corpus quoddam moveatur" (*Principles*, §473, p. 303).

504 "una substantia ab altera finita ratione existentiæ est independens, neque suis viribus e proprio fonte manantibus realitates in altera immutare potest, quia e manifestatione sui non fluit manifestatio alterius, neque positio unius substantiæ infert commercium actuale cum altera" (*Principles*, §71, p. 35). See also ibid., §180.

505 "Ex contingentia autem qua tali non possum argumentari ad existentiam aliarum substantiarum pariter contingentium, sed existentia plurium rerum ex alio fonte est probanda" (*Principles*, §164, p. 92).

substance owes its being to something other than another finite contingent substance. As we will see shortly, that is God; the creator-conserver of the existence of substances.

A third and final reason—which is Malebranchean in spirit—is that finite substances *qua* finite cannot act on one another:

> This conclusion is not valid: A being [the human soul] is simple; hence it cannot act on the body. But this one is: A being is simple and entails only a finite reality; hence it cannot act on the body or on another substance. The positing [*positio*] of one finite substance does not entail the cognition of another finite posited substance, even less that an action on the other [substance] [is] posited (*Principles*, §491, p. 315).[506]

From this it becomes clear that it is not *qua* simple that a substance cannot act on another substance, but *qua* finite. Ploucquet, here, takes his cue from Malebranche, with whom he was very familiar. Ploucquet cites with approval Malebranche's argument that causation must be (metaphysically) necessary, i.e., that there needs to be a necessary connection between the cause and the effect, one which can only be found in the case of God and His actions (*Principles*, §469). Since no such necessary connection can be found as far as finite substances *qua* finite are concerned, they cannot be true, but only occasional, causes. Ploucquet's case against the causal efficacy of finite substances *qua* finite must be seen against the background of this idea. According to Ploucquet, finitude rather than simplicity entails causal impotency.

Ploucquet's Positive Case for Occasionalism

Bearing in mind the absence of causal connections between finite substances, as well as between finite substances and their phenomena, Ploucquet faces the challenge of giving a plausible account of the nomological connections obtaining in this world. Ploucquet's chosen approach to address these challenges is to adopt a version of Malebranche's *Vision in God* doctrine and, of course, (crypto-)occasionalism.

Malebranche first sets forth his *Vision in God* doctrine in book three, part two of his *Search after Truth* (*Recherche de la Verité*). He later attempts to make it clearer in *Elucidation Ten* to the *Search*.[507] Malebranche's aim is to explain how we come to know eternal truths such as that two times two is four or that the sum of the interior angles of a triangle equals 180 degrees. In order to do justice to the fact that these truths are true necessarily, immutably, objectively (i.e., represent how things really are), and true intersubjectively (i.e., shared by a multiplicity of human beings and that they are so to speak public domain), Malebranche—following Augustine—places them as ideas in the mind of God: "All

506 Non valet hæc consequentia: Ens est simplex; ergo non agere potest in corpus. Sed hæc valet: Ens est simplex non nisi finitam involvens realitatem; ergo non agere potest vel in corpus vel in aliam substantiam. Positio unius substantiæ finitæ non involvit cognitionem alius substantiæ finitæ positæ, multo minus actionem in aliam positam" (*Principles*, §491, p. 315).

507 These are the two most prominent though by no means the only places where Malebranche discusses his *Vision in God* doctrine.

our ideas […] must be located in the efficacious substance of the Divinity, which alone is capable of enlightening us, because it alone can affect intelligences" (*Search after Truth*, LO, 232).[508] Insofar as ideas are in the mind of God, who is the only true efficient cause (ibid., 448, 450), they can be called efficacious, too (ibid., 232). In contrast to Augustine, Malebranche later extends the *Vision in God* doctrine to the case of sense-perceptions. These are the result of our having of a pure, universal idea (say, a triangle) modified by a sensation (say, redness), which is "a modification of our soul, and it is God who causes it [the sensation] in us" (ibid., 234). While ideas represent the (universal) essence of the thing we experience, sensations serve to particularise and individualise them (ibid., 621, 625; see Adriaenssen 2017, 146). While our (imperfect)[509] idea of a thing depends on God's (perfect) intellect, our sensation of it depends on God's will bringing about the sensation on the occasion of confrontation with a particular material body.[510]

Following Malebranche, Ploucquet uses what he calls the *real vision* (*visio realis*) of God to ground the existence of finite beings which, as we have seen before, could not be explained in terms of the existence or essence of finite beings themselves:

> An existing finite being is […] the effect of God's real representation, which He has of the existing being as such. God, who sees the idea of a self-manifesting being insofar as it manifests itself, produces that being Himself through that real vision (*Principles*, §189, p. 109).[511]

God is here characterised as having a blueprint of the world which is realised by means of his very *having* of this blueprint. More specifically, Ploucquet—borrowing from Malebranche—identifies God's efficacious ideas as the root cause of the existence of finite beings:

> The divine ideas are infinitely different from ours. Our ideas are not so efficient [*operosæ*] that they achieve a real effect outside themselves. The ideas of God are the true sources of every existence and on them depends originally everything that is really understood [*intelligitur*] (*Principles*, §190, p. 109).[512]

508 Adriaenssen (2017, 149f) draws attention to the "objective validity" and the "intersubjective validity" that truths obtain in virtue of the fact that they are located in the mind of God.

509 Malebranche points out that "minds do not see the divine substance taken absolutely but only as relative to creatures and to the degree that they can participate in it. What they see in God is very imperfect, whereas God is very perfect" (*Search after Truth*, LO, 231).

510 Discussion of the development of Malebranche's account of the *Vision in God* doctrine, his arguments in support of it, as well as critique by his contemporaries such as Arnauld and Régis, can be found *inter alia* in Adriaenssen 2017, ch. 4.2-4.4; Pyle 2003, ch. 3; Schmaltz 2000. Pessin 2006 gives a good overview of the existing scholarly debate.

511 "Ens finitum existens est […] effectus realis Dei repræsentationis, quam de ente existente qua tali habet. Deus, qui videt ideam entis semet manifestantis, in quantum se manifestat, eo ipso producit illud ens per hanc visionem realem" (*Principles*, §189, p. 109).

512 "Ideæ divinæ differunt infinite a nostris. Nostræ ideæ non sunt ita operosæ, ut effectum realem extra se obtineant. Ideæ Dei sunt veri fontes omnis existentiæ, & ab illis pendet orginarie, quicquid ut reale intelligitur" (*Principles*, §190, p. 109). The notion of efficacious ideas is a later development of Malebranche's thought.

The reasoning here presupposes that the relation between God's (intellect and) will and the effect is necessary. This means that what God wants to come about cannot fail to obtain. Ploucquet is explicit about his indebtedness to Malebranche: "Malebranche stipulates that it is necessary that there is a real proportion between the will of God and [its] effect, and that the will of God is the only true cause. I have nothing that I object" (*Principles*, §196, p. 112).[513] Not only finite substances, but the phenomena of the external corporeal world as well as the apparent changes it undergoes owe their existence to God:

> Since God represents to Himself through one action the infinite phenomena and the infinite nexuses between phenomena manifest in such and such a way, and able to manifest themselves [*manifestabilia*], it happens that God's real representation of the infinite phenomena with their nexuses and relations produces the existence of the corporeal world (*Principles*, §210, p. 122).[514]

Similarly, when God represents to Himself things as stable, they are perceived by us as stable. When he represents them to Himself as changing, they are perceived by us as changing (*Principles*, §217). Motion, therefore, comes about when "God really represents to Himself the state of a body following from the previous one in a very wise manner [*sapientissime*] and deducible according to constant and simple laws" (*Principles*, §264, p. 151).[515] Here and elsewhere, Ploucquet—like his occasionalist predecessors—draws attention to the idea that God's actions are lawful (see *Principles*, §§263, 497). They are not arbitrary, but regular. The (perceptions of the) existence and the alterations of the physical realm, hence, depend solely on God and his representative actions. Since God wills that a material world become manifest to spirits and perceiving beings, it happens that a connection between immaterial substances and material phenomena comes about (Principles, §497). That is, in virtue of the fact that God wants material phenomena to become apparent to us in sense-perceptions, this is the case. Part of the condition of the possibility of sense-perception, for Ploucquet, is that God allows finite minds to participate in His infinite mind (*Principles*, §124). This, of course, raises questions as to what the precise working mechanics of sense-perceptions really are. While Malebranche addressed these issues as well as he could, Ploucquet does not.

Although Ploucquet is not very explicit about changes that bodies (bodily phenomena) undergo on the occasion of a finite mind's desires and appetitions, it seems to follow from what has been said so far that motions occurring in bodies when a finite mind wills this to happen can only be due to God representing the physical world to Himself accordingly. As we saw before, Ploucquet does point out

513 "Malebranche statuit, necessarium esse, ut sit proportio realis inter voluntatem Dei & effectum, & voluntatem Dei solam esse causam veram. Non habeo, quod opponam" (*Principles*, §196, p. 112).

514 "Cum […] Deus infinita phænomena infinitosque nexus inter infinita phænomena taliter & taliter manifestata & manifestabilia uno actu sibi repræsentet, fit, ut repræsentatio Dei realis infinitorum phænomenorum cum suis nexibus & relationibus generet existentiam mundi corporei" (*Principles*, §210, p. 122). See also ibid., §262.

515 "Motus […] generatur, cum Deus realiter corporis statum subsequentem e priori sapientissime & secundum constantes ac simplices leges deducibilem sibi repræsentat" (*Principles*, §264, p. 151).

that there is a lack of "a real proportion" between a mind's volitions and consequent motions in a body which should raise sufficient doubt in the reader about some kind of influx from the mind to the body and make her inclined to buy into Ploucquet's *real vision* doctrine. Concerning the interaction between (mind-like) finite substances themselves, Ploucquet, unsurprisingly, locates them in the representative activity of God, too:

> I therefore conceive the action of a substance on a substance in this way: God represents to Himself substances as manifest to themselves. By means of that representative act [*actum repræsentationis*] substances exist. All representations of substances as existing are really in God. Hence, all these representations are connected with one another, and it cannot happen that a certain representation is cut off from the real interaction with all the remaining ones. The same principle that represents to itself *A* also represents to itself *B*. Since *A* and *B* therefore exist through the action of one and the same principle, it is necessary that *A* flows into *B*, and *B* into *A* by means of that law, however, that the passage of the action of *A* in *B* or *B* in *A* does not happen immediately, but by means of a mediating manifestative principle, which is in God and God Himself (*Principles*, §200, p. 114).[516]

What Ploucquet tries to say in this slightly puzzling passage is that there is no real *direct* or *immediate* influx between finite substances as the model of physical influx would have it, but only an *indirect* or *mediate* influx between finite substances. This indirect influx in turns depends on God's mediation. Without God there would be no influx whatsoever between finite substances. In addition, the unity of God's intellect provides the sufficient ground for the connectedness of substances. Since these substances are connected as representations in God's mind, and God is pure activity, they are also connected in the world out there. The fact that God's ideas (or representations) are efficacious and that they are connected is what grounds the real connectedness of substances.

It might appear somewhat strange that Ploucquet uses influxionist language to convey his occasionalist model—though this of course adds to Ploucquet's strategy of somewhat concealing his occasionalism—and that he even calls it a *real influx* (*Principles* §202). However, we have seen before that Baumgarten already re-described occasionalism in influxionist terms, that is, as a model of real influx. Like Baumgarten, Ploucquet then argues that insofar as there is a 'real influx' in occasionalism, it is one whereby only God acts on or 'flows into' finite substances. There is no real influx between finite substances—unless one speaks of mediated influx *via* God. So, despite Ploucquet's puzzling explanation, we find what was to be expected: there is no inter-substantial causation. Only God as the

516 "Actionem substantiæ in substantiam itaque hoc modo concipio: Deus repræsentat sibi substantias ut sibi manifestas. Per hunc actum repræsentationis substantiæ existunt. Omnes de substantiis ut existentibus repræsentationes sunt realiter in Deo. Ergo omnes hæ reales repræsentationes sunt inter se connexæ, neque fieri potest, ut repræsentatio quædam destituatur reali commercio cum reliquis omnibus. Id ipsum principium, quod sibi repræsentat το A repræsentat quoque sibi το B. Cum igitur A & B existant per actionem unius ejusdemque principii: necessarium est, ut A influat in B, & B in A, hac tamen lege, ut transitus actionis το A in B, vel το B in A non fiat immediate, sed mediante principio manifestativo, quod est in Deo seu Deus ipse" (*Principles*, §200, p. 114).

only truly efficient cause acts. But does Ploucquet's occasionalism range over every possible causal dimension, including *intramental* causation? Surprisingly, Ploucquet here diverts from Malebranche and answers in the negative. Like Sturm before him (chapter 2), Ploucquet insists that the mind is active in its own thinking:

> I deny that spirit is without a force to act [*vi agendi*]. In the idea of spirit, I see its manifestation which is a real action. When I think of God, the spirit acts […]. Someone else does not think in me, but I am thinking. Every egoity is necessarily something acting. I do not deny that the ground [*radicem*] of my existence depends on the divine operation, but that operation itself gives something active. The representation of a finite active being is contained in the real representation of God. A spirit cannot be conceived without [its] action, because if [its] action ceases, the existence of the spirit itself is taken away (*Principles*, §470, p. 301).[517]

God represents to Himself finite substances as active at least in terms of their own self-conscious thinking. While the mind is purely passive in both the reception of its sense-perceptions, as well as its (apparent) action on the body in virtue of its volitions, this is not true of its own thinking. Following a more Leibnizian-Wolffian (but also Cartesian) line of reasoning, Ploucquet holds on to the mind's intramental activity. As confined as it may be, finite substances possess *some* power.

Ploucquet's Change of Heart: the Renunciation of Occasionalism and His Endorsement of Physical Influx

From at least the *Foundations of Theoretical Philosophy* (*Institutiones philosophiæ theoreticæ*) (1772) onwards, Ploucquet discards his crypto-occasionalism.[518] Somewhat disappointingly, he does not state his reasons for this change of heart. One possibility is that he became increasingly aware of the idealist outlook of his philosophy and the role that occasionalism played in supporting it.[519] After all,

517 "nego, spiritum vi agendi esse destitutum. In idea spiritus video sui manifestationem, quæ realis est actio. Dum cogito de Deo, spiritus agit […]. Alius in me non cogitat, sed ego cogito. Omnis egoitas necessario est aliquid agens. Non nego, radicem existentiæ meæ pendere ab operatione divina, sed ipsa hæc operatio dat aliquid activi. In repræsentatione Dei reali continetur repræsentatio entis finiti activi. Non potest concipi spiritus absque actione, quia cessante actione ipsa spiritus existentia tollitur" (*Principles*, §470, p. 301). See also ibid., §132. This line of reasoning will recur in Ploucquet's textbooks from 1759 and 1772 in a slightly different form in an argument against occasionalism.

518 In his *Foundations of Speculative Philosophy* (*Fundamenta philosophiæ speculativæ)* (1759), in the part on metaphysics (*fundamenta metaphysicæ*), in the chapter *On the Order of Material and Immaterial Beings* (*De Ordinatione Entium materialium & immaterialium*), Ploucquet's positive representationalist account of occasionalism (here, §§783-787; 795) and a refutation of occasionalism (§§767-769) that will be taken over in the *Foundations of Theoretical Philosophy* (1772) stand side by side. Ploucquet does not seem to notice the tension in 1759. He even had his *Principles concerning Substances and Phenomena* (1753), which argued for his (crypto-)occasionalism, reprinted in 1764 *without changes*. The tension is ultimately resolved in 1772, when Ploucquet decides to dismiss occasionalism and to abstain from any representationalist argumentation in its favour. As I am translating both the *Fundamenta* and the *Institutiones* as 'Foundations,' I will add the year of publication—1772 in the case of *Institutiones* used here—to differentiate between them.

519 The idealist gloss of Ploucquet's philosophy *malgré lui* is noted by Bornstein (1898, 48) and Aner (1909, 48f). Fabian (1925, 158), too, notes that "[o]ccasionalism, for him [Ploucquet], did not counteract idealism

Ploucquet's philosophy looks like type monism in that the only real substantial beings are mind-like self-conscious entities. Bodies are stripped of their status as substances and reduced to mere phenomena produced in our minds by God. While Ploucquet (like Malebranche) might circumvent a sceptical solipsist stance by having God guarantee the objectivity and intersubjectivity of knowledge, he might have realised that he was steering too close to a sceptical stance concerning the existence of the material world. Avoidance of one kind of scepticism leads Ploucquet to the unintended tragical acceptance of another kind of scepticism, or so it might have seemed to him. Another possibility is that Ploucquet grew increasingly weary of what Bornstein (1898, 28) insightfully calls "supernaturalist rationalism." In consonance with the hypothesis proposed in this chapter, Ploucquet's later rejection of occasionalism could have been motivated by the realisation that a naturalised explanation of the world is preferable. He, too, might have realised that the natural world needs to ground itself rather than being solely grounded on God (see also Bornstein 1898, 51).

Ploucquet does, however, present arguments against occasionalism (*Foundations* 1772, section three, §§39-41). He now makes it clear that he believes that occasionalism and the idea that spirits possess an active principle do not sit well together:

> As *Malebranche* deprives Spirits themselves of an internal principle of acting the distinguishing feature [*character*] itself of existence in them is taken away, because an *ens Uniprincipalis* without an internal striving [*nisu*] to act coincides with a being [that is] in no way observable, even more, with nothing (*Foundations* 1772, section III, §39, p. 437).[520]

A spirit *qua* substance, i.e., *ens uniprincipalis*, without an active principle amounts to nothing, for Ploucquet. While this objection has a Leibnizian gloss, we have also seen Baumgarten argue against occasionalism in a similar way. Baumgarten went on to connect the absence of activity in substances with the objection that this absence raises serious concerns about the intelligibility of nature, since understanding requires an active intellect. While this objection of Ploucquet's is the only one to survive in the *Elements of Contemplative Philosophy* (*Elementa philosophiæ contemplativæ*) (1778) (section III, §231, p. 519) and the *Expositions of Theoretical Philosophy* (*Expositiones philosophiæ theoreticæ*) (1782) (part on metaphysics, ch. xxi, §523, p. 381), the *Foundations* (1772) that we are focusing on, here, provides two other objections.

First, Ploucquet objects to occasionalism on the ground that "in this hypothesis it is not explained how the immediate actions of God are to be understood with regard to successions" (*Foundations* 1772, §40, p. 438).[521] His point isthat the constant divine interventions (*Deus singulis momentis repetat suas actiones*) that he (now) takes to be characteristic of occasionalism are not sufficient to make

—rejected by him time and again—decisively enough."

520 "Cum *Malebrancus* ipsis Spiritibus principium agendi internum adimat: ipse existentiæ character in iisdem tollitur, quia ens Uniprincipale sine nisu agendi interno coincidit cum ente nulla ratione observabili, adeoque cum nihilo" (*Foundations* 1772, section III, §39, p. 437).

521 "non explicatur in hac hypothesi quomodo actiones Dei immediatæ intuitu successionum sint intelligendæ" (*Foundations* 1772, section III, §40, p. 438).

intelligible why and how a certain sequence of events happens (ibid.). Despite the claim that this is not worthy of the divinity (ibid.), Ploucquet can hence be seen to question in how far occasionalism sketches an intelligible picture of the world.

Second, Ploucquet points out that in light of God's alleged constant interventions in the case of both sense-perceptions in minds and motions in bodies, occasionalism questions the very existence of minds and bodies:

> If God's repeated action is necessary for the production of motion in the body, and for the excitation of perceptions in spirits: neither spirits nor bodies would exist. This, indeed, which does not continue its derived existence, does not really exist, because its duration is reduced to an indivisible moment. From the point of view of time it is nothing, as a mathematical point in a line is nothing real from the perspective of the line (*Foundations* 1772, section III, §41, p. 438).[522]

Ploucquet thinks that if minds and bodies do not (naturally) continue their respective sequences of sense-perceptions and motions by themselves but instead rely on God's continuous creation at every moment, their existence itself is atomised (*Foundations* 1772, §41, p. 438). Insofar as the mind and the body are essentially characterised by their sense-perceptions and motions—the case of minds seems somewhat questionable, since they also imagine, remember, and think—Ploucquet thinks that reducing these to disconnected moments in time is tantamount to reducing the very existence of minds and bodies themselves to moments in time.

While in his later works Ploucquet reveals himself to be sympathetic to the more developed physical influx of his former teacher Israel Gottlieb Canz *(Foundations* 1772, section III, §64), he ensconces himself in a form of naïve physical influx. He holds that the soul in virtue of a sensitive principle, with which it is essentially endowed, is affected by an external body through the mediation of (sense-)fibres (*Foundations* 1772, section III, §§65, 67), and that the soul acts on the body by directing the organism through the soul's own internal effort (*conatu suo interno*) (*Foundations* 1772, section III, §69). This position—resembling to some extent that of Descartes—is hardly satisfactory, and Ploucquet accepts that it is fraught with several inconveniences.[523] However, while Ploucquet's own position has changed over time, his identification of the main competitor, the system of pre-established harmony, remains stable. Not only did Ploucquet have his student Jacob Friedrich Weiss explicitly argue against Leibniz's system in a disputation from 1751, i.e., the *Disputation against the Pre-established*

522 "Si enim opus est actione Dei repetita ad producendos motus in corpore, & ad excitandas perceptiones in spiritibus: neque spiritus neque corpora existerent. Id enim, quod non continuat suam existentiam derivatam, reapse non existit, quia duratio ipsius redigeretur ad momentum indivisibile, id quod a parte temporis est nihilum, uti punctum mathematicum in linea a parte lineæ non est aliquid reale" (*Foundations* 1772, section III, §41, p. 438).

523 "[Objection:] Thus far this opinion is pressed hard by several inconveniences. [Answer:] I concede [this]" (*Foundations* 1772, section III, §79, p. 453). "Opinio hæc pluribus adhuc urgetur incommodis. R [= *responsio*]: Concedo" (*Foundations* 1772, section III, §79, p. 453).

Harmony of Mind and Body (*Disputatio contra harmoniam animi et corporis præstabilita*), as we have seen above, Ploucquet himself argued against this system in his *Principles* (1753). Moreover, even in his later *Foundations* (1772) twenty-two paragraphs, fourteen of which are critical in nature, discuss pre-established harmony, whereas only six paragraphs, three of which are critical in nature, concern occasionalism. Occasionalism was not only rejected by the later Ploucquet, but one would hardly believe it ever mattered to him.

1.2.4 Kant

Only quite recently has the pre-Critical philosophy of Immanuel Kant, including his views on causation, attracted broader scholarly attention.[524] While the majority of scholars agree that Kant adopts a (sufficiently sophisticated) version of physical influx (*inter alia* Ameriks, in Guyer 1992, ch. 8; Laywine 1993, ch. 2; Schönfeld 2000, ch. 6; Watkins 2005, ch. 2; Hogan 2021),[525] Sangiacomo (2019b) has recently challenged this view. He argues that at least in his *A New Elucidation of the First Principles of Metaphysical Cognition* (*Principiorum primorum cognitionis metaphysicæ nova dilucidatio*) (1755) Kant "adopts an understanding of causation similar to that of Malebranche" (ibid., 216) and that "Kant's account entails that the 'forces' or 'powers' that he attributes to finite things are not intrinsically efficacious" (ibid., 217). If Kant's position, here, were really occasionalist or quasi-occasionalist, he would constitute another exception to the general trend we have observed. What is more, the very phenomenon, i.e., the demise of occasionalism that we intend to explain would begin to seem questionable. If two out of seven philosophers, whose position on causation we have examined, were occasionalists, then occasionalism would not seem to have been unpopular or marginalised, as I have claimed. Therefore, I will subject Sangiacomo's reading to the acid test. I will argue that the best way to accommodate Kant's philosophical principles of the *New Elucidation*, and his explicit opinions about the three causal systems of physical influx, occasionalism and pre-established harmony, is, indeed, to read him as an influxionist. I will defend this interpretation of Kant's account as one of physical influx by looking at the case of Israel Gottlieb Canz, one of Kant's contemporaries and a teacher of Ploucquet's. This comparison, which will prove to be very helpful, has not been drawn in the existing literature.

524 Book-length studies dedicated to Kant's philosophical development prior to the publication of the first edition of the *Critique of Pure Reason* in 1781 include (but are not exhausted by) Laywine (1993), Schönfeld (2000), Watkins (2005, esp. chapters 1 and 2). A complete list of scholarly contributions on the pre-Critical Kant is, of course, beyond the scope of this chapter.

