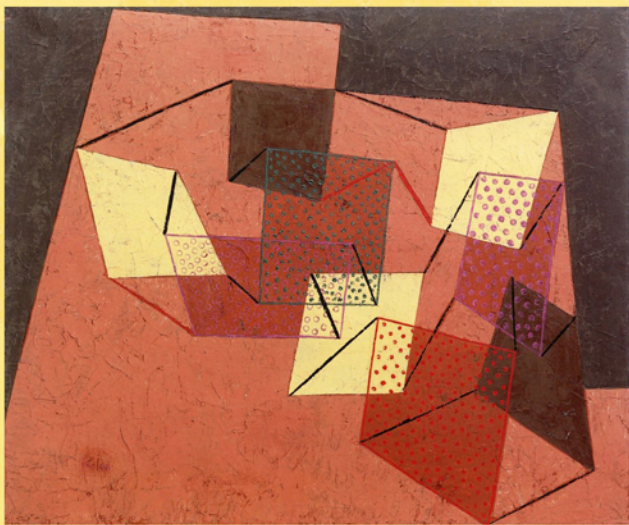


The Interpretation of Early Modern Philosophy



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The view that no substance is relative—a view that is commonly held—would appear to be open to question.

—Aristotle, *Categories*, 7 (8a13-16)

All things can be arranged serially in various groups [...] everything, with regard to its possible usefulness to our project, may be termed "absolute" or "relative".

—Descartes, *Regulae*, 6.

The Ideas then of Relations are capable at least of being more perfect and distinct in our Minds, than those of Substances.

—Locke, *An Essay Concerning Human Understanding*, II, 25, 8.

In some domains, such as perceptual and motor systems, one assumes that the cognitive processes at work are essentially invariant across the human species. In other domains, it has been standard to assume that the cognitive system can vary across populations in arbitrary ways. This has been the normal view about social and cultural cognition, at least until recently. Language demonstrates something in between: striking superficial diversity that can be reduced to a small number of discrete factors within a universal matrix. This is a model of cognitive architecture that should be kept in mind when studying other aspects of human culture.

—Mark. C. Baker, *Linguistic differences and language design*.

CHAPTER ONE*

THE INTERPRETATION OF EARLY MODERN PHILOSOPHY

What is early modern philosophy? That is, taking the standard periodization of early modern philosophy as given¹, what gives it intellectual unity? There have been a number of attempts (from Kant to the present) to answer this question, and by doing so to draw a coherent picture of what might be called (in more contemporary language) the early modern "paradigm", if we are to assume that such a thing might exist; to identify what, if anything, might successfully identify the distinctive features of early modern philosophical thought, if in fact modern philosophy can be approached in such a way, that is, as an epoch of thought that is internally coherent and distinctive, aside from any historical, social or institutional unity it may possess.

For the purposes of argument, I will take it as given that such an approach possesses at least an initial plausibility. There have been, historically, and continue to be, many