525 Beck (1969, 430) remarks that "[i]t was no doubt because of Knutsen [sic] that Kant found it easy to accept the theory of the interaction of substances which was present in his earliest works and perhaps never given up." Schönfeld lends support to Beck's claim in that Schönfeld observes the adoption of physical influx in Kant's (1747) *Thoughts on the True Estimation of Living Forces*, the (1755) *Universal Natural History* as well as the (1755) *New Elucidation* (2000, 129f). Watkins confirms the presence of physical influx in Kant's *True Estimation* (2003, 9) as well as in the *New Elucidation* (2003, 11, 14). Watkins (2003, 25) further notes that Kant also adopts physical influx in the (1756) *Physical Monadology*. The role of physical influx in these three works of Kant is also discussed at length in Watkins 2005, 104-160. With respect to the (1770) *Inaugural Dissertation*, Watkins (2005, 103) notes that Kant presented a "further […] sophistication to his arguments for physical influx."

Since Kant, unlike his predecessors, did not produce a textbook on metaphysics, the focus of this section will be on his two most relevant (pre-Critical) academic pieces on causation, i.e., the *New Elucidation* (1755) alluded to earlier, and his inaugural dissertation *On the Form and Principles of the Sensible and the Intelligible World* (*De mundi sensibilis atque intelligibilis forma et principiis*) (1770). The scope of Kant's approach of causation is cosmological. That is to say, Kant is concerned with the problem of inter-substantial causation in contrast to the more limited psycho-physical problem of mind-body causation. This becomes clear from the fact that the two main metaphysical principles Kant wishes to establish in the *New Elucidation*, the *Principle of Succession*, and the *Principle of Coexistence* apply to all finite substances *qua* such. Furthermore, in the Inaugural Dissertation, Kant is concerned with the sensible and intelligible conditions of the world as consisting of interconnected contingent substances, rather than merely with the more psycho-physical problem of the sensible and intelligible conditions (of the interaction) of minds and bodies. I will start by analysing the topic of causation in the *New Elucidation* before turning to the Inaugural Dissertation.

Kant's Position in the 'New Elucidation'

The over-arching aim of the *New Elucidation* (= NE) is to investigate the first principles of a metaphysical understanding of the world, i.e., the principle of (non-)contradiction, which Kant shows not to be a first principle, and what Kant labels 'the principle of the determining ground' (*principium rationis determinantis*).[526] From the latter principle, Kant, however, also derives two other principles which will occupy the centre stage of this chapter. These are the *Principle of Succession* and the *Principle of Coexistence*. *Both* principles must be taken into account in order to determine Kant's standpoint in the causation debate and his relationship to occasionalism, more specifically. We will see that it is partially due to the consideration of the *Principle of Coexistence* alone that Sangiacomo (2019b) reads Kant as leaning towards occasionalism.

The *Principle of Succession* holds that "*No change can happen to substances except in so far as they are connected with other substances; their reciprocal dependency on each other determines their reciprocal changes of state*" (NE, 37).[527] The immediate target of the *Principle of Succession* is Leibnizian-Wolffian pre-established harmony.[528] That is, the *Principle of Succession* in its more

526 In a nutshell, the principle of non-contradiction is not a first principle, according to Kant, since it depends on the bifurcate principle of identity (*whatever is, is* and *whatever is not, is not*) (NE, section 1). See also Schönfeld 2000, 132f.

527 All references are to *Immanuel Kant. Theoretical Philosophy 1755 – 1770*. Accordingly, I follow the translations of David Walford. Emphases are in the original. My understanding of Kant's *New Elucidation* benefited greatly from reading Watkins' interpretation in his *Kant and the Metaphysics of Causality* (2005), chapter 2. A (critical) analysis of the *New Elucidation* can also be found in Reuscher (1977), Schönfeld (2000, ch. 6); Watkins 2003, 11-23; Watkins 2005, 112-160.

528 Kant directly addresses Wolffian philosophy in the *elucidation* to the *Principle of Succession*. He has it that "those who give to the Wolffian philosophy its renown, have paid so little attention to this truth that they maintain, on the contrary, that a simple substance is subject to constant change in virtue of an inner principle of activity" (NE, 38). See also Laywine 1993, 36f. Watkins (2003, 15-23) distinguishes in how far Kant's critique would be effective against Wolffian authors on the one hand, and Leibniz himself on the other. While Watkins analysis is perspicacious as well as accurate from the point of view of nowadays history of

negative sense is in direct opposition to the main idea of pre-established harmony, namely, that the changes a substance undergoes can be accounted for in terms of one antecedent state or ground of that substance and an active force constitutive of the substance itself.[529] Even 'in a world apart'which was solely 'inhabited' by one finite substance and God, Leibniz maintained, enough would be given for a substance to undergo change.[530] Kant, however, points out that "a simple substance, which is free from every external connection and which is thus abandoned to itself and left in isolation, is completely immutable in itself" (NE, 37). According to Kant, changes in what is grounded require a change on the level of the underlying grounds. However, given that for Leibniz, a monad or (finite) substance is completely determined and self-sufficient—indeed, monads do not interact with other monads, or as Leibniz put it, they "have no windows through which something can enter or leave (*Monadology*, §7, AG, 214)"—all the grounds of that substance are already posited. If this were the case, Kant argues, then nothing would ever change since from one ground (and an active force understood as striving towards a new state) only one and the same (grounded) state would follow (see also Watkins 2005, 114). Kant puts it as follows:

> since change is the succession of determinations, that is to say, since a change occurs when a determination comes into being which was not previously present, and the being is thus determined to the opposite of a certain determination which belongs to it, it follows that the change cannot take place by means of these factors which are to be found within the substance (NE, 38).

One and the same ground cannot give rise to one state and (in the extreme case) its direct opposite (see also Watkins 2005, 117). This becomes even clearer when Kant explicates that "[i]t is necessary that whatever is posited by a determining ground be posited simultaneously with that determining ground" (NE, 37f), for otherwise the determining ground would not be really efficacious, i.e., determining. A time lapse between the determining ground and that which it grounds would question the efficacy of the determining ground. While Kant's reasoning does not provide a knock-down argument against pre-established harmony, and while it might underestimate the metaphysical and explanatory richness of the active force (or internal principle) Leibniz ascribes to monads or substances,[531] it might at least succeed in shifting the burden of proof. The Leibnizian-Wolffian would then be asked to elaborate on

philosophy, I wonder how much Kant himself distinguished Leibniz's position from that of his Wolffian followers. For the sake of brevity, I focus only on the broad outline of Kant's critique of pre-established harmony.

529 In the *Monadology* (1714), Leibniz insisted that a "monad's natural changes come from an *internal principle*, since no external cause can influence it internally" (§11, AG, 214; emphasis in original). Furthermore, in opposition to a physical influx model, Leibniz maintained that "a created monad cannot have an internal physical influence upon another [monad]" (§51, AG, 219).

530 In the *Système nouveau* (1695), Leibniz put it thus: "every substance represent[s] the whole universe exactly and in its own way, from a certain point of view, and […] the perceptions or expressions of external things occur in the soul at a given time, in virtue of its own laws, as if in a world apart, and as if there existed only God and itself" (AG, 143). Souls are a kind of monad or simple substance.

531 Depending on the degree of complexity of the rules that a Leibnizian-Wolffian active force follows, it might be sufficient to account for change even if only one and the same ground or antecedent state is given.

how true change can be predicated of monads or substances, and how best to understand the notion of force.

Positively speaking, the *Principle of Succession* shows that "if you want another determination to follow, you must also posit another ground" (NE, 37), and we have seen before that this ground must be outside the very substance whose change this ground is supposed to bring about. While this might seem to leave open the possibility that the ground which sufficiently determines a substance's change is located in God, Kant argues, in the so called 'application' of the *Principle of Succession*, that this is not so. The origin of sense-perceptions serves Kant as a case in point. The changes that the soul undergoes when it experiences various different sense-perceptions could not be brought about by the soul itself as the defender of pre-established harmony would have it. Rather, the changes of the soul's sense-perceptions are grounded in changes of bodies and their states. Kant maintains that:

> we could not have a representation, which was a representation of a body and which was capable of being determined in a variety of ways, unless there was a real thing present to hand, and unless its interaction [*commercium*] with the soul induced [*induceret*] in it a representation corresponding to that thing (NE, 39).[532]

What this means is that the determining ground of changes in the soul in the case of sense-perceptions needs to be placed in bodies existing in the outside world. Against defenders of pre-established harmony,[533] which again serve as the main target of critique, Kant points out that there is a "real connection" (*reali … nexu*) between the soul and external things (bodies) (NE, 39). However, such a real, i.e., efficacious connection between soul and body also clashes with occasionalism, since the occasionalist holds that the only truly efficacious connection is that between God and creatures (but not vice versa, of course).

Whereas the *Principle of Succession* brings to light the ground(s) of the changes of finite substances, that is, other finite substances, it does not explain how substances come to be part of the same world or why substances are interconnected, globally speaking. This is done by the *Principle of Coexistence*. Like Ploucquet before him, Kant calls to attention that:

> *Finite substances do not, in virtue of their existence alone, stand in a relationship with each other, nor are they linked together by any interaction at all, except in so far as the common principle of their existence, namely the divine understanding, maintains them in a state of harmony in their reciprocal relations* (NE, 40).

Immediately after stating this, the *Principle of Coexistence*, Kant explains that substances *qua* substances each have their own "separate existence," and that consequently the positing of one substance does not entail the positing of another substance (NE, 40). The fact that a set of substances

532 I have added the Latin original for the two terms that strike me as most important. They are not given in Walford's edition of Kant's *Theoretical Philosophy* used here.

533 Kant emphasises that "[o]ur proof utterly overthrows the Leibnizian pre-established harmony" (NE, 39).

pertains to one world, rather than each of them pertaining to a different world, needs to be accounted for by identifying a common ground or unifying cause. This common ground is God (NE, 41). All finite substances owe their existence to God. The mere coexistence of substances, however, is not enough to establish that they are connected with one another. God could have created all the substances pertaining to one world but left them unconnected. The common ground of the mutual connectedness of substances is again to be sought in God:

> it does not follow from the fact that God simply established the existence of things that there is also a reciprocal relation between those things, unless the self-same scheme of the divine understanding, which gives existence, also established the relations of things to each other, by conceiving their existences as correlated with each other (NE, 41).

While this might make one inclined to believe that by referring to God both as the ground of coexistence and connectedness Kant were siding with Malebranche or other occasionalists, this is more apparent than real. On the one hand, Kant does *not* say that the interactions of substances are acted out or realised by God. Nor does he strip finite substances of their causal powers. On the contrary, we have seen before that the *Principle of Succession* suggests quite the opposite, i.e., that substances really interact with one another (suitably understood as we will see shortly). On the other hand, making God the principle of the existence of finite substances, and the fact that they are related to one another could also be maintained by supporters of pre-established harmony, and even influxionists.[534]

Sangiacomo (2019b) has taken the *Principle of Coexistence* (PCE) as comprehensive evidence of Kant's Malebranchean occasionalist leanings (properly understood).[535] Sangiacomo claims that "PCE is inconsistent with the idea that substances can act in virtue of their own powers" (2019b, 236). He takes this to support the idea that Kant's own position "comes close to" Malebranchean occasionalism (ibid., 234). For Sangiacomo, the following passage from Kant serves as the smoking gun:

> [N]o substance of any kind has the power of determining other substances, distinct from itself, by any means of that which belongs to it internally (as we have proved). It follows from this that it only has this power in virtue of the connection, by means of which they are

534 Watkins similarly points out that the *Principle of Coexistence* is not directed against Leibniz. Even more, "as far as the content of the principle of coexistence goes, the Leibnizian would seem to be Kant's ally, not his opponent" (2005, 143). Watkins later identifies Crusius' position as the real target of this principle: "Crusius thought that the mere existence of a substance could connect it with other substances and thereby change their states. However, that is precisely what Kant is objecting to in the principle of coexistence" (2005, 145).

535 Sangiacomo contrasts an interventionist or Leibnizian understanding of Malebranche's occasionalism with a minimalist or Arnauldian understanding of it. According to Leibniz, Malebranche's occasionalism requires God to constantly intervene in the world whenever He is incited by an occasional cause. According to Arnauld's understanding of Malebranche's occasionalism, God acts by means of general volitions which do not require constant interventions by God. Rather, God's actions are somewhat automatised. Sangiacomo thinks that "Kant's position [is] very close to Arnauld's minimalist reading of Malebranche's account" (246). Since I believe that none of the passages in Kant suggests an occasionalism of either understanding, I will side-step this issue.

> linked together in the idea entertained by the Infinite Being. It follows that, whatever determinations and changes are to be found in any of them, they always refer, indeed, to what is external. Physical influence, in the true sense of the term, however, is excluded (NE, 44).

Sangiacomo (2019b, 237) interprets this passage as saying that "[s]ubstances have causal powers only in virtue of a principle *external* to them (i.e. God), substances do not have *intrinsic* causal powers."[536] He (ibid., 238) adds that "substances do *not* have any intrinsic causal powers; they receive these powers only because God established their reciprocal connection. […] Causal powers are the *result* of God's establishment of certain (causal) relations and remain, therefore, strictly dependent upon them."[537] However, I do not think that this actually follows from the passage in Kant. What Kant intends to say, bearing in mind the context, i.e., seeking the principle that accounts for the coexistence of distinct substances, is *not* that substances are causally inefficacious, as secondary or occasional causes are for Malebranche (to whom Sangiacomo turns right after the interpretation of the passage in Kant). Rather, Kant's point is that, setting aside how and in virtue of what power substances *de facto* interact, they cannot establish by themselves any connection with other substances like them. Causal connections are one such kind of connection. What Kant did prove is that positing one finite substance does not entail positing another, nor does positing two substances mean positing a connection between them. The connection *qua* such does not supervene on the mere positing of two distinct substances but rather requires a common ground 'bridging' the two isolated substances. This ground is indeed God, but this does not mean that God reduced them to mere occasional causes in establishing this connection.

It is important to carefully distinguish two separate problems: (1) What is the ground (or what are the grounds) of the coexistence and connection between substances? How is it at all possible that substances *qua* existentially isolated interact? (2) How do substances *de facto* interact? What is the ground accounting for a change in the states of substances, and where is this ground situated? While the solution to the first problem is the *Principle of Coexistence* referring to God as the common ground of the coexistence and of the connectedness of substances, the solution to the second problem is the *Principle of Succession* as applied to other finite substances.[538] Sangiacomo does not clearly

536 Emphases in original.

537 Emphases in original.

538 Schönfeld's understanding of the interplay between the *Principles of Coexistence* and *Succession*, which I have come across after establishing my interpretation, confirms this reading. He points out that "[t]he divine being merely warrants the possibility of inter-substantial interaction while leaving the specific interactions to the substances" (2000, 154). Hogan (2021, 276) agrees in that Kant "locates the possibility of transeunt causation in a voluntary divine representation of interdependence described as belonging to God's act of conservation. He then speaks of particular transeunt effects in created substances which themselves 'act and react' (Ak 1:414). This suggests a view of God as ground of the possibility of transeunt influence by virtue of the conserving/connecting act, and of creatures as sole causes of actual transeunt effects." Laywine (1993, 37) also thinks that "the principle of succession is supposed to explain how change in the world is possible, namely through real interaction between created substances. Now Kant has to explain how real interaction is possible. He does so by calling on the second special principle of his system, the so-called principle of co-

separate these two problems. Focusing solely on the *Principle of Coexistence* he is lead to believe that, for Kant, God not only grounds the coexistence and connectedness of finite substances, but also determines the changes of states of finite substances. Sangiacomo could, of course, reply that the grounds invoked by the *Principle of Succession* are to be understood as occasional causes, such that the notion of the 'determining ground,' say, in the context of the having of a sense-perception should be understood in occasionalist language meaning 'a certain state of my body is the occasional cause of my seeing the sun'. This would, however, come at the cost of importing an unwelcome degree of ambiguity into Kant's text. Kant uses terms such as 'determine' and 'depend on' when discussing both the *Principle of Succession* and the *Principle of Coexistence*. Maintaining that 'determine' and 'depend on', in the context of the former principle, designate occasional (i.e., non-efficient causes) whereas in the context of the latter principle they designate real (i.e., efficient causes (God)) seems unwarranted.

It might also be said that Kant does more in the section discussing the *Principle of Coexistence* than just to confine himself to this very principle. While I would like to maintain that what I take the job of PCE to be, namely, to account for the coexistence of substances and to establish a framework of possible interactions, seems to be Kant's primary concern, there are several passages that discuss inter-substantial causation. However, these passages actually support a reading of Kant as conceding causal powers to finite substances. Prior to the passage that Sangiacomo uses to support his occasionalist reading of Kant, Kant points out that "[a]ll substances […] reciprocally interact with each other, and thus they are dependent on each other in respect of their determinations" (NE, 43). More strikingly, Kant holds that "[t]here is rather a real reciprocal action between substances; in other words, there is interaction between substances by means of truly efficient causes" (NE, 44).[539] Finally, Kant explicitly distances himself from occasionalism. Having rejected "[p]hysical influence, in the true sense of the term" as much as pre-established harmony (NE, 44), Kant stresses:

> Nor, moreover, is there an ever special influence of God, that is to say, an influence through which the interaction of substances is here established by means of *Malebranche's occasional causes* (NE, 44).

existence."

539 N.B.: Kant speaks of efficient causes (*plural*) rather than of the efficient cause (*singular*). Sangiacomo (2019b, 244) claims that: "By understanding substances as *sine quibus non* conditions, Kant would be entitled to consider them as 'truly efficient causes' in the sense that substances are *real* causes that genuinely account for the natural phenomena traditionally associated with efficient causation (although the reason why they account for these phenomena is not to be found in their own nature, but only in God's free choice). Moreover, Kant would be entitled to contrast this account of efficient causes with merely 'accidental' causes, which are not causes at all." Emphases in original.

I am not convinced that Kant or the majority of other eighteenth-century German philosophers were still so much concerned with the topic of accidental causation. Furthermore, calling occasional or *sine quibus non* causes 'efficient,' in order to set them apart from mere accidental causes and to take this as evidence of occasionalism begs the question. This move becomes intelligible once a philosopher has set forth their respective theories of occasionalism and occasional causes. This, however, is what needs to be proven first and foremost, and I have argued in the preceding section why I believe Kant not to be an occasionalist.

Even though Kant seems to have inherited Leibniz's understanding of occasionalism in terms of constant interventions by God, to which he objects, this does not imply that he adopted a different understanding of occasionalism, as Sangiacomo (2019b, 234, 246) claims. As we have seen, too much speaks against this reading.

What theory *does* Kant opt for in the *New Elucidation*, then? I agree with Sangiacomo that it is neither a form of concurrentism nor pre-established harmony—we have seen above that the system of pre-established harmony is in fact the main target of Kant's critique—nor *common* physical influx (2019b, 241, 245, 239f, respectively). But that does not mean that he endorses occasionalism. In fact, I agree with Watkins (2005, 103) that Kant adopts *a suitably sophisticated version* of physical influx. Kant himself thought his account was preferable to *common* or *vulgar* physical influx, because it "reveals the origin itself of the reciprocal connection of things, and this origin is to be sought outside the principle of substances, considered as existing in isolation" (NE, 44f). By identifying God as the common ground for the coexistence and the mutual connectedness of substances, Kant's physical influx would be more complete than a version of physical influx naïvely asserting the reciprocal interaction of substances *tout court*.

In elaborating on a principle of coexistence and connectedness to flesh out physical influx, Kant would find himself in the company of thinkers such as Israel Gottlieb Canz (1690–1753). And in fact the case of Canz can, to some extent, help us better understand Kant's own account.

Like Kant later in the *New Elucidation* (1755), Canz in his earlier *Fundamental Philosophy* (*Philosophia fundamentalis*) (1746) rejected what he labelled (in a marginal note) *pseudo-physical influx (Pseudo-physicus influxus*); that is, *common* or *vulgar* physical influx:

> A *substance* is said to *inflow physically in another*, but in an erroneous sense, when this reality which is had by one substance is transferred into another [substance] in which it [this reality] was not [present] before (*Fundamental Philosophy*, §2555, p. 386).[540]

The idea that a real ontological property (a mode or an accident) could be communicated between distinct substances is rejected by Canz as it was by Kant. Furthermore, Canz maintained that the real influx of substances (*influxus realis substantiarum*) consists in nothing more than one substance functioning as the (determining) ground of a new modification obtaining in another substance:

> The influx, if not [only] of BODIES, *but certainly in general* of THINGS, *is mutual and true* when in the action of one substance a ground [*ratio*] is found why a new mode is determined in the other [substance] (*Fundamental Philosophy*, §2572, p. 389).[541]

540 "*Physice influere* dicitur vna *substantia in alteram*, sed *erroneo sensu*, si quæ realitas, vni substantiæ competens, transferatur in alteram, cui non inerat" *(Fundamental Philosophy*, § 2555, p. 386). All translations of Canz are my own. A brief presentation of Canz's philosophy—in particular insofar as the mind-body problem is concerned—can be found in Fabian 1925, 114-125. A very general account is given by Wundt 1945, 223-225.

Finally, Canz maintained that while substances do actually causally interact with one another (which is tantamount to endorsing physical influx), God functions as the ground of the coordination of substances. The fact that a certain mind is tied to or united with a certain body was established by God at the outset of this world and cannot be explained in terms of only these two substances themselves. This is what the real meaning of pre-established harmony is for Canz:

> The *true sense of pre-established harmony* is [that] by means of which the interaction of the soul and the body is explained in terms of the series of perceptions in the soul and the series of motions in the body the one of which God made agree with the other not so much extrinsically; rather he decreed that the one exists as *per se* and in virtue of its own nature determinable by the other (*Fundamental Philosophy*, §2581, p. 391).[542]

In contrast to Leibniz's extrinsic pre-established harmony, Canz believes that the mutual dependence and coordination of finite substances (here: the soul and the body) is built in to the very finite substances themselves. God decreed that my mind is connected and dependent upon my body and vice versa. Rather than a mere extrinsic correlation of sequences of mental and physical states, God pre-established my mind in such a way that it is tied to my own body. The dependence of my mind on my body and vice versa is rooted in the essence of my body and my mind, respectively. Again, same as Kant a bit later, Canz realised that the coordination and dependence of substances requires a ground that cannot be found in those substances themselves. Substances *qua* substances are radically distinct from one another. The existence of one substance does not entail the existence, let alone the coordination of or dependence on, another substance.[543]

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541 "Influxus […], *si non* CORPORVM, *certe tamen generatim*, RERUM, m*utuus & verus*, *est*, cum in unius substantiæ actione ratio reperitur, cur in altera modus determinetur nouus" (*Fundamental Philosophy*, §2572, p. 389f).

542 *Harmoniæ præstabilitæ sensus verus* est, quo commercium animæ & corporis explicatur per seriem perceptionum in anima, & seriem motuum in corpore, quarum alteram alteri Deus non tam extrinsecus conformauit, quam potius alteram ex altera per se, & natura sua determinabilem, existere iussit" (*Fundamental Philosophy*, §2581, p. 391).

543 I believe that an approach like Canz's is the right one when it comes to understanding the *New Elucidation*. However, while Kant says that in virtue of the *Principle of Coexistence* "the divine understanding" sustains substances "in a state of harmony in their reciprocal relations" (NE 40, emphasis omitted), in contrast to Schönfeld (2000, 279, n 43) I do not believe that "pre-established harmony returned to the *New Elucidation* in the guise of the divine schema of interaction, expressed by the principle of coexistence." Understanding the principle of coexistence in terms of either occasionalism (as Sangiacomo does) or pre-established harmony (as Schönfeld does) goes beyond what the text itself supports. As much common ground as Kant shares with Canz, he does not go the extra mile of spelling out the coordination principle in terms of pre-established harmony. Speaking of a harmonious relation between individual distinct substances does not establish pre-established harmony. It only observes that substances stand in empirically observable harmonious relations to one another, but this can also be claimed by the occasionalist or the common influxionist. Indeed, this empirical harmony was granted by (more or less) every participant in the eighteenth-century causation debate. Only if Kant had added that the inter-substantial relations are *pre-established* could we conclusively read him as a pre-established harmonist. In contrast to Canz, Kant was more hesitant of spelling out the underlying metaphysics of coordination and dependence of substances. Insofar as the working dynamics of the real efficient interaction between finite substances themselves is concerned, Kant remains silent. Similarly, Schönfeld (2000, 152) thinks that "unlike Euler, he [Kant] did not construct a specific theory that explicated the details of physical influx."

Kant's Position in the 'Inaugural Dissertation'

In one of his last prominent pre-Critical writings, the Inaugural Dissertation (= ID) *On the Form and Principles of the Sensible and the Intelligible World*, section IV, Kant returns to the topic of (the possibility of) inter-substantial causation.[544] As in the discussion of the *Principle of Coexistence* in the *New Elucidation*, in this section Kant is concerned with the identification of the unitary common ground in which consists the possibility of contingent substances belonging to one world rather than to a plurality of different worlds.[545] More specifically, Kant seeks to find the common ground not only of the existence but also the possible interactions between substances. Just as he had in the *New Elucidation*, Kant points out in the Inaugural Dissertation that:

> If a plurality of substances is given, *the principle* of a possible *interaction* between them *does not consist in their existence alone*, but something else is required in addition, by means of which their reciprocal relations may be understood. For they do not necessarily relate to anything else simply in virtue of their subsistence […]. […] Therefore, if any interaction should occur between them and outer things, a special ground, which determines this interaction precisely, will be needed (ID, §17, p. 402).[546]

The existence of substances alone does not entail their mutual interaction. Quite the contrary, a finite substance *qua* such does not depend on another finite substance for its existence or its subsistence. Therefore, interaction between substances does not arise simply in virtue of the positing of two substances, either. In other words, interaction is not logically entailed by the mere existence of one or more finite substances. The subsequent paragraphs (§§18-20) of this section show that the common ground of the existence and possible interactions of substances is the necessary being, i.e., God. While "the theory of physical influence, in the vulgar sense of that term […] rashly assumes [...] that there is an interaction of substances and transeunt forces, which can be cognised by means of their existence alone" (ID, §17, p. 402), a more refined theory of physical influx will also explain what ties completely distinct finite substances together, and how this is done.

Avoiding some of the vagueness of the *New Elucidation*, Kant this time really seems to lean towards Canz's hybrid model of physical influx and pre-established harmony (in Kant's understanding of the term). While there are real interactions between substances in the world (*pace* Leibniz's pre-

544 Scholars have debated the extent to which Kant's Inaugural Dissertation should be seen as belonging to his pre-Critical or rather to his Critical phase. While Josef Schmucker (1974)—besides giving a splendid overview of the *status quaestionis*—stresses the continuity of the Inaugural Dissertation with Kant's Critical period, Martial Gueroult (1978), in contrast, stresses how much the Inaugural Dissertation still lacks from the point of view of Kant's philosophy as developed first and foremost in the *Critique of Pure Reason*. It is beyond the scope of my work, here, to engage in the discussion. I will refer to the Inaugural Dissertation as 'pre-Critical' based on the mere fact that it predates the *First Critique* by more than ten years.

545 See also Laywine 1993, pp. 106f. An analysis of the Inaugural Dissertation can be found not only in Laywine 1993, ch. 6, but also in Watkins 2005, 170-177.

546 All references are to *Immanuel Kant. Theoretical Philosophy 1755 – 1770*. Emphases are in the original.

established harmony), that is, physical influx, one has to turn to God in order to understand the pre-established harmonious connectedness between finite substances:

> The harmony arising from their [substances'] very subsistence, a subsistence founded on their common cause, would accordingly arise in accordance with common rules. Now, I call a harmony of this kind a *generally established* harmony, whereas the harmony which only occurs in virtue of the fact that each individual state of a substance is adapted to the state of another substance would be an *individually established harmony*. And the interaction arising from the former harmony would be real and *physical*, whereas that arising from the latter would be ideal and *sympathetic*. Thus all interaction of the substances in the universe is *externally established* (by means of the common cause of them all). And it is either established generally by means of physical influence (in its more correct form) or it is obtained individually for the states of each substance. But, in this latter case, interaction between substances is either founded *originarily* through the primary constitution of each substance, or it is imposed *on the occasion* of some change. Of these in turn, the former is called *pre-established harmony* and the latter *occasionalism*. Thus, if as a result of all substances being sustained by one being, the *conjunction of all substances*, in virtue of which they form a unity, were *necessary*, then there would be universal interaction of substances by means of *physical influence*, and the world would be a real whole. But if not, the interaction would be sympathetic (that is to say, harmony without true interaction), and the world would be an ideal whole. For myself, indeed, although the former of these alternatives has not been demonstrated, it has nonetheless been rendered fully acceptable for other reasons" (ID, §22, p. 404).

Kant opposes any kind of 'individually established harmony'; that is, any theory positing a mere ideal influence between substances on a case-by-case basis. He finds both occasionalism and (Leibnizian) pre-established harmony guilty as charged. While the case-by-case harmony of occasionalism is effected by divine intervention on the occasion of a certain state of a substance, the case-by-case harmony of pre-established harmony is effected by means of the introduction of the very nature of individual substances.

From a historical point of view, it seems somewhat strange that Kant ascribes case-by-case interactions to Leibniz's pre-established harmony, since this is one of the things which Leibniz tried to avoid as this would have seemed to him to collapse his system into some kind of occasionalism. Also, it seems strange that Kant (*pace* Baumgarten and Ploucquet) would call occasionalism a system of ideal influence. Baumgarten and Ploucquet had called occasionalism a system of real influence because God really acts on finite substances. Then again, insofar as only finite substances in themselves are concerned, Kant does have a philosophical point in calling occasionalism a system of ideal influence in that finite substances do not really act on one another. Be that as it may. Kant

himself opts for a 'generally established harmony,' a theory inviting real causal interactions between substances which are coordinated in virtue of common rules of coordination which are grounded in God. In this way, Kant can be said to have developed a sufficiently sophisticated system of physical influx.[547]

Quintessence: Kant and Occasionalism

Far from being an occasionalist himself, Kant's interest in occasionalism is at best peripheral. The name of Malebranche— standing in, for Kant, for the entire tradition of occasionalism—appears only a couple of times. Kant did not subject occasionalism to any kind of thorough scrutiny. He does not argue against it at length, either. Part of the reason for this lack of attention might be Kant's growing hesitancy to engage in metaphysical problems of, as he would have it, an entirely speculative nature. According to Kant, metaphysical problems that caught the eye of entire generations of early modern philosophers, such as that of the nature of immaterial beings, the seat of the soul and the interaction of the soul with the body, are unsolvable because they exceed the bounds of the human intellect.[548] Trying to solve them would be, for Kant, a pointless effort comparable to the work of Sisyphus. It seems that occasionalism would have easily fallen prey to Kant's eliminativist stance vis-à-vis metaphysical problems or theories of an entirely speculative nature, and hence be seen as a non-starter. Furthermore, as I have argued, Kant defended an account of (sophisticated) physical influx which would be most at odds with occasionalism. That is, on numerous occasions, Kant argues in favour of the real interaction between finite substances.

1.2.5 Summary

To draw our study to a close, we have seen that while authors at the end of the seventeenth and the beginning of the eighteenth century—especially, Leibniz and the mature Wolff—strongly opposed occasionalism as the most promising competitor to their own system of pre-established harmony, later generations were increasingly disinterested in this theory. For Bilfinger, Thümmig and Gottsched just as much as for Knutzen, Baumgarten and the pre-Critical Kant, the causation debate is one between pre-established harmony and physical influx. The latter system would ultimately carry the day. Even our only exception, the early Ploucquet, soon changed his mind and adopted the more fashionable system of physical influx (albeit in a slightly naïve form). Thus, serious discussions about

547 This reading gains further support from Kant's *Lectures on Metaphysics* from 1762-1764 as transcribed by Johann Gottfried Herder (1744–1803). In this so called *Metaphysik Herder*, Kant makes it clear that "If two *substances are in interaction <in commercio>, the two depend on a third, so their powers are harmonious with one another: they stand in connection and relation, on account of the third substance which is the ground of both, and has willed a connection <nexus>*. […] a third [substance, i.e., God] must have willed this harmony (established harmony <*harmonia stabilita*>)" (*Metaphysik Herder*, p. 15, in *Lectures on Metaphysics*, translated and edited by Karl Ameriks, and Steve Nargon). Emphases and Latin terms are in the original.

548 This becomes particularly clear from Kant's *Träume eines Geistersehers* (*Dreams of a Spirit-Seer*) (1766).

occasionalism increasingly fade away. The topic receives increasingly shorter treatments and it would not be long until occasionalism beaome extinct; a fossil from the history of Western philosophy.

2. Why Did Occasionalism Disappear?

In her monograph on *Kant's Early Metaphysics and the Origins of the Critical Philosophy*, Alison Laywine expresses surprise about Kant's rejection of occasionalism. Referring to Kant's *New Elucidation*, she tells the reader that Kant "seems to have taken for granted—*for whatever reason*—that occasionalism was no longer a live possibility" (1993, 41; my emphasis). In light of the preceding analysis, it will become clear that Kant did not object to occasionalism 'for whatever reason,' but for a very particular one: doubts about its compatibility with the intelligibility of nature in non-transcendental terms. In other words, Kant doubted the compatibility of naturalised causal explanations in physics on the one hand, and the endorsement of occasionalism on the other hand. While Kant's own stance is revealed only later in works such as the *Dreams of a Spirit-Seer* (1766), and the *Prolegomena to Any Future Metaphysics* (1783), the increasing lack of attention, and (mostly negative or critical) engagement of his predecessors elucidates Kant's (at best) lukewarm attitude concerning occasionalism. It was the critique as much as the downplaying of the philosophical significance of occasionalism by authors ranging from Bilfinger to Baumgarten that must have made it seem to a young scholar of the 1750s like Kant that "occasionalism was no longer a live possibility."

We have observed the decreasing interest in discussing occasionalism and how it was taken less and less seriously from the time of the publication of Bilfinger's and Thümmig's main works in the 1720s to the time of the publication of the pre-Critical Kant's main works on causation in the 1750s and in the beginning of the 1770s. Taking his cue from Wolff, whom we have seen criticising occasionalism on mostly epistemological grounds and thereby shifting the focus of the more metaphysical refutation of Leibniz, our seven authors grew more and more suspect of the epistemological and explanatory aptitude of occasionalism. For instance, Bilfinger argues that occasionalism does not offer naturalised explanations of nature and draws the drastic conclusion that this renders occasionalism an *unphilosophical* account of causation. Knutzen, too, agrees that "[it] is not very philosophical to immediately summon the will of God when explaining the phenomena of nature" (*System of Efficient Causes*, §12, p. 54).

Why is occasionalism characterised as 'unphilosophical'? Surely authors such as Cordemoy, Malebranche, Sturm, and others were philosophers by vocation or simply by profession. While he was lawyer by training, Cordemoy was in social circles with people who regarded themselves as philosophers and who took him to be one of their peers. Moreover, Cordemoy's flagship writings, the *Six Discourses on the Distinction between the Body and the Soul* and the *Physical Discourse on Language* treat of unmistakeably philosophical topics from the perspective of both seventeenth as well as eighteenth-century thought. Malebranche deemed correct philosophy and natural philosophy, at

that, a proper means of wiping away the systems of the scholastics and of some Renaissance philosophers that had, according to him, given rise to heretical beliefs about the world and God. By showing that God is the only true efficient cause acting in nature—that is, by defending occasionalism—Malebranche thought he could fight the idolatry that, according to him, was created by introducing the ideas of occult qualities, faculties and active substantial forms.[549] For him, bad philosophy gave rise to bad theology and, in turn, irreligious common belief. Good philosophy, on the other hand, could prove an effective remedy to the 'maladies' inflicting our religious beliefs. Sturm held a chair in both mathematics and physics at the University of Altdorf. While the status of mathematics might not be universally agreed upon,[550] physics was uncontroversially considered a subdiscipline of philosophy.

Yet, Bilfinger and Knutzen labelled occasionalism—the fundamental doctrine underlying the systems of Cordemoy, Malebranche and Sturm—'unphilosophical'. In studying the causation debate of some of the most representative eighteenth-century German academic philosophers, it should have become clear that this dismissive labelling of occasionalism as 'unphilosophical' is due to the fact that these philosophers at least partially disagree with their predecessors about how philosophy, and natural philosophy, in particular, should be done. That is, they disagreed with their predecessors about what counts as philosophical and what does not. This fundamental disagreement about the character and methodology of natural philosophy is at the heart of the *internal factors* that led to the demise of occasionalism.

Thinkers like Baumgarten argued that the natural philosopher's task is to render the natural world intelligible. However, intelligibility requires, on the one hand, that the role of cognisers is taken seriously. Cognition requires activity, something that one might think is undermined by occasionalism insofar as every finite substance, including minds, is portrayed as merely passive.[551] Furthermore, one might argue that the natural world, on the other hand, should be made intelligible in non-transcendental, naturalised terms. The occurrence of an effect in the realm of nature needs to be

549 This is what Camposampiero, Priarolo, and Scribano (2018, 15) call Malebranche's "anti-pagan mission". For more on some of the targets of Malebranche's critique, see Scribano's contribution to this collective volume: *Connaissance et causalité: Les adversaires de Malebranche* (in Camposampiero, Priarolo, and Scribano 2018), 269-288.

550 See Lind 1992, ch. 2.3. In his *Catholic Physics. Jesuit Natural Philosophy in Early Modern Germany*, Hellyer remarks that "[d]espite its broad scope, in many regards mathematics did not enjoy the same prestige as other branches of philosophy such as physics and metaphysics. Indeed, there was considerable debate about whether it was truly philosophy at all. The debates about mathematics' status as a branch of philosophy and consequently as a true science extended through the Middle Ages back to antiquity. First, practical arts such as mechanics were tainted because they manipulated nature for gain, as opposed to philosophy, which sought only to apprehend the causes of things through pure speculation. […] Second, for the ancients, certain branches of mathematics […] were not considered to be part of natural philosophy precisely because they did not study natural motions" (2005, 115f). Furthermore, "[n]ot only was the epistemological status of the branches of mixed mathematics questioned, but they did not enjoy the same prestige as natural philosophy" (ibid, 116). It is clear that reservations vis-à-vis mathematics were not universal, but still wide-spread in the more conservative early modern Aristotelian circles. Both Hellyer and Lind show, however, that the attitude towards mathematics would change in particular throughout the eighteenth century.

551 However, while the occasionalisms of Cordemoy, Malebranche and the young Wolff fall prey to this objection, the occasionalisms of Sturm and Ploucquet (allowing for true intramental causation) do not.

assigned not only to a natural enabling condition, i.e., a natural occasional cause, but also a natural *efficient* cause. Why-questions in the domain of physics need to be addressed in naturalised terms by going back to natural agents and the immanent force with which they are endowed. Ernst Cassirer in his *The Philosophy of the Enlightenment* (1932, 45), too, points out that for the majority of Enlightenment philosophers endorsing occasionalism would have seemed like a "relapse into transcendence." In contrast to this, the philosophy of the Enlightenment "promulgated the pure principle of immanence both for nature and cognition. Both of them have to be understood on the basis of their own being [*Wesen*]" (ibid.).[552] Furthermore, as Thümmig—following Leibniz and Wolff—emphasises in his selection of arguments against occasionalism, any causal system has to agree with the empirically established laws of nature. According to Thümmig, occasionalism, however, does not straightforwardly agree with the newly found law of the conservation of force. For instance, in understanding God's causal engagement in the world in the case of voluntary motions, one might either be led to believe that God (on the occasion of my volition) adds motion, i.e., speed in non-vectorised terms, or that He (re-)directs existing bodily motions; that is, that He changes the velocity understood as a vectorised size. Either 'intervention' of God would result in a violation of the conservation of force, i.e., mv^2.

Adding to this, we find that all of the philosophers here studied endorse the principle of sufficient reason (PSR).[553] While this is, of course, a metaphysical principle, our participants of the eighteenth-century causation debate understand PSR in mainly epistemological terms. PSR is what renders the world intelligible. Thümmig, for instance, maintains that "Nothing is without a sufficient reason why something is rather than is not" (*Foundations*, "Ontology," §8, p. 41).[554] A reason is in turn defined as "that from which it is understood why another [thing] is" (*Foundations*, "Ontology," §9, p. 41).[555] Gottsched connects reason or ground (*ratio*) more closely with the notion of cause—we have seen the same in the case of Wolff (chapter 3). According to Gottsched, "a reason is called that through which one can understand why something is. […] That, however, which contains the reason in itself, is called the cause" (*First Grounds*, "Ontology," §222).[556] Knutzen connects PSR and the job description of a philosopher asking "[w]ho does not know that the task of the Philosophers is that they give the reason

552 "Gegenüber diesem Rückfall in die Transzendenz [of occasionalism] verkündet die Philosophie der Aufklärung für die Natur wie für die Erkenntnis das reine Prinzip der Immanenz. Beide müssen aus ihrem eigenen Wesen begriffen werden […]" (Cassirer, *The Philosophy of the Enlightenment*, 45). See also ibid., 208. All translation in this section are my own—unless stated otherwise.

553 See Thümmig, *Foundations*, part 1 (ontology), ch. 1, §§8, 9; Bilfinger, *Philosophical Elucidations*, section I, ch. III, §70; Gottsched, *First Grounds*, *Logic*, part 1, sect. III, §59, *Metaphysics*, part 1 (ontology), §§222, 223; Knutzen, *System of Efficient Causes*, §2 (p. 22), §4 (p. 30), §9 (p. 40); Baumgarten, *Metaphysics*, §§14, 20, 21, 22; Ploucquet, *Principles*, §117; Ploucquet *Foundations* (1772), "Ontology," §34, p. 186. Kant, *New Elucidation*, sect. II, proposition V. Kant labels it the principle of determining reason (or ground). With regard to our other philosophers, Kant is also admittedly a thinker most critical of the interpretation of PSR of Wolff and his followers.

554 "Nihil est sine ratione sufficiente, cur aliquid potius sit, quam non sit" (*Foundations*, "Ontology," §8, p. 41).

555 "Ratio vocatur id, unde intelligitur, cur alterum sit" (*Foundations*, "Ontology," §9, p. 41).

556 "Ein Grund heißt dasjenige, woraus man begreifen kan, warum etwas ist. […] Dasjenige aber, so den Grund in sich hält, heißt die Ursache" (*First Grounds*, "Ontology," §222, p. 144).

of anything why and how it happens" (*System of Efficient Causes*, §9, p. 40).[557] To some extent, this would appear to be the common ground from which our seven philosophers reject occasionalism. That is, they all do because they claim it fails to render the world intelligible by means of causal explanations based on worldly natural efficient causes. Consequently, occasionalism fails to live up to the task of the philosopher. Pre-established harmony and the eighteenth-century variant of physical influx overcome this first hurdle. However, as we will see shortly, pre-established harmony struggles to overcome the subsequent hurdle which is to provide a sufficiently intelligible, i.e., naturalised, explanation of the origin of the pre-established harmony itself. Insofar as the latter is taken to be established by God, pre-established harmony perhaps also ironically turns out to share the same fate (albeit a bit later) that occasionalism suffered earlier. Ultimately, then, occasionalism and pre-established harmony are companions in misfortune.

When it comes to the *external* or environmental factors that led to the demise of occasionalism in eighteenth-century philosophy, there is a noticeable tendency not to accept unconstrained speculative philosophy. While Leibnizian pre-established harmony was not exempt from being subjected to this critical attitude vis-à-vis speculative philosophy, occasionalism which emphasises the unique causal role of the divinity, was the first and most immediate target. Invoking the divinity to account for the occurrence of natural phenomena seemed to many an ever more wearisome philosophical move. More concretely, natural philosophy with its growing set of well-established empirical findings increasingly dictated the boundary conditions for any reasonable philosophical theory about the natural world. This tightening of the rule-book disadvantages occasionalism: not only is causal explanation itself more at the forefront of philosophical importance than metaphysical causation, causal explanations also have to be given in naturalised, non-transcendental terms and must be compatible with the best empirical physics available. While the occasionalist's occasional causes are, of course, perfectly naturalised and non-transcendental, the efficient cause is not. As the efficient cause gained ever more philosophical prominence from Suárez and Descartes onwards, causal explanations would also need to be given in terms of efficient causes. This combination, of preferring causal explanation to metaphysical accounts of causation and at the same time demanding that causal explanations should be given in terms of naturalised efficient causes, would prove fatal for occasionalism.

Cassirer adds to this by pointing us in the direction of a change in the underlying conception of reason itself that separates the seventeenth and eighteenth century:

> For the great metaphysical systems of the seventeenth century, for Descartes, and Malebranche, for Spinoza and Leibniz, reason is the realm of the 'eternal truths,' those truths that are common to the human and the divine mind. […] The eighteenth century

557 "Quis enim nescit, Philosophorum esse officium, ut reddant rationem quarumcunque cur et quomodo fiant" (*System of Efficient Causes*, §9, p. 40).

> takes reason in a humbler sense. […] Reason is much less such a *possession*, rather than a certain form of *acquisition* (*The Philosophy of the Enlightenment*, 12).[558]

Cassirer's sketch pushes us in the right direction. He enables us to comprehend to some extent the more sceptical attitude of eighteenth-century thinkers towards metaphysical speculation. Rather than assuming that we as cognisers are already *endowed* with the seeds of knowledge which we only need to see through to their development, Enlightenment thinkers (including our seven authors) emphasise that we are only given the faculty of *planting* the seeds of knowledge ourselves, but nothing else. In this regard, reason needs to be kept in check so that it does not wander beyond the realm of what can still be empirically grounded. The claim, here, is not that these thoughts are entirely new. On the contrary, Francis Bacon (1561–1626) made a strong case for a middle way between unsubstantiated metaphysical speculation, on the one hand, and a clueless collection of empirical data, on the other hand (see e.g., Henkel forthcoming; Rusu 2020). However, Bacon's philosophy celebrated a huge comeback in the tremendously influential *Encyclopédie* (1751–1766) of d'Alembert and Diderot. In turn, the *Encyclopédie* contributed to the set of external factors impacting future philosophical developments in the eighteenth century. While the publication date of the *Encyclopédie* itself is certainly too late to have made an impression on most of our authors except perhaps Ploucquet and Kant it serves the purpose of documenting the *zeitgeist* during the time of its production.

In the same vein, another external factor defining the general atmosphere of the time is the sceptical attitude towards metaphysical accounts of causation of extra-academic philosophers of English and French origin. In an article from 1966 on *The Beginnings of Kant's Critique of Causal Relations and its Preconditions in the 18th Century* (*Die Anfänge von Kants Kritik der Kausalbeziehungen und ihre Voraussetzungen im 18. Jahrhundert*), Giorgio Tonelli showed that philosophers like Hume, Maupertuis, Condillac, D'Alembert and others were all hesitant or agnostic towards the search for metaphysical causes or underlying forces bringing about natural effects and of the possibility that these could ever be known. The philosophical position of French Enlightenment philosophers sceptical about metaphysical accounts of causation, in turn, dominated at the influential Berlin Academy. In this respect, Tonelli (1966, 449) points out that "after 1745 Maupertuis becomes a philosophical force in Germany, which strenuously works for the diffusion of Newton's and French Enlightenment philosophy against the Wolffians." Furthermore, while the Berlin Academy—in contrast to other scientific academies in Europe—had a class dedicated to "disciplines like metaphysics, logic, and moral philosophy, which were grouped under the name of speculative philosophy" (LeDuc 2020, 175), this class was dissolved at the beginning of the nineteenth century "due to lack of interest and new recruitment" (ibid., 199). Furthermore, the list of publications of the speculative class of the Berlin

558 "Für die großen metaphysischen Systeme des siebzehnten Jahrhunderts, für Descartes und Malebranche, für Spinoza und Leibniz ist die Vernunft die Region der 'ewigen Wahrheiten' – jener Wahrheiten, die dem menschlichen und dem göttlichen Geist gemeinsam sind. […] Das achtzehnte Jahrhundert nimmt die Vernunft in einem bescheideneren Sinne. […] Die Vernunft ist weit weniger ein solcher *Besitz*, als sie eine bestimmte Form des *Erwerbs* ist" (*The Philosophy of the Enlightenment*, 12). Emphases in original.

Academy reveals that there were hardly any essays or articles on causation, be it in more global inter-substantial or cosmological, or in more localised mind-body or psychological terms.[559] In the same vein, Watkins (2005, 101) remarks that from the 1740s onwards:

> the issue of causality also attracted somewhat less philosophical attention than it had received earlier in the century, either because physical influx had won the debate or because the sides had become so entrenched that it was clear to many that neither side would budge from its antecedently held views. Thus, most German philosophers during this period [i.e., 1740 to 1770] were not thinking about causality nearly as much as they had been in the 1720s and 1730s.

A concern that my previous discussion might raise in the still unconvinced or even disinclined reader is that these more general remarks do not sufficiently explain why occasionalism rather than any other speculative causal system was ignored or pushed aside. I believe, however, that properly interpreted they do. My contention is that, to a philosopher increasingly weary of speculative approaches in philosophy, occasionalism must have seemed *more speculative* or far-fetched than, say, pre-established harmony or the eighteenth-century version of physical influx. Occasionalism does indeed make a number of speculative or metaphysical assumptions about God and the workings of the natural world that struck philosophers of the eighteenth century as increasingly odd, unsubstantiated or unphilosophical. In a system like that of Johann Christoph Sturm, every philosophical pathway ultimately leads to God: causal power is solely placed in the divinity, the origin and transfer of motion —the main explanatory tool in a mechanist world—is referred to God, and the realisation of final causes in non-rational agents owes itself to God (chapter 2). In comparison: according to Leibniz's system of pre-established harmony, finite substance are causally efficacious with regard to bringing about their own subsequent (representative) states. The problem of the origin and transfer of motion is somewhat side-stepped by reducing motion to a mere phenomenon. Finally, God does indeed remain the world's designer and responsible for its teleological character, for Leibniz. While pre-established harmony is by no means without metaphysical bearing (quite the contrary), it survived longer than occasionalism by providing a slightly less speculative (and divinely oriented) account of causal explanation.

Returning to a point made earlier, pre-established harmony also gives 'the right kind' of causal explanations; that is, non-transcendental and naturalised ones. It makes the world intelligible in its own right. My interpretation gains further support from the fact that ultimately it was not the doctrine of pre-established harmony but the doctrine of physical influx carried the day. Indeed, pre-established harmony would eventually be subjected to a similar kind of critique (by influxionists) that

559 Exceptions seem to include Formey's *Nouvelles Considerations sur l'union des deux Substances dans l'homme ou sur le commerce de l'ame et du corps* (1764)*;* and Pernety's *De l'Influence des causes physiques sur l'esprit de l'homme* (1776/1777).

occasionalism suffered earlier. The example of Johann Peter Reusch (1691–1758) is instructive.[560] In his *Metaphysical System* (*Systema metaphysicum*) (1735) Reusch—himself an influxionist—criticises pre-established harmony in the following way:

> Since nothing in the whole nature of things can be found by means of which that pre-establishment [*præstabilitionem*] can be understood [*intelligatur*]; indeed, [since] it has no sufficient reason in the whole nature of things but owes itself only to God, the omniscient, wisest, freest, most potent creator and ruler of all finite things: the *system of pre-established harmony is in light of its constitution a miracle* (§637) (*Metaphysical System*, §811, p. 607).[561]

While pre-established harmony provides a naturalised causal explanation of the subsequent changes in bodies and minds, it turns out to be of supernatural origin insofar as its constitution is concerned. That is why, at the end of the day, it needs to be replaced by a system that not only provides naturalised causal explanations but is itself of natural origin. Some eighteenth-century variants of physical influx qualify as such and hence prove more agreeable to thinkers who wish to refrain from committing themselves to controversial, unproven—or else not empirically verifiable—hypotheses. Indeed, in some versions, physical influx does hardly more than offer a re-description of the (origin of the) phenomena themselves. Here, we need to bear in mind that the kind of physical influx endorsed by eighteenth-century philosophers is not the one that (perhaps) Suárez developed more than a century earlier. While Suárez has it that being flows from the cause into the effect, no such transfer of being is accepted by any of the eighteenth-century influxionists with which I am familiar. 'Influx', for them, often seems to amount to little more than the observed mutual correspondence of states in two discrete substances. Physical influx might confine itself to stating that the mind and the body are somehow connected or interact without making any effort of providing a metaphysical sub-story. What is more, hardly any influxionist (at least after Leibniz's critique[562]) ever explicitly commits themselves to the view that motion is transferred from body to body, induced (in a metaphysically strong sense of the term) into the body by the mind, or else somehow transferred from the body into the mind.

Amongst eighteenth-century German philosophers, the scepticism towards metaphysical speculation perhaps crystallises most distinctly Kant. On numerous occasions in his delightfully ironic *Dreams of a Spirit-Seer* (1766), whose immediate target was the 'philosophy' of Emanuel Swedenborg (1688–1772), an incredibly popular self-professed spiritual medium, Kant calls to attention the limitations of the human understanding in matters of theoretical speculation. For instance, Kant observes that "[w]e

560 Reading Fabian (1925, esp. 109) brought this to my attention.

561 "Quum enim nihil in tota rerum natura queat reperiri, per quod præstabilitionem illam fieri potuisse intelligatur; adeoque in tota rerum natura rationem non habeat sufficientem, sed unice Deo omniscio, sapientissimo, liberrimo, potentissimo, creatori et gubernatori omnium rerum finitatrum debeatur: *systema harmoniæ præstabilitæ ratione constitutionis est miraculum* (§637)" (*Metaphysical System*, §811, p. 607). I am using the edition of 1753. The translation is my own.

562 For Suárez's as the earlier target of Leibniz's critique of influxionism, see O'Neill 1993.

may […] accept the possibility of immaterial beings without any fear that we shall be refuted, though there is no hope either of our ever being able to establish their possibility by means of rational argument" (*Dreams*, part one, 311).[563] While the possibility of the existence of immaterial beings, such as disembodied minds, angels, or other spirits, can, according to Kant, be safely assumed for whatever speculations one wishes to base on them, it is clear at the same time that the scope must lie outside a reasonable metaphysics which works "by means of rational argument." Furthermore, Kant remarks that the question of the seat of the soul which follows from the (unproven) assumption of immaterial beings or spirits (one of which is the soul)—a question that concerned thinkers like Descartes (*Passions de l'Ame*, §§31, 32)—exceeds the realm of (possible) experience, and can therefore hardly be settled (*Dreams*, 312). Consequentially, and in the same vein, Kant also dismisses the possible intelligibility of the union of the soul and the body:

> which necessity it is which causes a spirit and a body together to form a single being, and what grounds they are which, in the case of certain forms of destruction, then cancel this unity again – these questions, along with various others, far transcend my powers of understanding (*Dreams*, 316).

Accordingly, the mind-body problem is equally unsolvable:

> I make no mention […] how an immaterial nature can exist in a body and how it can exercise an influence by means of the body. And there is a good reason for all this, and it is as follows: I am completely ignorant about all these matters (*Dreams*, 338).

One might wonder at this point what the advantage of refraining from ungrounded metaphysical speculation is. Kant provides his own answer. By "reducing the scope of my enquiry and ridding myself of a number of completely futile investigations," he "hope[s] to be able to invest the modest abilities of my [his] understanding in a more profitable fashion in the objects which are left" (*Dreams*, 339). Rather than investing time and mental effort in trying to answer questions that exceed our cognitive capacities (that this is the case is supported by the diversity and incompatibility of centuries of metaphysical speculation), these limited capacities are better directed to problems which can actually be solved. This means we would be better off addressing problems that are anchored in human sensibility or have empirical footing. Probably inspired by Hume, Kant points out that the same goes for the case of causality, in that "[i]t is impossible for reason ever to understand how something can be a cause, or have a force; such relations can only be derived from experience" (*Dreams*, 354).

In almost identical words, Hume in his *Enquiry concerning Human Understanding* (1748) had argued that "this relation [of cause and effect] is not, in any instance, attained by reasonings *a priori;* but arises entirely from experience" (E 4.6, p. 30).[564] What is also striking, given our current concerns, is

563 All references to *Immanuel Kant. Theoretical Philosophy 1755 – 1770*. Accordingly, I here follow Walford's translation.

564 The edition of Hume's *Enquiry* used here is Stephen Buckle's *Cambridge Texts in the History of Philosophy* (2007).

(part of) Hume's refutation of occasionalism, i.e., "this theory of the universal energy and operation of the Supreme Being" (E 7.24, p. 67). According to Hume, it is not only "too bold", but more specifically, "it has carried us quite beyond the reach of our faculties," that is to say, "to conclusions so extraordinary, and so remote from common life and experience" (ibid.).

But what about our eighteenth-century German thinkers? After all, Hume is immersed in a somewhat different intellectual context and is more sceptical of metaphysical and causal speculation than our authors. They all held chairs in metaphysics at various German universities and (except Kant) published textbooks on metaphysics. I am not claiming that they were disinterested in metaphysics *tout court*. What I am arguing, however, is that there is an increasing reluctance outside the universities concerning heavily speculative metaphysical endeavours and that this reluctance would slowly affect university philosophers themselves. In turn, I suggest, this led to the gradual dissolution and abandonment of some metaphysical projects. The more metaphysical projects, so to speak, would be abandoned first. Occasionalism, as a more transcendental, supernatural and speculative theory than others, would then be seen by participants of the German eighteenth-century causation debate as one of the first theories to disregard or simply abandon.

Besides Kant, a second case of the crystallisation of a more hesitant and sceptical attitude towards metaphysics is Georg Friedrich Meier, Baumgarten's most prominent student. In the introduction to the first part of his *Metaphysics* (*Metaphysik*) (1755), Meier is concerned with determining the subject matter and methodology of the science of metaphysics. Faced by metaphysics' "very bad reputation" (*sehr üblen Rufe*) (*Metaphysics*, §10, p. 19), Meier finds himself having to justify his engagement with the discipline. Noteworthy for our purposes is Meier's remark that any true metaphysics has to be confined within the limits of human understanding (§4).[565] Furthermore, Meier strongly emphasises the requirement of practical usefulness of any future metaphysics:

> The more practical the truths of metaphysics are, the more perfect are they. When a science is not practical, it is an artificial but useless cobweb. Therefore, metaphysics would be a useless pastime, if it were not a practical science (*Metaphysics*, §6, p. 12).[566]

In a fashion reminiscent of Bacon's critique of scholasticism in his *Novum Organon* (aphorism 95), Meier—whose views usually reflect those of Baumgarten's—defends the practical side of metaphysics.[567] In contrast to the scholastics who took pride in metaphysics' purely contemplative

565 "Nay, any true metaphysics must be a science which indeed merits this name, and it must explain most distinctly in every respect [*allerwegen*] and most thoroughly, insofar as the boundaries of human understanding permit" (Meier, *Metaphysics*, §4, p. 7). "Nein, eine ächte Metaphysik muß eine Wissenschaft seyn, welche diesen Namen in der That verdient, und sie muß allerwegen aufs deutlichste erklären, und auf gründlichste beweisen, so weit es die Schranken des menschlichen Verstandes zulassen." All translation of Meier's *Metaphysics* are my own.

566 "Je practischer die Wahrheiten der Metaphysik sind, desto vollkommener ist sie. Wenn eine Wissenschaft nicht practisch ist, so ist sie ein künstliches aber unnützes Spinnengewebe. Also würde die Metaphysik ein unnützer Zeitvertreib seyn, wenn sie keine praktische Wissenschaft wäre" (Meier, *Metaphysics*, §6, p. 12).

567 For a concise analysis of Bacon's anti-scholasticism, see Henkel forthcoming, section II.1

character, Meier wants to strengthen the importance of metaphysics for the conduct of daily life.[568] Strikingly, Meier's critical attitude towards metaphysics manifests in his own writings. While he had extensively discussed the three causal systems in the first part of his *Proof of Pre-established Harmony* (*Beweis der vorherbestimmten Uebereinstimmung*) (1743, 2nd edition: 1752), in his later *Metaphysics* (*Metaphysik*), Meier dismisses a discussion of both the topic of inter-substantial causation in the *Metaphysics'* second part on *Cosmology* (1756, §442), and of the topic of the mind-body problem in the *Metaphysics'* third part on *Psychology* (1757, §757). The discussion of the mind-body problem, in particular, is rejected as "useless". This is because for practical purposes the adoption of either of the three causal systems is as good as any other.[569] While this later dismissive standpoint of Meier is, of course, neutral to the case of occasionalism, it firmly supports the scepticism vis-à-vis metaphysical speculation which I have argued for. Overall, a growing weariness of metaphysical speculation first led to the rejection and neglect of occasionalism, then pre-established harmony, and ultimately culminated in the collapse of the causation debate as a whole.

3. Conclusion

My analysis of the positions of a set of eighteenth-century German philosophers—Bilfinger, Thümmig, Gottsched, Knutzen, Baumgarten, Ploucquet and the pre-Critical Kant including cross-references to Meier, Reusch and Canz—has confirmed that there was an increasing lack of interest in

568 Later in the introduction, Meier once again points out that "we have to admit, of course, that any science would be worthy of contempt which is not at all practical. Mere speculations are a useless cobweb, and a learned man who has filled his head with a lot of speculations, can indeed be an impudent and great chatterer; however, in everything that concerns human life, he is a fool. He might be fit for a world, in which nothing were to be done; however, he is not fit for this world, in which there is constantly a lot to be done (*Metaphysics*, §14, p. 24). "Freylich müssen wir zugeben, daß eine iede Wissenschaft verachtungswürdig sey, welche gar nicht practisch ist. Blosse Speculationen sind ein unnützes Spinnengewebe, und ein Gelehrter, der seinen Kopf mit lauter Speculationen angefült hat, kan zwar ein dreister und grosser Schwätzer seyn; allein er ist, in allen Fällen des menschlichen Lebens, ein Narre. Er schickte sich vielleicht in eine Welt, in welcher nichts zu thun wäre; allein er schickt sich nicht in diese Welt, in welcher beständig sehr viel zu thun ist." However, Meier insists that not the entirety of metaphysics consists in such useless speculation (ibid., §14, p. 24f).

569 In the *Cosmology* (1756, §442, p. 268), Meier writes: "And it is here that the famous question has arisen: whether this general efficient nexus of the substances of the best world rests on a real or ideal influence of substances in the world, or on none of the two §.167. Thence the three famous opinions of physical influx, of pre-established harmony, and of occasional causes originated. We would like not to touch upon this profound matter, because, according to the current degree of human cognition, it can count for the same in all practical sciences whether one chooses the one or the other opinion." "Und hier ist die berühmte Frage entstanden: ob dieser allgemeine würkende Zusammenhang, der Substanzen der besten Welt, auf einem reellen oder idealischen Einflusse der Substanzen in der Welt beruhe, oder auf keinem von beyden §.167. Daher die drey berühmten Meinungen von dem physischen Einflusse, der vorher bestimmten Uebereinstimmung, und den gelegentlichen Ursachen ihren Ursprung genommen. Wir wollen diese tiefsinnige Materie unberührt lassen, weil, nach dem ietzigen Maasse der menschlichen Erkenntniß, in allen practischen Wissenschaften es gleich viel gelten kan, ob man die eine oder die andere Meinung erwählt."

In the *Psychology* (1757)—I am using here the second edition from 1765—Meier writes: "Between all things in the best world is the greatest harmony, and between the body and the soul this harmony becomes quite visible and noticeable. We do not want to get into the profound and useless investigations of metaphysics which have evolved on this occasion" (ibid., §757, p. 460). "Unter allen Dingen in der besten Welt ist die gröste Uebereinstimmung, und zwischen Leib und Seele wird diese Uebereinstimmung recht sichtbar und merklich. Wir wollen uns hier nicht in die tiefsinnigen und unnützen Untersuchungen der Metaphysik einlassen, welche bey dieser Gelegenheit entstanden sind."

occasionalism in eighteenth-century German debates. Ultimately, I have argued, this culminated in the demise of occasionalism. While in the seventeenth century occasionalism was regarded by figures such as Leibniz as a force to be reckoned with, in an age that became increasingly sceptical towards metaphysical and causal speculation, occasionalism was eventually outmanoeuvred. Besides the more external factors of increasing scepticism towards metaphysical speculation and the realisation (in particular by thinkers outside the universities) that this kind of human endeavour would eventually remain fruitless, we have also identified two strong internal factors that worked against occasionalism. These two internal factors are (1) the intelligibility of the world in natural, non-transcendental terms, and a shift from metaphysical accounts of causation to causal explanation; and (2) the conduciveness of causal theories to the advancement of learning in natural philosophy. As far as the latter is concerned, it seems that natural philosophy becoming increasingly more self-confident and independent would even set boundary conditions for theoretical speculation. Any attempt at theoretical speculation would need to be compatible with the best theory and established principles of natural philosophy, in particular, the laws of nature. Occasionalism struck our authors (except the early Ploucquet) as unphilosophical because it could not make the world intelligible in its own terms. In giving answers to why-questions that were solely based on God as the efficient cause, occasionalism seemed to many to be "a relapse into transcendence," in Cassirer's words. In failing to show its compatibility with a viable research agenda in natural philosophy or at least its compatibility with a best system of natural philosophical insights, occasionalism again seemed to our philosophers to fail to live up to the standards set by a new age of thinkers.

The idea of an essential incompatibility of occasionalism and natural philosophy is best encapsulated in Kant's *Prolegomena* which I cited at the outset of this chapter. There, Kant writes:

> following a correct maxim of natural philosophy, we have to abstain from all explanation of the institution of nature drawn from the will of the highest being, since this is not natural philosophy anymore but the confession that it has come to an end (*Prolegomena*, §44, p. 202).

CONCLUSION

While occasionalism was by no means first invented in the seventeenth century, it was in the context of early modern natural philosophy that occasionalism was most successful. Occasionalism was not just a flash in the pan. It was not an *ad hoc* theory whose single purpose was to solve the Cartesian mind-body problem, although considerations concerning the distinction between mind and body did at least partially motivate some authors to lean towards occasionalism. Overall, occasionalism is best described as a *general system* to account for the interactions of all finite substances. That is to say, its scope is—in Wolffian terminology—cosmological and not just psychological. In the same vein, there is not just one unique motivation for occasionalism that all occasionalist philosophers can be said to share. At best, there are some general conceptions that inclined philosophers towards occasionalism—inclined but not necessitated. The driving forces behind occasionalism are (1) thin essences, (2) the notion of substancehood in terms of independent existence, (3) a rejection of Aristotelian-scholastic philosophy and (4) concerns about a truly Christian world view. Let us take a closer look at each of these motivations for occasionalism.

(1) In contrast to Aristotelian-scholastic authors—as well as Leibniz and the mature Wolff—occasionalist philosophers, at least the ones here studied, conceived of finite substances as being endowed with thin essences. That is, they understood minds as essentially characterised by thought and bodies as essentially characterised by extension. The essence of finite bodies was thus not seen to logically entail any active principle or a force, although some thinkers would extend this claim even to the case of finite minds.[570] For the scholastics, as well as Leibniz and the mature Wolff, it was clear that substances possess or just *are* active principles or forces to act.[571] Insofar as activity is not an essential characteristic of *finite* substances for the occasionalist, the real ground of activity in this world has to be sought in the activity of the *infinite* substance. Indeed, God is purely active.

(2) The occasionalist philosophers dealt with in this work conceived of substances as beings that exist independently from all other beings save God, and in this they can be seen as having followed a remark from Descartes in his *Principles of Philosophy* (part I, §51). Insofar as substances are independent beings, the positing of one (finite) substance does not entail or necessitate the positing of any other (finite) substance. Similarly, the existence of two (finite) substances does not entail or necessitate that these two substances are causally connected, let alone that they truly act on one another. From this it follows that the ultimate sufficient ground of the nomological connections that we discover in this world must be sought elsewhere, namely, in God, who acts according to general rules following his general volitions.

570 Admittedly, this account is somewhat complicated by the case of Ploucquet who understood substances as principles manifesting themselves or, differently put, as self-conscious entities.

571 In scholasticism, this role is, of course, fulfilled by substantial forms informing otherwise passive (prime) matter.

(3) The occasionalist philosophers discussed in this dissertation (Géraud de Cordemoy, Johann Christoph Sturm, the early Christian Wolff, and the early Gottfried Ploucquet) by and large reject Aristotelian-scholastic philosophy.[572] They dismiss occult qualities, faculties, virtues of natural entities, substantial forms, and celestial intelligences. Instead, they view nature as mostly passive. This is particularly true of bodies. In addition, they emphasise efficient causation as the predominant, if not the only, kind of causation. The principle of motion is taken to reside outside the moving object. In conjunction with considerations about causation as necessitating, occasionalist philosophers are then led to dismiss finite bodies and minds as true causes. This is because finitude is interpreted in terms of feebleness, and this raises doubts as to whether a finite substance could fulfil so strong a criterion as causal necessitation. Furthermore, occasionalist philosophers are usually sceptical vis-à-vis the belief held by most Aristotelian-scholastic philosophers that causal relations are plainly obvious to the senses; i.e., that observation of nature itself revealed cause-effect relations. Finally, while the standard scholastic position concerning the relation between God as the first cause and finite substances as secondary causes is that they (immediately) concur or work together, i.e., that they wholly account for the whole effect, occasionalist thinkers find this idea of concurrentism unintelligible. They dismiss any genuine metaphysical-causal role played by secondary or natural causes.

(4) The occasionalist philosophers studied here believe that occasionalism elevates God's role as the creator of the world and makes a stronger case for the veneration we owe to Him. In other words, occasionalist philosophers maintain that their doctrine offers a strong antidote against paganism. Interestingly, they take Neoplatonic-vitalism as well as Aristotelian-scholastic natural philosophy as instances of paganism. This is because allowing for truly efficacious secondary causes is thought to make (at least uneducated) people cherish, and eventually venerate, these secondary causes—veneration that, in actual fact, only God is due. Occasionalism was hence seen as the right Christian world view.

This dissertation was also concerned with showing that occasionalism played a strong role in projects of grounding of various kinds.

It has been shown in chapter 1 that what motivated Cordemoy's endorsement of occasionalism was its role in grounding the human world and its role in supporting absolutism. Cordemoy departed from the socio-political realm of the state, in order to show that it relies on towns, families and eventually the association of individuals. Individual humans were then deconstructed into what we call 'our body' and a mind. While minds are truly unified and simple substances, 'our bodies' *qua* matter are ultimately constituted of simple material substances, i.e., atoms. In light of its ultimate metaphysical reliance on atoms, Cordemoy's reconstruction of the human and the social realm steered close to an eliminativist position, admitting ontological reality to atoms (and minds) alone and thus not to material

572 We have seen, however, that Sturm—in line with the Aristotelian-scholastic tradition—endorses finality (final causes).

composites like our body. I presented a solution to this challenge in terms of the functional unity that makes our body one. In addition, only beings of a certain (though ultimately undetermined) degree of complexity would be considered alive rather than dead. Cordemoy accounted for the interaction of atoms, macroscopic bodies, and minds by means of occasionalism. Occasionalism, hence, provided the grounding of otherwise isolated and disconnected substances (or aggregates of substances in the case of macroscopic bodies). Having reconstructed human beings from atoms forming larger-scale macroscopic matter functionally united, i.e., our bodies, and minds, Cordemoy noticed the importance of language in human socialising. Human communication in terms of speech, in particular, was grounded in mind-body, body-body, and body-mind interactions all of which were ultimately based on God's regular causal activity. The association of human beings led to the emergence of families, towns, and eventually states governed by a king of absolute power. God's absolute causal power is mirrored by a king's absolute political power. The causal impotency of finite substances and their reliance on God is mirrored by the political impotency of citizens and their reliance on the king as invested by God.

In chapter 2, it was shown that Sturm's occasionalism was driven in similar ways by considerations concerning philosophical grounding, although it was more limited to natural philosophy itself. Based on an eclectic-scientific method aimed at reconciling old and new philosophy, occasionalism in conjunction with mechanism and finality emerged as one of the three constitutive elements of a reasonable natural philosophy. Sturm's (Cartesian) mechanism conceived of the physical realm in terms of passive matter, and so-called 'forms' which Sturm, in opposition to the Aristotelian-scholastic tradition, reinterpreted (or 'Cartesianised') as purely passive modifications of matter. As a consequence of his mechanist worldview, he conceived motion solely in terms of local motion. Sturm regarded the principle of motion as extrinsic to the thing moved. Bodies, as well as finite minds, were shown to be too feeble to conserve, let alone *cause*, motion. Hence, Sturm invoked God's causal efficacy to ground the motion as much as the existence of matter through time and space. In alignment with the Aristotelian-scholastic tradition, Sturm retained final causes, but showed that in the case of non-rational beings these are extrinsic to them. The final causes of non-rational beings were grounded in God's purposeful design of the world and His implementation of this design solely by means of efficient causation. Despite the fact that rational beings are aware of final causes, *qua* passive, they, too, rely on God for their realisation. Sturm applied his theoretical natural philosophy to all kinds of more practical problems of which we have studied the problem of life. Like Cordemoy, Sturm characterised living beings as functional unities. What distinguishes living from non-living beings is the degree of complexity—one that is ultimately rooted in the supernatural act of God's creation. We have seen that Sturm availed himself of the theory of pre-existence to explain the generation of living beings.

Chapter 3 focused on the young Wolff's adoption of occasionalism in his *Disquisitio philosophica de loquela* argued that it was motivated by the need to ground human speech in God's causal agency in order to bridge the disparity between the mind as thinking, and the body as an extended, substance. The young Wolff was, however, aware that occasionalism is not restricted to grounding mind-body interactions, and that it can be employed as a universal causal theory to ground all interactions between substances. Wolff's correspondence with Leibniz, and the unfolding of Wolff's mature philosophy led to a change of heart. Soon, Wolff would be sceptical of how promising a theory occasionalism really was at the end of the day. The mature Wolff questioned the occasionalism of his predecessors on several fronts, from its compatibility with what he took to be the best scientific method, to its underlying assumptions in physics. Most importantly, we have seen that in the eyes of the mature Wolff occasionalism severed the vital nexus between sufficient reason, efficient cause and force, and, hence, proved explanatorily deficient. Or else, it fell short of rendering nature intelligible. According to Wolff, nature needed to be explained in terms of natural agents working as efficient causes in virtue of an inherent force to act. Occasionalism, in contrast, apealled to God as the only truly efficient cause and the source of force in this world, thereby giving up the possibility of naturalised explanations of nature. In a word, in Wolff crystallises a change from causal to explanatory grounding, or from metaphysical causation to causal explanation, that his followers would embrace and amplify.

Chapter 4 explained why occasionalism slowly but surely fell into oblivion during the eighteenth century. Analysing the philosophical positions on causation of Bilfinger, Thümmig, Gottsched, Knutzen, Baumgarten, Ploucquet and the pre-Critical Kant, we found that occasionalism, over time, received less and less attention. Bracketing the case of the early Ploucquet, it was considered a non-starter. This is because occasionalism explained nature in non-naturalised, transcendental terms by locating the source of causal power solely in God. In addition, even German university professors—as isolated as they sometimes were—had to face the pressure on speculative philosophy exerted by extra-academic authors both within and outside continental Europe. We found that the critical attitude against speculative philosophy is best encapsulated in Kant. After all, occasionalism was outmanoeuvred by (at least *prima facie)* less speculative systems and the eighteenth-century variant of physical influx ultimately carried the day. All the authors studied in this chapter, except the early Ploucquet, endorsed more 'orthodox' or less 'extravagant' theories of causation, and even Ploucquet eventually gave up on his representationalist-idealist version of occasionalism. Emphasising causal explanation over strong metaphysical models of causation—a trend which, I suggested, occasionalism may have, somewhat ironically, contributed to—cost occasionalism its place as a respectable theory of causation.

Besides the more philosophical quintessence of this dissertation, there are also distinctive historical conclusions to be drawn. First and foremost, we have analysed the dissemination of occasionalism and

its fate in seventeenth- and eighteenth-century Germany. Perhaps as a result of focusing too much on Leibniz and Kant as the figureheads of seventeenth- and eighteenth-century German philosophy, the dissemination and endorsement of occasionalism have almost entirely been overlooked by scholarship to date. Only recently have scholars begun to wonder what the fate of occasionalism in the Holy Roman Empire of German Nation really was.

Second, I have identified a direct line of reception leading from French early modern occasionalists like Malebranche, and Cordemoy to Sturm, the young Wolff and the early Ploucquet. I argued that Sturm is best seen as a second-generation occasionalist from the perspective of his French predecessors. TFor Sturm, I showed, is very much familiar with the argumentation set forth by his predecessors. Oftentimes, he condenses their key arguments. At times, this even makes it difficult to reconstruct his own line of argumentation itself. The young Wolff's endorsement of occasionalism, too, constitutes a case of second-generation, or perhaps even third-generation, occasionalism if we bear in mind Wolff's familiarity with Sturm and Weigel's Jena school. Even though Cordemoy's name is not mentioned in Wolff's *Disquisitio philosophica de loquela*, the parallels between Wolff's *Enquiry* and Cordemoy's *Discours physique de la parole* are too striking to be ignored. I have suggested that Cordemoy's occasionalist account of the causal mechanism underlying language, and speech in particular, served as a blueprint for Wolff's own work. The early Ploucquet, in turn, showed himself to be inspired by Malebranche's *Vision in God* doctrine and also agreed with Malebranche's account of causation as (logical) necessitation.

Third, these German authors' endorsement of occasionalism is not a consequence of some kind of Cartesianism *sensu stricto*. Sturm accepts final causes *in spite of* Descartes' dismissal of them, and Sturm's eclectic attitude makes him a cautious reader of Cartesian philosophy as one of the predominant sects of his days. Ploucquet's metaphysics steers an interesting middle-way between Cartesian and Leibnizian assumptions, and he cannot be seen as a mere representative of either Cartesianism or Leibnizianism.

Fourth, unlike most of the French occasionalists that we typically study—philosophers like Cordemoy, La Forge, and Malebranche—the German occasionalist philosophers studied here all had secure university positions during their lives.[573] On the one hand, this shows that occasionalism made its way into the academic system, where philosophy was by and large shaped in the Holy Roman Empire of the German Nation (bracketing the peculiar case of Leibniz). On the other hand, occasionalism was not regarded as a philosophical view that seems to have violated university statutes: none of the German occasionalists we have studied here ran into institutional trouble due to their occasionalist views, nor am I aware of any German controversy over occasionalism.

573 Wolff was, of course, expelled from the University of Halle. However, this was not due to his occasionalism which he had already given up by the time he was forced to leave Prussia. Moreover, his occasionalist disputation did not cause any controversy inside the university.

To end this dissertation on a more speculative note, we can wonder about the relation between occasionalism and the reformation of Lutheran-Protestant scholasticism. In particular, we might consider the relation between occasionalism and the reformation of Lutheran-Protestant metaphysics and natural philosophy. It is a well-known fact that while Luther himself strongly opposed the cultivation of metaphysics and scholastic learning, Melanchthon, one of his most prominent followers, attempted to reconcile the new Protestant confession and the Aristotelian-scholastic tradition. It was not long, however, before Melanchthon's textbooks appeared unsatisfactory to later generations. Oftentimes reliant on Spanish-Jesuit philosophical textbooks mostly (but certainly not only) on the writings of Suárez, future Lutheran philosophers tried to build a more solid and thoroughgoing scholastic philosophy. In so doing, they were to some extent motivated by being better prepared for the often complicated, and at times hairsplitting, theological debates with their Catholic and reformed counterparts.[574] Nevertheless, relying on Catholic Aristotelian metaphysics to fight Catholic philosophy and theology sounds like a tightrope walk at best and a recipe for disaster at worst. The search for better alternatives seems only natural and perhaps occasionalism appeared to some to be just such a better alternative. Occasionalism not only accentuates God's omnipotence, and our dependence on God, but might also harmonise better with Protestant-Lutheran accounts of grace and predestination. Certainly, it is no coincidence that occasionalism was endorsed by so many Lutheran philosophers in Germany: Weigel, Sturm, Hamberger, the young Wolff, Ploucquet—only some of whom we have studied here. It would be very interesting to investigate more thoroughly the connection between the emergence of occasionalism in German Lutheran philosophers and its relation to reformation approaches to Aristotelian-scholastic metaphysics and natural philosophy.

574 This account is by and large taken from Weber 1907.

APPENDIX

To Chapter 1

(α) Cordemoy's Life and Works[575]

Géraud de Cordemoy (1626–1684) was a philosopher, lawyer, historian, teacher of the Grand Dauphin and member and later director of the *Académie Française*. Cordemoy was born in Paris in 1626. While we do not know the exact day of his birth, it is likely that he was baptised on 6 October.[576] His family descended from old nobility from the Auvergne, to wit, from Royat. His parents were Géraud de Cordemoy and Nicole Bucé. His father was a university professor, *contrôleur des decimes* in Langres, and lawyer at the *Parlement de Paris*. Cordemoy had three siblings: Catherine, Marie, and Nicole. Surprising as it might sound, nothing is known about Cordemoy's childhood, youth or his studies (Clair and Girbal 1968, 16; Battail 1973, 2). Some time before 1651, Cordemoy married Marie de Chézelles. They had five children. The most prominent of them, Louis-Géraud—Cordemoy's eldest son—later became a priest and helped his father finish his extensive *History of France*.

Cordemoy's main profession was as a lawyer at the *Parlement de Paris*, like his father. However, Cordemoy was very interested in mathematics but above all in philosophy. In the late 1650s and the 1660s, Cordemoy regularly attended the philosophical-intellectual academies, and the salons of de Bonneveaux, Montmort, Rohault, Lamoignon, Bourdelot, d'Ormesson, and Bossuet.[577] On the occasion of one such event, Cordemoy presented a discourse on the action of bodies (*L'Action des Corps*) which was later published as part of the posthumous 1664 edition of Descartes' *Le Monde*. Cordemoy was well-known in the philosophical scene of the time.

In 1666, Cordemoy published his first philosophical treatise, the *Six Discourses on the Distinction between the Body, and the Soul serving the Elucidation of Physics* (*Le Discernement du Corps et de*

575 This section is based on Clair and Girbal 1968, 15-84; Battail 1973, ch.1; Nadler's introduction to Cordemoy's *Six Discourses on the Distinction between the Body and the Soul* (2015, 1-53); Ablondi 2005a, ch.1; Rodis-Lewis 1993, 414-415; and Prost 1907, 36-39.

576 Battail (1973, 1) takes 6 October 1626 to be Cordemoy's date of birth.

577 On the occasion of one of Montmort's conferences in 1657, Cordemoy met the French Minim Emmanuel Maignan (1601–1676). Maignan is interesting insofar as he tried "to reconcile Gassendi's atomism, and Descartes' method with a traditional scholastic course in philosophy" (entry on 'Emmanuel Maignan,' in Schmutz's *Scholasticon* (online)). Maignan might have inspired Cordemoy's atomism (Ablondi 2005a, 11 (n3)). Proust (1907, 58-62) while he was one the first to point to a connection between the two, doubts Maignan's influence on Cordemoy in this respect due to the fact that Maignan favours an atomism that allows atoms to differ qualitatively, and allows them to have different essences. Insofar as Maignan's atomism transcends a view of physics that is purely geometrical, it could not have been the source for Cordemoy, who based his philosophy solely on Descartes, and his own thinking, or so Proust has it (ibid, 62). Another interesting component of Maignan's thought is his occasionalism. Battail (1973, 7) mentions the possibility that Maignan even inspired Cordemoy's occasionalism. Hellyer (2005, 225) lends further support to Maignan's occasionalism by pointing out that he had opted for an occasionalist theory to account for the Eucharist (which was in turn adopted by some German Jesuit thinkers). The relation between Maignan and Cordemoy certainly merits future research.

l'Ame en six discours, pour servir à l'éclaircissement de la Physique). It incorporates his earlier discourse on the action of bodies as its second discourse (*On the Motion and Rest of Bodies*). In 1667, Cordemoy published a letter written to the Jesuit Father Cossart—priest and teacher at the College of Clermont (Nadler 2015, 5)—wherein he demonstrates the compatibility of Cartesian physics with the first Book of Genesis. The same year, Cordemoy attended a ceremony for the interment of Descartes' remains, after they were transferred from Stockholm where Descartes died of pneumonia in 1650. In 1668, Cordemoy published his *Physical Discourse on Language* (*Discours physique de la Parole*) famously alluded to by Molière in his *Bourgeois Gentilhomme*. While Cordemoy's *Treatises on Metaphysics* were only published posthumously, Battail (1973, 18) conjectures that they were written between 1668 to 1670, prior to Cordemoy's political and historical writings.[578] In 1668, Cordemoy wrote a treatise on the Reformation of the State (*De la Reformation d'un Etat*) published posthumously in 1691 and 1704. In 1673, upon the advocacy of his friend Jacques Benigne Bossuet (1627–1704), Cordemoy was elected teacher of Louis XIV's son, the Grand Dauphin. Cordemoy's appointment letter was signed by Louis XIV and his chief advisor Colbert (Clair and Girbal 1968, ch. 7, especially 50; Battail 1973, 22). It seems plausible that on the occasion of this appointment Cordemoy was commissioned with writing an extensive *History of France* (*Histoire de France*) which was supposed to support the education of the Grand Dauphin. It was only completed after Cordemoy's death by his son, published in 1685 (vol. 1), and 1689 (vol. 2). In 1675, Cordemoy was elected to the *Académie Française*. He became the Academy's director in 1683. That year he also gave a eulogy for the death of the Queen Marie-Therèse. Cordemoy himself died after a short illness on 15 October 1684.[579] In the *Académie Française* he was succeeded by the famous dramatist Jean-Baptiste Racine (1639–1699).

Cordemoy's philosophy was influential in its time and beyond. Malebranche and Leibniz carefully studied his works and used them as starting points for their own philosophical thinking (Prost 1907, 186f, 232, respectively).[580] Hume might also have read Cordemoy during his stay in France (Prost 1907, 263).

(β) The Holistic Nature of Cordemoy's Works

The holistic nature of Cordemoy's project gains support from the somewhat overlooked fact that his works are continuous and coherent. They build upon and gear into one another. They all contribute to his grander project which was analysed in the main body of this dissertation (chapter 1). Reading through Cordemoy's whole work, the idea of a comprehensive philosophical project gains support, although it is certainly true to say that he "disseminated his thought across numerous works and

578 More on the evolution and coherence of Cordemoy's work can be found below in the appendix to chapter 1, β. Cordemoy's other works on history and politics are discussed in the same section.
579 Rodis-Lewis (1993, 414f) gives 14 October 1684 as Cordemoy's day of death.
580 For Leibniz's engagement with Cordemoy, see the introduction of this dissertation.

opuscules" (Battail 1973, viii) which makes the job of reconstructing his overall project more complicated.

The continuity of Cordemoy's works is particularly obvious with respect to the DCA and the DPP, which were initially intended as two parts of a larger work. They were eventually published independently of one another in 1666 and 1668, respectively. However, the traces of this intention remain present in both works. The DCA ends with the remark that "in what follows, pursuing my investigations beyond my own case, I will try to discover if, among the bodies that surround me, there are any to which I must believe souls are united" (DCA, 142). This, the problem of other minds, or solipsism derives from Cordemoy's method of self-reflection, first-person analysis, and reliance on innate knowledge.[581] It is taken up in the beginning of the DPP. Furthermore, the *Discours physique de la Parole* begins with a direct reference to to the *Six Discourses*: "This Discourse is the Continuation [*la Suite*] of some others" (epistle, page 1).[582] What is more, he continues to refer to the results arrived at in the DCA (for instance DPP, 120). The main theme of the DCA, to distinguish what can properly be said about the mind and the body, respectively, and what makes them so radically different etc., is taken up in the preface of the DPP and recurs throughout the whole work (e.g., DPP, 62, 65f). For instance, understanding mind-body correspondence as mind-brain correspondence figures in the DCA (135-142), and is taken up in the DPP (120f, 136). At the end of the DPP where he explicitly draws on the considerations of the 4th and 5th *Discourse* of the DCA, Cordemoy calls it "la premiere partie" (DPP, 194)[583] making the DPP the second part of this 'double album'.

Cordemoy's *Lettre* sent to a learned friar of the Jesuit order, Father Cossart, on 5 November 1667, though primarily concerned with reconciling Descartes' physics with the Bible (specifically, the first chapter of the Book of Genesis) foreshadows the debate about animals as beast-machines present in the DPP (*Lettre*, 33-35, 45-48; DPP, 83-88, 110-123). When Cordemoy claims to be sorry that "if my Letter were not already too long, I could explain to you [Cossart] the most astonishing functions of the Beasts through the construction of their organs only, as one explains to you all the operations of a Watch through the arrangement of its parts, and I could show you that there is no difference between artificial and natural machines" (*Lettre*, 52)[584], he is referring to the 3rd *Discourse* of the DCA. Cordemoy's remark towards the end of his letter that "it is God who is the cause of the movement of the least portion of matter, […] it is His almighty hand which takes it everywhere" (ibid., 64)[585] draws on his argument for body-body occasionalism in the 4th *Discourse* of the DCA. When Cordemoy notes

581 For Cordemoy's method of self-reflection, see DCA, 57f; for innate knowledge, see DCA, 55f; for first-person analysis, see DCA, 56-58, 118f, 135, 142.

582 "Ce Discours est la Suite de quelques autres" (DPP, epistle 1st page).

583 For further allusions to the DCA in the DPP, see DPP, 5, 120, 190, 193f.

584 "Si ma Lettre n'estoit déja trop longue, je pourrois vous [Cossart] expliquer les plus étonnantes fonctions des Brutes, par la seule construction de leurs organes, comme on vous explique toutes les operations d'une Montre, par l'arrangement de ses parties, & vous montrer qu'il n'y a de difference entre les machines artificielles & naturelles" (*Lettre*, 52).

585 "c'est Dieu qui est cause du mouvement de la moindre portion de matiere, […] c'est sa main toute puissante qui la conduit par tout" (*Lettre*, 64).

that “it is certain that the things conserve themselves naturally by the same means which has produced them” (Lettre, 56)[586], this amounts to nothing other than a restatement of his fifth axiom of the 4th *Discourse* of the DCA. Along the same lines, Cordemoy’s warning that there is “always an extreme danger to confuse in man the two substances which compose him, and the functions which depend on each of them” (ibid, 50)[587], is a reiteration of the main theme of the DCA. Furthermore, the case of “the first man in his most perfect state since the moment of his creation (*production*)” (*Lettre*, 60)[588] foreshadows the discussion of the Fall in *Traitez de Metaphysique* (TdM) I.

The *Traitez de Metaphysique*, the dating of which is controversial, pick up on the problem of *intramental* causation left open by the DCA and the DPP. Battail (1973) has suggested that there is not only a logical succession between these three works but also an immediate chronological one: the DCA appearing in 1666 and the DPP in 1668. Battail therefore dates the TdM “between the end of 1668 and 1670” (ibid., 18). TdM I, in particular ties in with themes discussed in Cordemoy’s earlier works. That is to say, §§ix, and xi-xvi pick up on mind-body union as well as the distinction between the mind and the body and go hand in hand with the DCA’s exposition of the same topic. §x turns to the doctrine of the beast-machine, which is present in the *Lettre*, and the DPP. The biblical themes of the Book of Genesis, i.e., paradise lost, Original Sin, and the Incarnation were partially anticipated in the *Lettre*. However, TdM II is also continuous with Cordemoy’s previous work, in that the aspect of God’s infallibility which derives directly from His perfection is present in the former (TdM II, 153), but also in the DPP (167).

Cordemoy’s political works posthumously published in his *Divers Traitez*, such as the *De la Reformation d’un Etat* and the *Des Moyens de rendre un Etat heureux*, spell out ideas alluded to in the epistle to the king and the preface of both the DCA and the DPP. That is, they emphasise the absolute role of the king (*Reformation d’un Etat*, 115; *Des Moyens*, 216) and his central duty to make his citizens happy (*Reformation d’un Etat*, 109; *Des Moyens*, 215). Furthermore, when Cordemoy presents the ideal reformed state (*l’Etat reformée*) and its academic system in the *De la Reformation d’un Etat*, both the distinction between the mind and the body (the main topic of the DCA) and eloquence (one of the main topics of the DPP) are part of the envisioned academic curriculum of older students (187-189, 192).[589] Moreover, in history lessons in the ideal state, pupils aged ten to fifteen not only study ecclesiastical history, but, more specifically, the history of the last century of their own country. Unsurprisingly, it is examples from the sixteenth century which Cordemoy avails himself of when presenting his *Maximes tirées des Faits de l’Histoire de Charles IX*. Cordemoy’s aforementioned *Maximes*, in particular maxim 59, also pick up on an idea alluded to in Cordemoy’s

586 “il est certain que les choses se conservent naturellement par le même moyen qui les a produites” (*Lettre*, 56).

587 “Il y a toujours un extrême danger de confondre dans l’homme les deux substances qui le composent, & les fonctions qui dependent de chacune d’elles” (*Lettre*, 50).

588 “[L]e premier homme en son estat le plus parfait dés le moment de sa production” (*Lettre*, 60).

589 Battail (1973, 237, 242) also notes that Cordemoy’s own philosophy, in combination with Descartes’ philosophy, forms part of the curriculum.

historical work, i.e., the *De La Necessité de l'Histoire*[590], to wit, that God often punishes a king's abuse of power during his earthly life (*Necessité de l'Histoire* 75).

Finally, even Cordemoy's historical works are continuous with, and refer back, to his earlier works. In his *De la Necessité de l'Histoire*, he talks about the differences between man and beasts as elucidated by the Book of Genesis (79), and, in so doing, he develops an idea raised in his *Lettre* (45-48). Further, the topics of the First Man and the Fall (*Necessité de l'Histoire*, 79) figure prominently in TdM I (148f). The same is true of the topic of the Incarnation (*Necessité de l'Histoire*, 81) which is present in TdM I (149). Moreover, Cordemoy's remark that the 'holy history' (*l'Histoire sainte*) can serve to improve one's own rhetoric and eloquence (ibid, 88f) alludes to the DPP's in-depth study of eloquence (DPP, 148-169). Certainly, the idea that children are endowed with an innate faculty of reason that they can use and that drives first-language acquisition (*Necessité de l'Histoire*, 95f) is foreshadowed in the DPP as well (DPP, 58f), and also appears in the *Reformation d'un Etat* (179).[591] Finally, Cordemoy's conviction that a historian is trustworthy if and only if he is a gentleman (*homme de bien*) in his *Observations sur l'Histoire d'Hérodote* (38) is closely linked to the conception of eloquence outlined in the DPP (167): "a man could not be eloquent without being a gentleman (*homme de bien*)."[592] Indeed, an ideal historian such as Herodotus is identical with an ideal orator in that both focus on what is essential and both present their subject matter clearly and briefly (*l'Histoire d'Hérodote*, 30-32, 35; DPP, 148-150). The historiographic style of perfectly Herodotus exemplifies Cordemoy's suggestions of to how to proceed in historiography in his *Ce qu'on doit observer en écrivant l'Histoire*. Insofar as the ideal historian focuses on the main events, and the king's work in favour of the state, historiography and real-politics as presented in his *Des Moyens* go hand-in-hand.

Cordemoy's works, then, are not only continuous in the sense that later works fill the gaps left by earlier ones. They are also coherent in that they deliberately build upon what the preceding works already established. This is most obvious in the case of the DCA and the DPP. This lends additional support to the idea that every *œuvre* contributes to the presentation of Cordemoy's grander project, i.e., the rigorous grounding of human reality.

590 The full title is: *De La Necessité de l'Histoire, de son usage, & de la maniere dont il faut méler les autres sciences en la faisant lire à un Prince*.
591 Battail (1973, 235) notes this, too.
592 "un homme ne pouvoit estre eloquent sans estre homme de bien" (DPP, 167).

(γ) Cordemoy's Influences, Sources and Reception

Influences suggested in secondary literature	Cordemoy's sources as referenced by himself	Reception suggested in secondary literature[593]

• **Arnauld** (Battail 1973/ Clair & Girbal 1968)
• **Augustine**—directly or indirectly *via* Platonist Christians (Battail 1973)
• **Biel** (Scribano 2011)[594]
• **Bossuet** (Damiron 1846)
• **Cicero** (Scheib 1997)
• **Clauberg** (Scheib 1997; Schött 1899)
• **De la Chambre** (Damiron 1846)
• **De Raey** (Scheib 1997)
• **Descartes** (e.g., Ablondi 2005a, ch. 4)
• **Gassendi** (Scheib 1997; Damiron 1846)
• **Heerebord** (Scheib 1997)
• **La Chambre** (Battail 1973)
• **Maignan** (Ablondi 2005a; Scheib 1997)
• **Malebranche** (Stein 1888)
• **Nicole** (Battail 1973/Clair & Girbal 1968)
• **Sénault** (Battail 1973)
• **Sorel** (Scheib 1997)
	• **Aeschylus** (*L'Histoire d'Herodote*, 51)
	• **Bossuet** ("Mr. L'Evêque de Meaux")
	  ○ "Discours sur l'Histoire Universelle" (*De la Necessité de l'Histoire*, 77, 78)
	• **Cicero** (DCA, 58); (DPP, 154/155) (*L'Histoire d'Herodote*, 31, 33, 52, 54-58, 60-62)
	  ○ "De Oratore": (*L'Histoire d'Herodote*, 33, 54)
	• **Descartes** (<u>implicitly</u>: DCA, passim; DCA, 118: Cordemoy calls his reflections "meditations", clearly an homage to Descartes; <u>explicitly</u>: passim in his *Lettre)*
	• **Euripides** (*L'Histoire d'Herodote*, 51)
	• **Herodotus** (passim in his *L'Histoire d'Herodote*)
	• **Homer** (*L'Histoire d'Herodote*, 51)
	• **Payen,** Antoine François (DPP, 167)
	• **Pecquet**, Jean (DCA, 78)
	• **Pindar** (*L'Histoire d'Herodote*, 51)
	• **Platon** (*De la Reformation d'un* Etat, 101)
		• **Condillac** (Waldow)[595]
		• **Desgabets** (Ablondi 2005a)
		• **Fénelon** (Thuillier 1960)
		• **Hume** (Prost 1907)
		• **Leibniz** (Nadler 2015; Battail 1973, Prost 1907):
		  ○ Ex Cordemoii tractatu *De Corporis et mentis distinctione*
		  ○ Primary Truths
		  ○ New System
		  ○ Correspondence with Arnauld (1686/87)
		• **Malebranche** (Schmaltz 2017a; Nadler 2015, Battail 1973; Prost 1907)
		• **Oldenburg**[596] (Dobre 2010)
		• **Sturm** (Bohatec 1912)
		• **Régis** (Ablondi 2005a)
		• **Rochon** (Schmaltz 2017a; Ablondi 2005a)
		• **Rohault** (implicitly) (Ablondi 2005a)

593 For the contemporary reception of Cordemoy's work, see Rodis-Lewis 1993, 419-423.

594 Cordemoy is not mentioned here, but the passage from Campanella summarising Biel is reminiscent of Cordemoy ('that God does everything that is real').

595 Personal conversation on the occasion of the 2018 *THouGHtS* workshop at Harvard University.

596 In Oldenburg's *Philosophical Transactions*, no. 17 (09/09/1666)

	• **Plutarch** (*L'Histoire d'Herodote*, 60) • the '**Schoolmen**' (DCA, 78; 82) • **Sophocles** (*L'Histoire d'Herodote*, 51) • **Thucydides** (*L'Histoire d'Herodote*, 51)	

(α) Sturm's Life and Works[597]

Johann Christoph Sturm (1635–1703) was a German eclectic philosopher, university professor, one of the first experimental physicists, a mathematician, calendariographer, Protestant (Lutheran) priest, and astronomer.[598] He was a correspondent of Robert Boyle and Gottfried Wilhelm Leibniz, and he was held in high esteem by his contemporaries. However, he has been forgotten for a long time by the history of philosophy. Only recently has he received sustained scholarly attention. This is true, in particular, of German scholarship.

Throughout his life as a professor of mathematics and physics at the University of Altdorf (close to Nuremberg), Sturm was publishing extensively on natural philosophy. His three physics textbooks, the *Physica conciliatrix* (1685) (PC), the *Physica electiva* (1697/1722) (PE) and the posthumously published *Physicæ modernæ sanioris compendium* (1704) (CPMS), aim at a thorough explanation of the whole of nature including its general principles, the supra- and sublunary world, and inanimate and animate bodies (including human beings). Sturm reworks an Aristotelian-scholastic natural philosophy by taking into consideration the mechanist philosophy popular during his life-time. His writings reveal that he was influenced by the occasionalist theories of French philosophers, such as Cordemoy and Malebranche.

Sturm was born in Hilpoltstein close to Nuremberg on 3 November 1635 during the Thirty Years War (1618–1648). Sturm's father, Johann Eucharius Sturm, was a tailor, valet, treasurer, and custodian of the silverware at the court of Count Palatine Johann-Friedrich of Pfalz-Hilpoltstein. Sturm's mother was Gertraud Bock, daughter of Konrad Bock, country parson of Liebenstadt. During his infancy, Sturm was taught Latin and other (fine) arts by the court chaplain (*concionator*), Johann Jakob Beurer.

When the Count Palatine Johann-Friedrich (himself a Protestant) died in 1644 and left no heir to the throne, his territory passed on to his older brother Wolfgang Wilhelm, who had converted to Catholicism in 1613. Although Johann-Friedrich had reached an agreement with his brother that—unlike all other subjects —the courtiers and servants to his (Johann-Friedrich's) court could remain

597 This biography is based on Albrecht 1994, 309-357; Albrecht 2001; Bosl 1983; Brucker 1766, 769-772; Doppelmayr 1730; Gaab 2004a; Gumposch 1851, 99f; von Haller 1774; Kratzer et al. 2003; Herrmann 2013; König 1678, 783; Krafft 1978; Jöcher 1750; Leinsle 1988; Recknagel 1998; Pfeiffer, in Recktenwald 1966; Schimank 1969; Will 1757; Zedler 1731–1754.

598 Zedler in his (1731–1754) presents Sturm as "the first to introduce the eclectic philosophy (*philosophiam eclecticam*) instead of the sectarian philosophy (*philosophia sectaria*) at Altdorf" (column 1418). See also Jöcher 1750, 913. Albert von Haller (1774, 632) introduces Sturm as "a physics professor from Altdorf, who established as one of the first an experimental physics in a German University." "Professor Physices Altdorfinus, ex primis qui experimenta physica in aliqua Academia Germanica fecit." See also Albrecht 1994, 22; Recknagel 1998, 149; Will 1757, 802; Doppelmayr 1730, 122 note m; Pfeiffer, in Recktenwald 1966, 110. Doppelmayr (1730, 117) points out that Sturm was the first one to organise *collegia experimentalia*. For this, see also Schimank 1969, 456, and Krafft 1978, 136. Gaab 2004a, 70f corrects that Sturm was not the first one overall to give lectures in experimental physics, but the first one to offer such lectures on a regular basis.

Protestant, his brother reneged on this promise when Johann-Friedrich had died. All subjects had to become Catholic.[599] Sturm and his family being Protestants (Lutherans) and resisting this call, fled the county in 1645. They settled close by in Weißenburg. From 1646 onwards, Sturm attended the Latin School in Weißenburg living in the house of the rector, Johannes Hupfer, who took care of him.[600] In 1653, upon the advocacy of Sturm's father, Daniel Wülfer, priest and dean of St. Lorenz, employed Johann Christoph as amanuensis. He supported Sturm financially and supported Sturm's academic career. Initially, Sturm thought about studying at the University of Altdorf and he enrolled on 4 October 1653.[601] However, he did not take up his studies.

Instead of studying at the University of Altdorf, Sturm decided to attend the University of Jena enrolling on 2 February 1656. Sturm studied mathematics and physics with both Erhard Weigel (1625–1699) and Johann Zeisold (1599–1667). He studied theology with Henning Spoercke (Gaab 2004a, 23). Sturm was awarded the degree of *magister philosophiæ magna cum laude* on 27 January 1658. On 10 October 1660, Sturm enrolled at the University of Leiden where he studied philosophy with Johannes De Raey (1622–1702), and architecture *privatim* with Nicolai Goldmann (1611–1665). It was in Leiden that Sturm most likely came into contact with the idea of eclecticism as Henricus Bornius (1617–1665), professor of ethics at the University of Leiden, had formulated it in his inaugural lecture *De vera philosophandi libertate* (1653) (Gaab 2004a, 31). During his one year stay in Leiden, Sturm also visited Baruch de Spinoza (1632–1677).[602] In 1661, Sturm returned to Jena *via* Amsterdam, Hamburg, Lower Saxony, Magdeburg, and Leipzig. In Jena, he spent one more year studying theology.[603]

In 1662, Sturm returned to his former benefactor, Daniel Wülfer and taught his (Wülfer's) sons while also conducting his own philosophical studies. Only in 1664 was Sturm able to find a decent employment as priest of Deiningen and (from 1667 onwards) also of Klosterzimmern, allowing him to settle and start a family.

On 15 August 1669, Sturm was offered a position as professor of mathematics and physics at the University of Altdorf succeeding Abdias Trew (1597–1669).[604] Sturm held this position until his death in 1703. His most famous students were the Swiss polyhistor Johann Jakob Scheuchzer (1672–1733); Johann Gabriel Doppelmayr (1671–1750), a German mathematician, natural philosopher and encyclopedist; Johann Heinrich Müller (1671–1731), one of Sturm's successors to the chair of mathematics and physics at the University of Altdorf; Martin Knorre (1657–1699); and Georg

599 For more on the historical details, see Wurdak 2003.
600 For the curriculum of the Latin School, see Kammerl 2003.
601 Gaab (2003, 45) cites Steinmeyer's *Die Matrikel der Universität Altdorf* (1912, vol. 2, 574) as a source for this. Gaab (2004a, 22) repeats the point.
602 Or so Leinsle (1988, 105) has it.
603 Jöcher (1750, 912) is the only commentator to maintain that Sturm also studied at the University of Leipzig. However, he does not substantiate this claim.
604 König (1678, 783) seems to be the only scholar to maintain that Sturm received a call by the University of Altdorf as early as 1666.

Albrecht Hamberger (1662–1716), a teacher of Christian Wolff (1679–1754) (Gaab. 2004a, 48f). Sturm was the rector of the University of Altdorf twice, and the dean of the faculty of philosophy nine times (Gaab 2004a, 51f).[605]

During his academic career, Sturm produced a variety of works including his main work, the *Physica electiva sive hypothetica* (1697/1722), treatises of physics, mathematical textbooks, a colourful set of disputations, works on astronomy (aimed at discrediting astrology), and calendars.[606] Notably, Sturm was among the first to offer (private) courses on experimental physics, published as his *Collegium experimentale sive curiosum* (1676/1685). Sturm corresponded with and was venerated by members of the Royal Society. In particular, Sturm exchanged letters with John Wallis (1616–1703), Robert Hooke (1635–1707), Thomas Gale (1636–1702), Edmond Haley (1656–1742), Theodore Haak (1605–1690) (Gaab 2004a, 47), and Robert Boyle. Sturm's own influences and sources are too vast to list, but they include a lot of ancient and modern authors (the so called *novatores*).[607]

Sturm was married three times: his first wife was Barbara Johanna Kesler. They married in 1664. She died in 1679. His second wife was Maria Salome Höchstetter. They married in 1680. She died in 1691. His third wife was Dorothea Elisabeth Göring.[608] They married in 1692 and she outlived Sturm. Sturm had thirteen children, Leonhard Christoph Sturm being the most famous one.

Sturm died in Altdorf on 25 December 1703 from the consequences of a stroke he had suffered two months earlier.[609] He was said to be "a pious, honest, kind, upright man, of clear speech, very eager in [the search after] justice and truth, and the successful renovator of mathematical studies" (Brucker 1766, 770).[610] In his eulogy on Sturm, Georg Paul Rötenbeck, who was an ordinary professor of political science and logic at the University of Altdorf, and whose daughter was married to Sturm's son Leonhard Christoph, portrays Sturm as humble, decent, impartial, duteous, patient, and godly. Furthermore, Sturm is venerated as a brilliant philosopher and mathematician as well as a good family father.[611]

605 Sturm was also the inspector of the scholarship students (Gaab 2004a, 52). See also Will 1757, 803.
606 For a comprehensive list of Sturm's works, see Gaab 2004b, 250-311.
607 An abregé of some of Sturm's sources is provided in the appendix to chapter 2, β.
608 Göring was her widow name.
609 There is some controversy in the literature as to Sturm's day of death: Bosl (1983) gives 26 October 1703. Zedler (1731–1754), Hermann (2013), Doppelmayr (1730), Jöcher (1750), Will (1757), Leinsle (1988) and Recknagel (1998) give 25 December 1703. Gaab (2004a) gives 26 December 1703. Albrecht (1994 and 2001) cannot even decide whether Sturm died in 1703 or 1704. I side with the majority position, here.
610 "Testati autem sunt collegæ, qui ei [Sturm] superuixerunt, fuisse *virum pium, probum, candidum, integrum, aperti oris iustitæque veritatisque studiosissimum, et studiorum mathematicorum felicem instauratorem*" (Brucker 1766, 770). Emphasis in original.
611 Rötenbeck's eulogy is translated into German and annotated by Kratzer et al. 2003.

(β) An Abregé of Sturm's Sources[612]

1) The Ancient Greeks

1.1) Pre-Socratics

Alcmaeon (PSE, pp. 45)
Anaxagoras (PE I.1, pp. 40, 83; PSE, pp. 45, 46, 58; PC, p. 252)
Anaximander (PE I.1, p. 26; PSE, p. 4)
Anaximenes (PE I.1 preface; PSE, p. 46; CPMS, p. 560)
Archytas (PE I.1, p. 49; CPMS, p. 652)
Democritus and his school (PE I.1, preface, pp. 9, 26, 29, 30, 48, 81, 82, 83, 85, 206, 20; PSE, pp. 13, 44, 45, 46, 53, 54, 58; CPMS, pp. 17, 560, 564; PC, pp. 20, 25; 252)
Empedocles (PE I.1, pp. 83, 207, 225; PSE, p. 46, 53; CPMS, p. 560; PC, p. 252)
Heraclitus (PE I.1, preface, p. 192; PSE, pp. 45, 46)
Leucipp (PE I.1, pp. 26, 83; PSE, pp. 26, 44, 46, 58; CPMS, p. 17; PC, p. 25)
Melissos (PSE, p. 46; CPMS, p. 256)
Parmenides (PE I.1, p. 152; PSE, p. 26, 46, 58; CPMS, p. 256)
Pherecydus (PSE, p. 44)
Philolaus (PSE, p. 58)
Pythagoras (PE I.1, pp. 30, 33, 65; PSE, pp. 4, 26, 44, 46, 58; PC, p. 21)
Thales (PSE, pp. 4, 45, 46)
Xenophanes (PSE, pp. 5, 58)
Zeno (PE I.1, pp. 33, 56; PSE, pp. 4, 5, 64; CPMS, p. 256)

1.2) Post-Socratics/The Classical Period

Andronicus Rhodius (PSE, pp. 27, 47, 66)
Appolonius (PE I.1, preface; CPMS, p. 596)
Archimedes (PE I.1, preface; CPMS, p. 596)
Aristotle (PE I.1, preface, pp. 6, 10, 11, 21, 23, 26, 27, 28, 33, 34, 39, 41, 42, 43, 44, 55, 57, 58, 61, 66, 78, 79, 80, 81, 82, 85, 92, 94, 95, 100, 104, 106, 108, 109, 110, 111, 112, 128, 130, 131, 132, 134, 136, 143, 144, 145, 150, 151, 152, 154, 155, 159, 160, 163, 165, 170, 171, 185, 187, 192, 196, 206, 207, 208, 220, 225, 232, 237, 245; PSE, pp. 4, 26, 27, 29, 32, 34, 39, 41, 42, 44, 46, 47, 48, 53, 55, 58, 67, 68, 69, 70, 73, 74, 77, 78; CPMS, pp. 6, 35, 36, 37, 42, 45, 47, 258, 261, 560, 563, 564, 568, 578, 635, 684; PC, preface; 2, 4, 6, 7, 8, 10, 15, 17, 21, 22, 24, 26, 28, 31, 40, 41, 44, 45, 46, 48; 245, 247, 251, 252, 264, 265, 279, 286, 288)
Clazomenius (PSE, p. 46)
Critia (PSE, p. 45)
Diodoros Cronos (CPMS, pp. 256, 257)
Diogenes Laertius (PE I.1, preface, pp. 85, 208, 230; PSE, pp. 4, 5, 10, 44, 45, 46; CPMS, pp. 256, 559; PC, pp. 25, 28,41; 250, 265, 277)
Ephesius (PSE, p. 66)
Epicurus (PE I.1, preface, pp. 9, 26, 29, 30, 40, 48, 65, 83, 85, 142, 143, 145, 187, 188, 192, 207, 208, 223, 230; PSE, pp. 4, 13, 39, 78; CPMS, pp. 6, 258, 559, 587, 588, 684; PC, pp. 4, 20, 25; 242)
Euclid (PE I.1, preface, pp. 34, 46, 239; PSE, p. 34; CPMS, p. 596)
Hero (PE I.1, p. 51)
Herophilus (CPMS, p. 256)
Hippasus Metapontinus (PSE, p. 46)

612 Underlined authors are occasionalist philosophers or show some occasionalist inclinations. I have at times added the first names of philosophers to facilitate identification.

Hippocrates (PE I.1, pp. 145, 153, 155, 180)
Metrodorus Chius (PE I.1, p. 30)
Pappus (CPMS, p. 596)
Pericles Lydus (PE I.1, p. 26)
Plato (PE I.1, pp. 30, 33, 41, 143, 152, 153, 154, 207; PSE, pp. 1, 4, 32, 39, 44, 46, 47; CPMS, pp. 560, 603, 663; PC, pp. 22, 26, 27; 252)
Potamon of Alexandria (PSE, pp. 10, 43, 44)
Seleucus (PSE, p. 54)
Sotion (PSE, p. 43)
Speusippus (PSE, pp. 26, 45)
Stobaeus (PE I.1, p. 30; PSE, pp. 9, 54)
Theophrastus (PSE, p. 66)
Xenocrates (PE I.1, p. 30)
Xenophone (p. 145)

2) Roman Philosophers

2.1) Stoics

Aelianus (PSE, p. 44)
Cicero (PE I.1, pp. 10, 143, 230; PSE, pp. 26, 57; PC, p. 25)
Galen (PE I.1, pp. 206, 208; CPMS, pp. 559, 684; PC, p. 242)
Marcus Aurelius (PE I.1, p. 147)[613]
Pliny The Elder (PE I.1, preface)
Plutarch (PE I.1, p. 142; PSE, pp. 9, 44, 54; CPMS, p. 559; PC, pp. 25; 249, 252)
Seneca (PE I.1, pp. 10, 145, 147; PSE, pp. 16, 30, 36, 41, 43, 54, 57)
[Emperor] *Tiberius* (PSE, p. 43)

2.2) Sceptics

Aulus Gellius (PSE, p. 65)
Sextus Empiricus (PE I.1 p. 145)

2.3 Epicureans

[Gaius] *Velleius* (PE I.1, p. 143)

3 The Commentary Tradition

3.1) The Greek Commentators

Alexander of Aphrodisias (PE I.1, preface, pp. 25, 26, 31, 82; PSE, pp. 49, 66; PC, p. 27)
Ammonius (PE I.1, preface, pp. 25, 79; PSE, pp. 1, 43, 66; PC, p. 40)
Aspasius (PSE, p. 66)
Iamblichus (PE I.1, preface)
Olympiodorus (PE I.1, preface; PSE, p. 46)
Philoponus (PE I.1, preface, pp. 25, 82; PSE, pp. 46, 66)
Simplicius (PE I.1, preface, pp. 25, 80, 82, 85, 109, 110, 111; PSE, pp. 46, 65, 66; PC, p. 40)
Themistius (PE I.1, pp. 24, 25, 82, 156; PSE, pp. 4, 66; CPMS, p. 559; PC, p. 249)

3.2) The Arabic Commentators

Averroes (PE I.1, p. 25; PSE, p. 66; PC, p. 48)
Avicenna (PE I.1, p. 25; PSE, p. 66)

613 Sturm falsely refers to ‘Marcus Antonius’ (book V, article 9).

3.3) The Latin Commentators

Albertus Magnus (PE I.1, preface, p. 25; PSE, p. 66; PC, p. 2)
Thomas Aquinas (PE I.1, preface, pp. 24, 25, 108, 129, 175, 176; PSE, pp. 46, 52; CPMS, p. 617; PC, pp. 2, 48)
Durandus of St. Pourçain (PE I.1, pp. 24, 128, 129, 167; PSE, p. 66)
Duns Scotus (PE I.1, preface, p. 24; PSE, p. 66; PC, p. 2)
William of Ockham (PSE, p. 66)

4) Aristotelians

4.1) Medieval Scholastic Aristotelians

[Gabriel] *Biel* (PE I.1, 128, 129)
Eustratius (PSE, pp. 46, 66)
Psellus (PSE, p. 66)

4.2) Renaissance and Early Modern Scholastic Aristotelians

[Felice] *Accorambonus* (PSE, p. 66)
Julius *Alexandrinus* (PSE, p. 45)
Aliacensis = Pierre *d'Ailly* (PE I.1, p. 128)
Arriaga (PSE, p. 66)
Bartholin (PSE, p. 19; PC, p. 276)
Becher (PE I.1, p. 110; PC, p. 286)
[Friedemann] *Bechmann* (PE I.1, p. 128)
Bodin (PE I.1, p. 160; CPMS, p. 47)
Cabaeus (PSE, p. 46)
Caesalpinus (PE I.1, preface, pp. 26, 31, 79, 81, 85; PSE, p. 41; PC, p. 27)
Cajetan (PE I.1, p. 24)
Capreolus (PE I.1, p. 24)
Joh. *Casus* (PSE, p. 46)
Claramontius (PSE, p. 66
'Complutenses' (PE I.1, p. 155)
'Conimbricenses' (PE I.1, pp. 89, 155; PSE, p. 66)
Contaretus (PE I.1, p. 26)
Cremonini (PE I.1, preface; PSE, p. 66))
[Johann Michael] *Dilherr* (PE I.1, pp. 129, 131, 163)
Drebbel (PE I.1, p. 110)
Drejer (PSE, p. 47)
Fabri (PE I.1, preface, pp. 6, 9, 38, 40, 45, 47, 81, 92, 160; PSE, pp. 58, 59; CPMS, pp. 43, 47, 573; PC, pp. 33, 40; 248, 252, 264, 265, 266, 275, 276, 278, 285, 287)
Fonseca (PSE, p. 66)
Greydanus (PE I.1, pp. 7, 12, 84; PC, p. 40)
Heinsius (PE I.1, p. 134)
Hornius (PSE, pp. 4, 5, 32, 36, 46, 47, 55)
Jacchaeus (CPMS, p. 49; PC, pp. 7, 17, 48)
Javellus (PE I.1, p. 24)
Kobius (PE I.1, preface)
Laurent (PSE, p. 45)
Lana (PE I.1, pp. 15, 17, 18, 19, 20, 21, 45, 48, 75, 81, 153, 160; CPMS, p. 47)
Licetus (PE I.1, preface)
[Celsus] *Manzinius* (PE I.1, p. 26)

[Samuel] *Maresius* (PE I.1, preface)
[Cornelius] *Martini* (CPMS, p. 622)
Mendoza (PE I.1, p. 155; PSE, p. 66)
Montecatinus (PSE, p. 66)
Morbosius (PSE, p. 54)
Pacius (PE I.1, pp. 27, 43, 56, 57, 111, 131, 159, 160; PSE, pp. 45, 65)
[Lelio] *Pellegrino* (PSE, p. 66)
Pereira (PSE, p. 54)
Piccart (PE I.1, preface, pp. 78, 79)
[Andreas?] *Pruckner* [Prückner?] (PC, pp. 43, 263)
Redi (PSE, pp. 40, 62)
Ruvius (PE I.1, p. 89)
Scaliger (PE I.1, pp. 77, 93, 105, 156; PC, pp. 42, 43, 266)
Scheibler (PE I.1, p. 128)
Scherb (PE I.1, preface)
Scheurl (PSE, p. 71)
Slevogtius (PE I.1, p. 128)
Soncinas (PE I.1, p. 24)
'Sonchidus' = *Sonchis of Saïs* (6th BC) (PSE, p. 44)
Soner (PE I.1, preface, pp. 26, 31, 78, 79, 81, 85, 132; PSE, p. 49; PC, p. 26)
Sperling (PE I.1, preface, pp. 7, 12, 77, 89, 93, 148, 154; CPMS, pp. 35, 47; PC, pp. 3, 17, 42, 43, 48; 264, 265, 266)
De *Stair* (PE I.1, pp. 32, 33, 34, 35, 46, 47, 139, 140, 158, 160, 164, 175, 176, 177, 178; CPMS, p. 47)
Stier (PC, pp. 48, 263)
Suárez (PSE, p. 66
Taurellus (PE I.1, p. 128; PC, pp. 249, 251, 277)
Jakob *Thomasius* (PE I.1, p. 92; PSE, pp. 45, 72; CPMS, p. 622)
Toletus (PE I.1, p. 89; PSE, p. 66; PC, p. 48)
Vasquez (PSE, p. 66
Voetius (PSE, p. 38)
Wedelius (PE I.1, p. 156)
Weigel (PE I.1, pp. 57, 59, 139; PC, p. 8)
Zabarella (PE I.1, preface, pp. 6, 24, 25, 26, 237; PSE, p. 53; PC; pp. 2; 253)
Zeidler (CPMS, p. 617)
Zeisold (PSE, p. 71; PC, pp. 17, 28, 48)

5) Humanists

Agrippa (PSE, pp. 33, 45)
Lull (PE I.1, preface; PSE, p. 5)
Luther (PSE, p. 33; CPMS, p. 615)
Melanchthon (PSE, p. 39)
Casimiro Tholosanus (?) (PE I.1, p. 33)
Ramus (PSE, pp. 5, 29)
Turnebus (PE I.1, p. 51)
Valla (PSE, pp. 5, 45)
Vives (PSE, p. 5)

6) Novatores

6.1) Natural philosophers

Agricola (PSE, p. 5)
[Gaspare] *Aselli* (PC, p. 276)
Auzut (PSE, p. 23)
Basso (PE I.1, preface, p. 89)
Bernier (PE I.1, preface)
Joh. Alphonsus *Borellus* (PE I.1, pp. 60, 161; PC, p. 277)
Brahe (PE I.1, preface, pp. 123; PSE, p. 30)
Campanella (CPMS, p. 560)
[Alexandre Tineli, Abbé de] *Castelet* (PSE, p. 61)
Copernicus (PE I.1, preface)
Joh. *Dolaeus* (PE I.1, p. 157)
Fernel (PE I.1, p. 89; PC, p. 42)
Galilei (PE I.1, p. 33)
[James/David] *Gregory* (PSE, p. 23)
Grew (CPMS, p. 689; PC, pp. 262, 263, 266)
von *Guericke* (PE I.1, p. 183)
Harvey (PSE, p. 31; CPMS, p. 661)
[Moritz?] *Hofman* (PC, p. 266)
Leeuwenhoek (PE I.1, p. 22)
Stanislaw *Lubieniecki* (PE I.1, p. 123)
Magalotti (PSE, p. 62)
Malpighi (PE I.1, p. 238; PSE, p. 23; CPMS, p. 689; PC, pp. 262, 263)
[Joh. Marcus] *Marci* à Kronland = [Jan Marek] *Marci* (PE I.1, p. 156)
Mariotte (PE I.1, p. 237)
[Gottfried] *Moebius* (PC, p. 276)
Pecquet (CPMS, p. 660; PC, p. 276)
Perrault (PE I.1, preface, pp. 38, 238; PC, p. 276)
Petit (PSE, p. 23)
Regiomontanus (CPMS, p. 652)
Riccioli (PSE, p. 37)
Schott (PE I.1, p. 109)
Schuyl (PC, p. 287)
Du *Verney* (PE I.1, p. 238)
Vossius (PE I.1, preface, p. 134; PSE, pp. 5, 7, 10, 32, 44, 46, 56, 57, 58)
[Thomas] *Willis* (PE I.1, pp. 204, 238; PSE, p. 54; CPMS, p. 663; PC, p. 263, 275, 276, 278)

6.2) Seventeenth-Century Independent Philosophers

Bacon (PSE, pp. 39, 41, 42, 47, 57, 60, 68)
Digby (PE I.1, p. 16; PSE, p. 54)
Hobbes (PSE, p. 52)
Leibniz (PE I.1, indirect reference: p. 119f; explicitly: pp. 211, 236)
Newton (PE I.1, pp. 236, 238)
Pascal (PE I.1, p. 181)
Spinoza (PE I.1, pp. 146, 180)

6.3) Cartesians

Arnauld (PSE, p. 52)

6.4) Neo-Platonists/Cambridge Platonists

6.5) The Royal Society

7) Atomists

Gassendi (PE I.1, pp. 7, 9, 29, 30, 48, 51, 53, 64, 82, 83, 85, 134, 145, 207, 208, 209, 213, 214, 219, 223, 230; PSE, pp. 42, 46, 78; CPMS, p. 559; PC, pp. 25, 28, 40; 250, 265, 277, 281, 284, 288)
Lucretius (PE I.1, p. 48, 49, 50, 207; PC, pp. 25, 250)
Sennert (PE I.1, pp. 77, 89; PC, p. 42)
Sorbière (PE I.1, preface)
[Caspar] *Wyssius* (PE I.1, p. 32; PC, 6, 26, 42, 48)

8) Alchemists

Van Helmont (PE I.1, preface, pp. 156, 157, 185)
Kircher (preface, p. 109; PC, p. 265)
Paracelsus (PE I.1, preface, pp. 93, 156, 157, 185)
'Trismegistus'/Corpus Hermeticum (PE I.1, p. 153)

9) Christian Mystics

[Petrus (Pierre)] *Poiret* (pp. 138, 214, 218, 219, 222, 223; CPMS, pp. 66, 67; PC, p. 16)
Tauler (PE I.1, p. 167)

10) Theologians/Church Historians

[Johann] *Fabricius* (PE I.1, p. 128)
[Johannes] *Sleidanus* (PSE, p. 33)
[Friedrich] *Spanheim the Younger* (PSE, p. 36)
Wölffing (CPMS, p. 614)

11) Church Fathers/Apostles

Clemens of Alexandria (PSE, pp. 44, 55)
Lactantius (PE I.1, p. 207; PSE, p. 56)
Origenes (PSE, p. 56)
Paulus (CPMS, p. 603)
Theodoret (PE I.1, p. 30)

12) Unclassifiable

'Ernesto-Gothani' (PC, pp. 263, 287)
[Reiner?] *Vogelsang* (PSE, p. 52)

(α) Christian Wolff's Life and Works[614]

Christian Wolff was born on 24 January 1679 in Breslau, in Silesia (then part of Prussia). He was the second child of the family. Wolff's father, Christoph Wolff, was a tanner. His mother was Anna Giller. Wolff was raised in a Lutheran way and his father taught him Latin in order to prepare him for an academic career in theology.

From 1687 to 1699, Wolff attended the Lutheran 'Magdalenengymnasium' in Breslau where he was taught the philosophy of (*inter alia*) Averroës (1126–1198), Pedro Hurtado Mendoza (1578–1641) and Francisco Suárez (1548–1617) (Specht 2019, xix), as well as that of Johannes Scharf (1595–1660) (*Eigene Lebensbeschreibung*, 114).[615] Wolff himself reports an early interest in mathematics, algebra, and the new Cartesian philosophy.

He enrolled at the University of Jena in 1699, initially on course to obtain a degree in theology, but soon turning towards mathematics and physics. He studied with Georg Albrecht Hamberger (1662–1716), one of Johann Christoph Sturm's former students, and Johann Paul Hebenstreit (1664–1718), who had been taught by Erhard Weigel (1625–1699). Weigel had turned Jena into "a centre for mathematics and mathematical methods" (Specht 2019, xx) and Wolff's adoption of the mathematical method might not only be due to the influence of Ehrenfried Walter von Tschirnhaus (1651–1708), whom he met towards the end of his stay in Jena, but also due to the influence of Weigel and Hebenstreit (Wundt 1932, 59 n1). Hamberger, in turn, used Sturm's *Mathesis enucleata* and *Mathesis compendiaria* in teaching mathematics and Sturm's *Physica conciliatrix* in instructing in physics (Wolff, *Eigene Lebensbeschreibung*, 113; *Specht* 2019, xxiv; Biller 2018, 9).[616] Broadly speaking, the academic climate in Jena was determined by the philosophy of Weigel, Tschirnhaus, and Descartes (Specht 2019, xxx).[617] In 1702, Wolff enrolled at the University of Leipzig due to better studying conditions and obtained his *Magister* in the same year. He returned to Jena after his examination.

In 1703, Wolff was awarded the doctoral degree in philosophy by the University of Leipzig. His dissertation, the *Philosophia practica universalis*, was examined by Otto Mencke (1644–1707), editor of the *Acta eruditorum* and professor of moral philosophy. Mencke asked Gottfried Wilhelm Leibniz

614 The overall biography is based on Biller 2018, and Carboncini 2018; Hetteche 2016, Specht's (2019) commentary on Wolff's *Disquisitio philosophica de loquela*, and Wolff's intellectual autobiography (*Eigene Lebensbeschreibung*) edited by Wuttke 1841.

615 See also Neveu 2018, 59-62. For Suárez's influence on Wolff, see also Leduc 2018, 37-44. The scholastic philosophy of Johannes Scharf is discussed in Wundt 1939, 115-117.

616 Wolff himself initially used Sturm's *Physica conciliatrix* in teaching physics at the University of Halle before his expulsion (*Eigene Lebensbeschreibung*, 140).

617 For Weigel's, Sturm's, Hebenstreit's and Tschirnhaus' influence on Wolff's formative years in Jena, see also Neveu 2018, 64-70.

(1646–1716) for his opinion on the work which raised Leibniz's awareness of Wolff, resulting in a correspondence that would continue until Leibniz's death.[618]

In 1707, Wolff received a call for the position of professor of mathematics at the University of Halle. In 1709, his teaching activity was extended to metaphysics, logic and ethics. In 1715, he was permitted to teach physics (Biller 2018, 9f). Wolff's early years in Halle led to the production of his comprehensive and tremendously successful *German series* of philosophical textbooks: the *German Logic* (1713), the *German Metaphysics* (1720), the *German Ethics* (1720), the *German Politics* (1721), the *German Teleology* (1724), the *Remarks on the German Metaphysics* (1724), the *German Experimental Physics* (three vols., 1721–1723), the *German Physics* (1723), and the *German Physiology* (1725).[619]

Wolff's popularity was indeed unmatched by any of his academic peers. What is more, Wolff was soon elected to the most distinguished scientific societies of early modern Europe: the Royal Society in 1710, the Berlin Academy in 1711, the St. Petersburg Academy in 1725, the *Académie royale des sciences* in 1733, and the Academy of Bologna in 1752. However, Wolff's difficult character as well as his philosophical doctrines (*inter alia* the propagation of the mathematical method, his conception of philosophy as a universal science, his conviction that a proper ethics can be had in the absence of Christian revelation, and his adoption of pre-established harmony) led to confrontations with fellow academic philosophers, especially those of Pietist conviction: Joachim Lange (1670–1744), Johann Franz Budde (1667–1729), August Hermann Francke (1663–1727), Andreas Rüdiger (1673–1731), Adolf Friedrich Hoffmann (1703–1741), and Christian August Crusius (1715–1775). The main objections to Wolff's philosophy were that it supported determinism, or even fatalism, and atheism.[620]

The agitations of Lange and Francke, in particular, led to Wolff's expulsion from Halle in 1723. An order signed by Frederick the First, King of Prussia, forced Wolff to leave the country within forty-eight hours on pain of death by hanging.[621]

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618 For a brief survey of Leibniz's influence on Wolff, see Leduc 2018, 44-51. Leduc shows both similarities and differences between their respective philosophies. Overall, he argues for a reconsideration of the notion of 'Leibnizian-Wolffian philosophy'. For a brief survey of Wolff's deviations from Leibniz and his independent philosophical stance, see Corr 1975. Carboncini (2018, 484) mentions Leibniz's influence on Wolff as far as the latter's career planning is concerned.

619 These works went through a number of editions, as much as fourteen in the case of the *German Logic*, and ten in the case of the *German Metaphysics* (Wundt 1945, 183). I have only provided the year of the first publication of each work.

620 For a detailed discussion of Wolff's opponents and the three stages of their battle against Wolff's philosophy, see Wundt 1945, part two, chapter three (230-264). For a study of the philosophical commitments underlying Pietism, see Szyrwińska 2018, 383-425. She argues that the different conceptions of human will—radically indeterminate for the Pietists, determined by reason for Wolff—were at the heart of the clash between the Pietists and Wolff.

621 For a detailed presentation of the events concerning the *Causa Wolffiana*, see Hinrichs 1971, 388-441. See also Beck 1969, 258-261, and Zeller 1862, 47-72. Zeller traces the roots of the conflict between Wolff and the Pietists back to the different reform projects concerning religion and philosophy of Jakob Philip Spener (1635–1705) taken up by the Pietists, and Gottfried Wilhelm Leibniz taken up by Wolff. According to Zeller, these projects—aimed at restoring the intellectual life of 'Germany' after the Thirty Years War—boil down to voluntarism and lived faith on Spener's side, and intellectualism and enlightened ideas on Leibniz's side.

Wolff continued his academic career at the University of Marburg. Wolff's years here led to the production of his more thorough but less successful *Latin series*[622]: the *Philosophia rationalis sive Logica* (1728); his metaphysics now split into separate works according to the subject matter they dealt with, i.e., the *Philosophia prima sive Ontologia* (1730), the *Cosmologia generalis* (1731), the *Psychologia empirica* (1732), the *Psychologia rationalis* (1734), the *Theologia naturalis* (two vols., 1736/37) and the *Philosophia practica universalis* (two vols., 1738/39).[623] In Prussia, however, Wolff's works were banned from 1727 to 1734 (Biller 2018, 16).

In 1740, Frederick the Great ordered Wolff back to Halle. He was ennobled in 1745 receiving the title of baron (*Reichsfreiherr*). During the final years of his life, Wolff dedicated himself mostly to practical philosophy. He published his enormous eight volumes *Ius naturæ* (1740–1748), and the *Ius gentium* (1749), as well as the *Philosophia moralis sive Ethica* (five vols, 1750–1753), and the *Oeconomica* (two vols., 1754/55).[624] Wolff died of the gout on 9 April 1754 in Halle.[625]

There is hardly any other German philosopher whose philosophy has caused more conflicting sentiments in the hearts and minds of his learned readership than Christian Wolff. Ridiculed by his contemporaries for his at times lengthy writing style and his alleged return to scholasticism (among others, Voltaire, 1694–1778), condemned by his Pietist academic peers for allegedly lending support to atheism, Spinozism or immorality (Joachim Lange, 1670–1744), forgotten until recently by historians of philosophy, Wolff's reception is a troubled one. For later philosophers, such as Arthur Schopenhauer (1788–1860), the name Wolff became synonymous with boredom and causing fatigue (*Preisschrift über die Grundlage der Moral*, 223). Even Louis White Beck, a twentieth-century historian, in his *Early German Philosophy* (1969) finds Wolff's philosophy "confused" (267), his terms "equivocal" (266), his treatises "tedious" and "almost unreadable" (275) and by and large unoriginal (261). Wolff did not meet Beck's own hyperbolic ideal of genius that Leibniz and especially Kant met—a caricature of Kant, indeed, that is only possible on the basis of Beck's inability to see historical continuities from Leibniz *via* Wolff to Kant—continuities that other scholars, such as Max Wundt in his *Die deutsche Schulphilosophie im Zeitalter der Aufklärung* (1945), were able to apprehend. Strangely, the harsh criticism that Wolff was subjected to was not even confined to his

622 The Latin works failed to live up to the number of editions gone through by the German works. The *Latin* Logic, for instance, went through three editions, any other Latin work less than that (Wundt 1945, 183).

623 The *Latin Ontology* corresponds to the second chapter of the *German Metaphysics*, the *Latin Empirical Psychology* to its first and third chapter, the *Latin Cosmology* to its fourth chapter, the *Latin Rational Psychology* to its fifth chapter, and the *Latin Natural Theology* to its sixth chapter. Wundt (1945, 182, 191, 212) remarks that Wolff's change of the order of these works—the *Cosmology* preceding the *Empirical Psychology*—was inspired by Wolff's own student Ludwig Philipp Thümmig, realised in the latter's *Institutiones philosophiæ Wolffianæ* (two vols., 1725/1726). Carboncini (2018, 488) notes that while the German works are "short and concise" written for the "German audience which consists of beginners in philosophy", the Latin works are "meticulous and arguing in a technical way" written for "the European learned people, for the universities all over the world and for the Church."

624 The *Ius naturæ* and the *Ius gentium* were published in an abridged form in 1750 as the *Ius naturæ et gentium*.

625 Beck (1969, 261) mentions gout as the cause of Wolff's death.

philosophy. Voltaire mocked his looks, affronting him as an “enormous” monad. Beck attests him simple-mindedness (1969, 272) and a lack of “sensitivity and taste” (ibid., 278). He vituperates Wolff as “prosy, pretentious, [and] slightly comical” (ibid., 275).

On the other hand, Wolff was venerated as “The Teacher of Germany” (*Præceptor Germaniæ*)—a title previously attested to Philipp Melanchthon (1497–1560)—and the “Professor of the Whole of Mankind” (*Professor totius generis humani*). Kant praised him as “the greatest of all dogmatic philosophers,” “the founder of the not yet extinct spirit of thoroughness in Germany” (*Urheber des bisher noch nicht erloschenen Geistes der Gründlichkeit in Deutschland*) and praised his strict method (*Critique of Pure Reason*, B XXXVI, p. 36). The Philosopher-King Frederick the Great wished to have one of his most favourite philosophers back after his own father had expelled Wolff from Prussia.

Wolff was systematic in a way not many philosophers were before him. He was a polymath publishing on almost every subject of human knowledge. He was one of the first to teach in the vernacular in Germany. He was the founder of the German philosophical vocabulary (Beck 1969, 261) and “thought to be the first man to teach the calculus in Germany” (ibid., 257). At the peak of his popularity, German universities were competing to hire Wolff and were willing to pay him a salary according to his own wishes.

His influence on the later development of German philosophy can hardly be overstated. He not only trained philosophers such as Ludwig Philipp Thümmig (1697–1728), Georg Bernhard Bilfinger (1693–1750) and Johann Christoph Gottsched (1700–1766).[626] What is more, the work of philosophers such as Alexander Gottlieb Baumgarten (1714–1762), Immanuel Kant (1724–1804), Johann Gottlieb Fichte (1762–1814), Georg Wilhelm Friedrich Hegel (1770–1831), Friedrich Wilhelm Joseph Schelling (1775–1854), and Arthur Schopenhauer (1788–1860) evolved at least in part from engaging with, adopting elements of, and arguing against Wolff’s philosophy.[627]

Furthermore, Wolff was among the mostly widely read philosophers in and outside Europe of his time. His works were studied in Protestant and Catholic countries alike as well as in North-and South America. They were reprinted several times and translated into several languages (French, English, Italian, Dutch, Russian, Spanish, etc.). He inspired and served as a source for the project of the Encyclopedists and for the political ideas of the US founding fathers.[628] Arguably, his influence on the philosophical and intellectual development of Eastern and South-Eastern early modern Europe is unrivalled (Mühlpfordt 2001).

626 For the reception of Wolff’s philosophy in the German universities of the eighteenth century, see Wundt 1945, part two, ch. 2; Albrecht 2018, 427-465.

627 For the influence of (for example) Wolff’s ontology on Baumgarten, Kant, and Hegel, see Effertz 2018, 150f.

628 See Carboncini 2018, 467-495. Carboncini goes so far as to claim that Wolff was “the most productive philosophical writer of all times” as well as the most successful one (ibid., 471f).

The last couple of decades have seen an increase in Wolff scholarship. Finally, he has been taken seriously and thus subjected to unemotional, impartial and critical historical research. The two most significant interpretative strands—as Christian Leduc (2018, 36) rightly remarks—have stressed Wolff's continuity with scholasticism and his engagement with Leibniz. Indeed, "Leibnizian-Wolffian philosophy" is a much-used label in contemporary academic discussions. However, what has been overlooked is Wolff's early intellectual development as well as his standpoint(s) concerning philosophical positions that one might rashly put aside as outliers. Occasionalism is a case in point.

(α) The Lives and Main Works of Seven Eighteenth-Century German Philosophers

(1) Georg Bernhard Bilfinger (1693–1750)[629]

Georg Bernhard Bilfinger was born in Cannstatt (close to Stuttgart) on 23 January 1693. His father was a Lutheran superintendent. Bilfinger attended convent schools in Blaubeuren (close to Ulm), and Bebenhausen (close to Tübingen), as well as the *Tübinger Stift* when he was seventeen years old. At the University of Tübingen, he studied theology, philosophy, and mathematics. He obtained academic degrees in philosophy and theology in 1711 and 1713, respectively. Enchanted by Leibniz's and Wolff's philosophy, Bilfinger left everything behind, including his fiancée, to study with Wolff himself in Halle in 1717. Returning in 1719, Bilfinger was given an unpaid position as an adjunct professor in philosophy at the University of Tübingen. In 1721, he presented his inaugural dissertation defending pre-established harmony, the *Dissertatio de harmonia animi et corporis humani maxime præstabilita (Dissertation on the Most Pre-established Harmony of the Soul and the Body*), which would be published in an extended form in 1723. It would later (in 1734) be placed on the *Index Librorum Prohibitorum*. Also in 1723, Bilfinger became ordinary professor of ethics and mathematics at the *Collegium Illustre*, a public school for the education of the nobility in Tübingen. In 1725, he published his main work, the *Dilucidationes philosophicæ anima humana, mundo, et generalibus rerum affectionibus* (*Philosophical Elucidations on God, the Human Soul, the World and the General Affections of Things*). He continued his academic career as professor of mathematics and physics in Russia at the newly opened academy of St. Petersburg. Christian Wolff himself had recommended him. His philosophical work during his Russian years engages extensively with (experimental) natural philosophy. An article on the physical cause of gravity, the *De causa gravitatis physica generali disquisitio experimentalis* (*Experimental Investigation concerning the General Physical Cause of Gravity*), even won him an award of the *Académie Royale des Sciences* in Paris in 1728. Bilfinger returned to Germany in 1731 and worked as professor of theology at the University of Tübingen and as professor of natural philosophy and measuring at the *Collegium Illustre*. In 1734, he swapped his career in academia for a career in politics at the court of the duke of Württemberg. Bilfinger died on 18 February 1750 in Stuttgart.

629 This biography is based on Kapf 1905, 279-283; Schmid 1939; Kintrup 1974, 27f, and Klemme & Kuehn 2010/2012, 225-229. An account of Bilfinger's works can be found in Schmid 1939; Liebing 1961, ch. 2; and Klemme & Kuehn 2010/2012, 229.

(2) Ludwig Philipp Thümmig (1697–1728)[630]

Ludwig Philipp Thümmig was born in Helmbrechts (in Upper Franconia close to Hof) on 12 May 1697. His father was the local pastor. Despite growing up in poverty, his mother managed to have him study at the lyceum in Kulmbach, and from 1712 onwards attend the *Fürstenschule* in Heilsbronn. Later in 1717, he began to study at the University of Halle and became a student and protégé of Christian Wolff. Thanks to Wolff's support, Thümmig became extraordinary professor in the faculty of philosophy at the University of Halle in 1723. However, since Thümmig's fate depended on that of his master, he lost this position when Wolff was expelled from Prussia in the same year. Once more, Wolff provided Thümmig with a position as professor of philosophy at the *Collegium Carolinum* in Kassel in 1724. In 1725/26, Thümmig published his most influential work, the *Institutiones philosophiæ Wolffianæ* (*Foundations of Wolffian Philosophy*)—a textbook on the whole of Wolff's philosophy in a condensed form. Thümmig's work not only bridged Wolff's *German* and *Latin series* but inspired changes in the arrangement of Wolff's later *Latin series* itself (Wundt 1945, 212-214, Klemme and Kuehn 2010/2012, 1629f). Moreover, the *Institutiones* were used by fellow Wolffians, such as Gottsched, for teaching at university level. Thümmig died on 15 April 1728 in Kassel, only thirty years of age.

(3) Johann Christoph Gottsched (1700–1766)[631]

Johann Christoph Gottsched was born in Judditen (close to Königsberg) on 2 February 1700. His father worked as a parson. In 1714, Gottsched commenced his studies at the University of Königsberg, where he obtained a master's degree in 1719. It was here that Gottsched was introduced to Wolff's philosophy by Georg Rast (Wundt 1945, 208). In order to escape recruitment by the Prussian army, Gottsched went to Leipzig. He started teaching at the University of Leipzig in 1725 and became adjunct professor of poetry in 1729 (Wundt 1945, 204).[632] In 1733/34, Gottsched published his main work, the *Erste Gründe der gesammten Weltweisheit* (*First Grounds of the Whole of Philosophy*) (two vols.) which went through eight editions (Wundt 1945, 216). In 1734, he became ordinary professor of logic and metaphysics at the University of Leipzig. Later in the 1740s, Gottsched published a German translation of Pierre Bayle's *Dictionnaire Historique et Critique (Historical and Critical Dictionary*). In 1747, Gottsched also published a German translation of Pieter van Musschenbroek's (1692–1761) *Elementa physicæ* (*Elements of Physics*).[633] Gottsched died on 12 December 1766.

630 This biography is based on Klemme & Kuehn 2010/2012, 1628-1631. An account of Thümmig's works can be found in Klemme and Kuehn 2010/2012, 1631.

631 This biography is based on Klemme & Kuehn 2010/2012, 638-643. A selection of Gottsched's works can be found in Klemme and Kuehn 2010/2012, 643.

632 For Gottsched's career as a university professor in Leipzig, see Marti 2014, 269-292.

633 For a general discussion of Gottsched's edition of van Musschenbroek's physics, see Steinmann 2014, 379-385. For van Musschenbroek's natural philosophy in the context of eighteenth-century German physics textbooks and education in natural philosophy, see Lind 1992, ch. 5.1.

Throughout his life, Gottsched was not only concerned with philosophy, but also linguistics, literature, poetry and theatre. His most prominent work in this regard is perhaps his *Versuch einer Critischen Dichtkunst* (*Essay on a Critical Art of Poetry*) (1729) as well as his play *Sterbender Cato* (*Dying Cato*) (1731). In fact, Gottsched features more prominently in German language and literature studies than in philosophy.[634]

(4) Martin Knutzen (1713–1751)[635]

Martin Knutzen was born in Königsberg on 14 December 1713. His father was a merchant. Knutzen's family was rather poor and his parents died very early. His mother died two months after giving birth and his father passed away when Knutzen was five or six years old. While Knutzen's life did not start well, his relatives, who raised him, made sure he received a proper education. He attended the parochial school, and, as early as 1728, he attended the University of Königsberg.[636] He studied philosophy and mathematics with Christian Friedrich Ammon (1696–1742), physics with Johann Gottfried Teske (1704–1762), and theology with Abraham Wolff (1680–1731) and Franz Albert Schultz (1692–1763). Knutzen also attended *collegia* in history and philology, even studying oriental languages. In 1733, he received his master's degree. In 1734/35, Knutzen was made adjunct professor of logic and metaphysics. He would become one of Kant's most influential teachers. In 1735, he published his most important philosophical work, the *Commentatio philosophica de commercio mentis et corporis per influxum physicum explicando* (*Philosophical Commentary on the Interaction of the Mind and the Body Explained through Physical Influx*), which was republished in 1745 under the title of *Systema causarum efficientium (System of Efficient Causes*). In 1740, he published his main theological piece, the *Philosophischer Beweis von der Wahrheit der christlichen Religion* (*Philosophical Proof of the Truth of the Christian Religion*). He also published a number of less-known treatises dedicated to physics and mathematics, such as his *Vernünftige Gedanken von den Cometen* (*Reasonable Thoughts on Comets*) in 1744. In the same year, Knutzen was made an adjunct of the royal library and superintendent of the university college. Soon thereafter, Knutzen married the daughter of a merchant from Königsberg. In 1747, he published his main work on logic, the *Elementa philosophiæ rationalis seu Logicæ* (*Elements of Rational Philosophy or Logic*). He died at the age of thirty-seven on 29 January 1751.

634 See Otto's (2014, 407-461) bibliography of works on Gottsched from 1985 to 2012.

635 This biography is based on Erdmann 1876, 48-54; Klemme & Kuehn 2010/2012, 922-925. An account of Knutzen's works can be found in Erdmann 1876, 52-54.

636 While Erdmann (1876, 49) gives 1728 as the matriculation date, Klemme and Kuehn (2010/2012, 922) give 1726 which seems very early.

(5) Alexander Gottlieb Baumgarten (1714–1762)[637]

Alexander Gottlieb Baumgarten was born on 17 June 1714 in Berlin. He was the youngest of his five brothers. His father was a military chaplain. Baumgarten's parents died while he was still a child. His mother died when he was three years old and his father died when he was eight. Consequently, Baumgarten was raised by his grandmother. A former colleague of his father's also took care of him. He was first taught by Martin Christgau (1697–1776) who introduced him not only to Latin poetry but also Hebrew. The most influential figure concerning Baumgarten's intellectual formation, however, was no doubt his oldest brother Siegmund Jakob (1706–1757) and Baumgarten followed him to Halle in 1727, where Siegmund Jakob was the principal at August Hermann Francke's (1663–1723) orphanage. Baumgarten then attended the school associated with the orphanage. In autumn of 1730, Baumgarten began to study at the University of Halle. He read theology with Joachim Justus Breithaupt (1658–1732), Joachim Lange (1670–1744), Johannes Liborius Zimmermann (1702–1734), and Gotthilf August Francke (1696–1769) as well as classical languages with Johannes Heinrich Michaelis (1668–1738). He also undertook studies in oriental languages under Christian Benedikt Michaelis (1680–1764) and Johann Heinrich Schulze (1687–1744). He was taught philosophy by his brother Siegmund Jakob. Upon visiting the University of Jena, Baumgarten also attended lectures by Johann Peter Reusch (1691–1758), Jakob Carpov (1699–1768), Heinrich Köhler (1685–1737) and Georg Erhard Hamberger (1697–1755).[638] Despite his Pietist intellectual environment, Baumgarten soon began engaging with Wolffian philosophy. In 1735, Baumgarten obtained his master's degree with his *Disputatio chorographica inauguralis notiones superi et inferi indeque adscensus et descensus in chorographiis sacris occurentes, evolvens* (*Chorographical Inaugural Disputation Clarifying the Notions of High and Low and then Ascent and Descent Occurring in the Sacred Chorographies*). Baumgarten then started lecturing philology and logic (following Wolff) at the University of Halle. In 1737, he was made adjunct professor. In 1739, he published the first of his two main works, the *Metaphysica* (*Metaphysics*), which—as is well known—Immanuel Kant (1724–1804) later used to teach metaphysics at the University of Königsberg. Around Easter of 1740, Baumgarten left Halle to teach philosophy at the University of Frankfurt a. d. Oder giving in to the king's wish. In 1741, Baumgarten married, but his wife—the daughter of the privy counsellor Aleman in Berlin—died soon thereafter in 1745. Baumgarten remarried in 1748. Two of his children with his second wife Justina Elisabeth Albinus outlived their father. In 1750, Baumgarten published the first part of his second main work, the *Aesthetica* (*Aesthetics*), the second (partial) volume of which was published in

637 This biography is based on G. F. Meier 1763; Abbt 1765; Klemme and Kuehn 2010/2012, 161-165. A short summary of Baumgarten's life can also be found in Fugate's and Hymer's introduction to their translation of Baumgarten's *Metaphysics*, 5-8.

638 For the philosophical history of the University of Jena, see Wundt 1932. For the period of the Enlightenment, see ibid., ch. 2. Georg Friedrich Meier (1763) only mentions the surnames of Baumgarten's professors. And so does Abbt (1765). I deem it most likely that we are dealing here with Georg Erhard Hamberger, professor of mathematics and physics at the University of Jena. For G. E. Hamberger, see Lind 1992, ch. 4.4.

1758. In 1752/53, Baumgarten held the post of rector of the university. He died on 27 May 1762 as a consequence of a stroke which he had suffered seven days earlier. Baumgarten had a significant influence on later thinkers, especially Kant, and he is often regarded as the founder of aesthetics as a scientific discipline—perhaps together with his most prominent student Georg Friedrich Meier (1718–1777).

(6) Gottfried Ploucquet (1716–1790)[639]

Gottfried Ploucquet was born in Stuttgart on 25 August 1716. His father was a barkeeper. Ploucquet was born into a family of French Protestant emigrants who had to leave their home country to avoid religious oppression after the Edict of Nantes had been revoked in 1685 by Louis XIV. As a pupil, Ploucquet attended the ducal gymnasium in Stuttgart. In 1732, at the age of sixteen, Ploucquet enrolled at the University of Tübingen. He was taught logic and metaphysics by Daniel Maichel (1693–1752), practical philosophy by Johann Eberhard Rösler (1668–1773), and rhetoric and poetry by Israel Gottlieb Canz (1690–1753), who recommended Wolff's philosophy to Ploucquet and made a lasting impression on his student (Aner 1909, 5f). Ploucquet went on to study theology with Christian Hagmajer (1680–1746), Christian Eberhard Weissmann (1677–1747), and Christoph Matthäus Pfaff (1686–1760) (Aner 1909, 9-11). In 1738, Ploucquet left the university and worked as a vicar in small towns in Württemberg. In 1743, he accepted a position as parish of Rotenberg and married Christine Magdalene Ebel, the daughter of the priest of Frauenzimmern. They had seven children, only three of whom outlived their father. The most famous one was Gottfried Wilhelm Ploucquet (1744–1814), who later became professor of medicine at the University of Tübingen. In 1746, Ploucquet (senior) became the deacon of Freudenstadt in the Black Forrest. In 1747, his *Primaria monadologiæ capita accessionibus quibusdam confirmata et ab obiectionibus fortioribus vindicata* (*The First Chapters of the Monadology Confirmed through some Supplements and Defended against more Forceful Objections*) won the essay prize competition of the Berlin Academy.[640] He became an external member of the Academy, along with Bilfinger, in 1749. A year later, Ploucquet returned to academia being appointed to the chair of logic and metaphysics at the University of Tübingen. In 1753, he published his first main work, the *Principia de substantiis et phænomenis* (*Principles concerning Substances and Phenomena*). In 1763, Ploucquet presided over the University of Tübingen as rector. Suspending his university duties from 1778 to 1779, Ploucquet taught at the military academy in Stuttgart. Here, Friedrich von Schiller (1759–1805) was one of his pupils. In 1782, Ploucquet suffered a stroke that

639 This biography is based on Schlichtegroll 1791, 249-261; Bornstein 1898, 4-9; Aner 1909, 3-16; Klemme and Kuehn 2010/2012, 1242-1246. An overview and discussion of Ploucquet's works can be found in Bornstein 1898, 10-14. A bibliography of Ploucquet's works can also be found in Franz 2005, 65-69.

640 In fact, Ploucquet shared the prize with Johann Heinrich Gottlob Justi (1717–1771). While Justi argued against the existence of monads, Ploucquet argued in favour of their existence (Neumann 2009, in Neumann 2009, 211, 218). For an analysis of Ploucquet's essay as well as the circumstances of the essay prize competition, see Neumann 2009 (in Neumann 2009), pp. 203-270.

ended his academic career. He died on 13 September 1790 due to a second stroke (Franz and Pozzo 2005, 43).

While Plocuquet did not have any prominent university students, his last textbook on logic and metaphysics—the *Expositiones philosophiæ theoreticæ* (*Expositions of Theoretical Philosophy*) (1782)—was used to teach Friedrich Hölderlin (1770–1843) and Georg Wilhelm Friedrich Hegel (1770–1831) (Franz and Pozzo 2005, 39-64; Klemme and Kuehn 2010/2012, 1243). Furthermore, Ploucquet had engaged in debates over logic with Johann Heinrich Lambert (1728–1777) and argued against Kant's *Der einzig mögliche Beweisgrund zu einer Demonstration des Daseyns Gottes* (*The Only Possible Argumentative Foundation for a Demonstration of God's Existence*) (1763).

(7) Immanuel Kant (1724–1804)[641]

Immanuel Kant was born in Königsberg (Prussia) on 22 April 1724. His father was a master saddler and his mother was the daughter of one. Kant also had three sisters and one brother. Due to the Pietist inclinations of his mother, Kant attended the *Collegum Fridericianum*, a Pietist institution, from 1732 to 1740 for his secondary education. During his stay at the *Fridericianum*, Kant developed a passion for ancient Roman classics (Borowski 1804, 25). In 1740, Kant enrolled at the University of Königsberg. He studied philosophy and mathematics with Martin Knutzen, physics with Johann Gottfried Teske, and theology with Franz Albert Schultz. Knutzen, however, was apparently Kant's favourite teacher (Borowski 1804, 29). From 1748 to 1754, Kant earned his living as a private teacher. Returning to the University of Königsberg in 1755, he then obtained his master's degree. His master's thesis was the *Meditationum quarundam de igne succincta delineatio* (*Concise Outline of Some Reflections on Fire*) (1755). The *Principiorum primorum cognitionis metaphysicæ nova dilucidatio* (*A New Elucidation of the First Principles of Metaphysical Cognition*), which he defended three and a half months later, won him the *venia legendi* (Rohlf 2020, 4). A year later, he published the *Monadologia physica* (*Physical Monadology*). Kant soon started teaching at the University of Königsberg.

Lecturing on logic, he used G. F. Meier's *Auszug aus der Vernunftlehre* (*Compendium of Logic*). For metaphysics, Kant relied first on Baumeister; then on Baumgarten's *Metaphysica* (*Metaphysics*). For physics, he used Eberhard's *Erste Gründe der Naturlehre* (*First Grounds of Physics*) and for mathematics Wolff's textbooks (Borowski 1804, 33).[642] Despite Kant's reception of eighteenth-century

641 This biography is mainly based on Borowski (1804), whose biography was revised and corrected until the year 1792 by Kant himself. Borowski was both Kant's student and friend. An overview and discussion of Kant's works can be found in Borowski 1804, 41-82. I also used the recent entry on Kant in Klemme and Kuehn 2010/2012, pp. 878-882, as well as Rohlf's entry on "Immanuel Kant," in the *Stanford Encyclopedia of Philosophy* (2020), section 1. See also Beck 1969, 430-438. The translation of the titles of Kant's Pre-Critical works follows by and large the Cambridge Edition of his *Theoretical Philosophy 1755 – 1770*.

642 Kant's use of Meier's *Logic* is mentioned by Schaffrath (1940, 97). Kant's use of Baumgarten's *Metaphysics* is mentioned inter alia by Fugate and Hymers (2013, 22), Watkins (2005, 74), and Cassirer (2007 [1932], 354). Kant's use of Eberhard's *Physics* is mentioned by Klemme and Kuehn (2010/2012, 436). Wolff's mathematical works which Kant possessed are the *Foundations of Universal Mathematics* (*Elementa*

German philosophers, he was also inspired by British thinkers such as Francis Hutcheson (1694–1747) and David Hume (1711–1776) as well as the Swiss thinkers Jean-Jacques Rousseau (1712–1778) and Johann Heinrich Lambert (1728–1777) (Rohlf 2020, 5, 8). Kant also taught natural law, moral philosophy, natural theology and later anthropology as well as physical geography (Borowski 1804, 34). In 1763, he published his *Der einzig mögliche Beweisgrund zu einer Demonstration des Daseyns Gottes* (*Only Possible Argumentative Foundation for a Demonstration of God's Existence*) which was soon criticised by Ploucquet among others. In 1766, Kant argued against Emanuel Swedenborg (1688–1772) in his *Träume eines Geistersehers* (*Dreams of a Spirit-Seer*). Despite all his earlier efforts, Kant only became ordinary professor for logic and metaphysics in 1770. On this occasion, he presented his inaugural disputation, the *De mundi sensibilis atque intelligibilis forma et principiis* (*On the Form and Principles of the Sensible and the Intelligible World*). Despite offers from other universities, such as Halle, Jena, Erlangen and Mitau, Kant remained at the University of Königsberg for the rest of his life. In the years from 1771 to 1781, the period between what are commonly referred to as 'the pre-Critical period' and 'the Critical period', Kant "published almost nothing," which is why this interval of Kant's life is oftentimes referred to as "the silent years" (Klemme and Kuehn 2010/2012, 878).

In 1781, Kant presented to the world the first result of his new Critical philosophy, to wit, the *Kritik der reinen Vernunft* (*Critique of Pure Reason*). The two other main works of his Critical philosophy are, of course, his *Kritik der praktischen Vernunft* (*Critique of Practical Reason*) (1787), and the *Kritik der Urteilskraft* (*Critique of Judgement*) (1790). In 1786 and 1788, Kant was made the rector of the university. In the meantime (in 1787), he had also become a member of the Berlin Academy. Due to his declining health, Kant stopped teaching in 1796, though he continued publishing works such as the *Anthropologie in pragmatischer Hinsicht* (*Anthropology from a Pragmatic Point of View*) (1798). He died on 12 February 1804.

Setting aside the initial hesitation and even dismissal that Kant's Critical philosophy received amongst his contemporaries, his philosophy was influential like hardly any other. It influenced Fichte (1762–1814), Hegel (1770–1831), Schelling (1775–1854) (see Klemme and Kuehn 2010/2012, 881), as well as Schopenhauer (1788–1860), and the German philosophical scene of the nineteenth and early twentieth century as a whole. Kant's placement among other German university professors, however, should also make it clear that he did not start from nothing but took his inspiration from his colleagues whose textbooks he studied, used, cherished and criticised. Kant's originality notwithstanding, he is a child of his own time just like the other philosophers studied in this dissertation.

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matheseos universæ), and the *Foundations of All Mathematical Sciences* (*Anfangs-Gründe aller Mathematischen* Wissenschaften) as well the abridged version thereof (*Auszug aus den Anfangs-Gründen aller Mathematischen Wissenschaften*), see Warda 1922, 40. Borowski only mentions Kant's reliance on these authors in the aforementioned disciplines, but not their precise works. I am grateful to Stephen Howard for bringing to my attention Warda's work.

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SAMENVATTING

Deze dissertatie analyseert de rol die occasionalisme speelt in het formuleren van filosofische grondslagen in vroeg moderne natuurfilosofie. Occasionalisme is de leer die, in zijn meest sterke en universele formulering, volhoudt dat alleen God causale kracht heeft, en dat eindige wezens, over het algemeen zowel geesten alswel lichamen, volledig passief zijn. De historische en conceptuele focus ligt op de verspreiding van occasionalisme in het vroegmoderne Duitsland. Naast dat er wordt gekeken naar de relatie tussen occasionalisme en het bieden van grondslagen, geeft deze dissertatie een uitleg over waarom occasionalisme—*en vogue* in de continentale filosofie van de tweede helft van de zeventiende eeuw—langzaam verdween binnen achttiende-eeuwse Duitse filosofie. Deze dissertatie stelt vast dat deze verandering gebeurde omdat occasionalisme er meer en meer verouderd uit kwam te zien gegeven het groeiende belang van causale—en niet metafysische—verklaringen.

Het eerste hoofdstuk van deze dissertatie kan gezien worden als het voorspel dat zal leiden tot Duits occasionalisme, aangezien het hoofdstuk ingaat op de meer bekende Géraud de Cordemoy (1626–1684). Cordemoy was een van de grote vroegmoderne occasionalisten en hij was zeer invloedrijk in het Duitse debat dat zou volgen. Dit hoofdstuk legt voor dat Cordemoy, om zijn ambitieuze project om de menselijke wereld te deconstrueren en reconstrueren te funderen, occasionalisme gebruikte. Cordemoy reduceert staten tot steden, steden tot families en deze, uiteindelijk, tot de individuele burger. Metafysisch bezien zijn de burgers in hun menszijn opgebouwd uit simpele en ondeelbare geesten en functioneel georganiseerde materie. Materie is op zijn beurt afhankelijk van de schikking van atomen, of ‘lichamen’, zoals Cordemoy ze noemt—simpele, ondeelbare en verenigde materiele deeltjes. Na deze deconstructie van de menselijke realiteit, vormt occasionalisme de grondslag voor haar reconstructie: om de interactie en verbinding tussen lichamen, lichamen (en materie) en geesten, verscheidene geesten, en (wellicht) de geest en haar denken, te verklaren, gebruikt Cordemoy occasionalisme. Taal is het cement van de sociale en politieke realiteit en occasionalisme verklaart de causale dynamiek die de grondslag voor taal vormt. Naast een meer filosofische motivatie, laat ik zien dat Cordemoy’s occasionalisme ook politiek gemotiveerd is, namelijk ter ondersteuning van de absolute heerschappij van Louis XIV. Occasionalisme maakt mensen machteloos in hun causaal agentschap en ondersteunt daarmee ook het politiek machteloos maken van mensen onder het bewind van een absolute heerser.

Het tweede hoofdstuk maakt de stap naar de Duitse context door Johann Christoph Sturm (1635–1703) onder de loep te leggen. Gedreven door zijn eclectische benadering tot filosofie probeert Sturm Aristotelische scholastiek en de nieuwe Cartesische filosofie met elkaar te verzoenen. Breed bezien identificeert Sturm drie elementen die van belang zijn voor het formuleren van een geslaagde natuurfilosofie: (Cartesisch) mechanicisme, occasionalisme, en doelgerichtheid. Sturm herinterpreteert de scholastieke tweedeling tussen materie en vorm door vormen (die als passief worden gelabeled) te reduceren tot enkel modificaties van materie: aangezien materie volledig passief is, zo ook haar

modificaties. De materiele wereld behoeft een voldoende grondslag ter verklaring van haar doorlopende bestaan voor hoe ze verandert over de tijd heen. Sturm laat zien dat deze grondslag enkel God kan zijn. Hij bewaart de wereld in haar bestaan en brengt veranderingen in de wereld aan *via* lokale bewegingen. Sturm gebruikt ter verdediging van occasionalisme niet alleen (wat ik zal noemen) zijn *argument van spatio-temporele grondslagen* (*argument of spatio-temporal grounding*), maar ook argumenten die komen van zijn Franse occasionalistische voorgangers, bijv., Cordemoy. Sturm geargumenteert, in tegenstelling tot Descartes, dat alles in de wereld (of ze dat nu weten of niet) handelt ten behoeven van—of, eigenlijk, op wordt op gehandeld ten behoeven van—bepaalde doelen.

In het derde hoofdstuk ligt de aandacht op Christian Wolff (1679–1754); eerst ondersteunt hij occasionalisme in zijn *Disquisitio philosophica de loquela* (1703), waarop twijfels volgen die worden opgerakeld door Leibniz in zijn briefwisseling met Wolff en ten slotte kijken we naar hoe de volgroeide Wolff occasionalisme verwerpt. De jonge Wolff had een occasionalistische verklaring voor hoe taal werkt zich eigen gemaakt in zijn vroege academische disputatie—een verklaring die erg lijkt op wat we vinden in Cordemoy's *Discours physique de la parole*. Toen Wolff aan Leibniz een kopie van zijn dissertatie stuurde, verwees Leibniz Wolff naar zijn eigen werk, waarin hij kritisch is over occasionalisme, in een poging om Wolff occasionalisme te laten vallen. Met Leibniz' twijfels in het achterhoofd, welke van invloed zouden zijn op Wolff's filosofische ontwikkeling, laat Wolff te zijner tijd occasionalisme vallen. For de volgroeide Wolff is occasionalisme slecht te verenigen met een wetenschappelijke verklaring van de natuur. Dat is omdat, volgens Wolff, occasionalisme zowel te veel steunde op de gebrekkige Cartesische natuurkunde en omdat occasionalisme de verbinding tussen efficiënte oorzaak, kracht, en toereikende grond, doorknipt. Door natuurlijke zaken te ontdoen van hun capaciteit om te handelen blijft voor occasionalisme alleen God over als de efficiënte oorzaak en dus ook, enige toereikende grond, voor veranderingen in de natuur. Wolff zag dit als een schending van het principe van de toereikende grond en als schending van een genaturaliseerde en wetenschappelijke verklaring van natuur. Zodoende verwerpt de volgroeide Wolff occasionalisme om kentheoretische redenen.

Het vierde en laatste hoofdstuk bekijkt de teloorgang van occasionalisme in het achttiende-eeuwse Duitsland door te kijken naar een verzameling van zeven invloedrijke filosofen. Wolffianisme was het dominante academische kamp op dit moment, dus ze zijn allemaal in meer of mindere mate van Wolffiaanse afkomst: Georg Bernhard Bilfinger (1693–1750), Philipp Thümmig (1697–1728), Johann Christoph Gottsched (1700–1766), Martin Knutzen (1713–1751), Alexander Gottlieb Baumgarten (1714–1762), Gottfried Ploucquet (1716–1790), en (de pre-Kritische) Immanuel Kant (1724–1804). In elk van deze auteurs, behalve de vroege Ploucquet, vinden we een kritische houding ten overstaan van, en een marginalisatie van, occasionalisme. Wat deze filosofen betreft faalt occasionalisme, omdat het niet een genaturaliseerde en immanente verklaring van de natuur kan brengen, en daarmee, geen waarlijk filosofische verklaring is. Door de voorkeur te geven aan causale verklaringen in plaats van

metafysische verklaring, wordt occasionalisme buiten spel gezet omdat het dit eerste niet kan leveren. Bezijden deze interne redenen, laat ik zien dat de sceptische attitude tegen metafysische speculatie die bestond buiten de universiteiten ook mogelijk heeft bijgedragen aan de ondergang van occasionalisme.

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I first encountered this strange and yet fascinating doctrine called *occasionalism* when I attended Thomas Sattig's lectures on contemporary philosophy of mind at Tübingen University. During the course we read a couple of chapters from Jaegwon Kim's great textbook *Philosophy of Mind*. Occasionalism features very briefly in the fourth chapter (on page ninety-six) alongside Cartesian interactionism, and Leibnizian preestablished harmony. Upon re-reading the short sketch I now realise that Kim simply takes for granted an interventionist reading of occasionalism, and even slightly satirises occasionalism believing that God's causal role were "rather like that of the leprechaun in the clock shop" continuously adjusting, or synchronising mental and physical states. Back then, in the summer semester of 2013—I was still a Bachelor's student—Kim's account just left me unsatisfied. Unintentionally, he had created a somewhat mystic air around this long-forgotten causal doctrine. Yet, had someone told me that this would become a future area of my research, or even the topic of my PhD dissertation, I would have given that person a strange look.

It would take another three years before I would get back to occasionalism, and before I would read some occasionalist texts first hand for the first time. As a Master's student at the University of Edinburgh, I attended Pauline Phemister's seminars on *Mind and Body in Early Modern Philosophy*, and *Reason and Experience: Seventeenth Century Philosophy*. Pauline not only taught me a great deal —including how to radically cut down ones own texts—but she also encouraged me to write a Master's dissertation on a non-canonical occasionalist author who would occupy my mind for the time to come: Gérauld de Cordemoy. Finally, Pauline was not only immensely supportive when I first drafted a PhD project on occasionalism, she also recommended applying to a PhD position at the University of Groningen which would make it possible to work with an absolute expert on the topic: Andrea Sangiacomo.

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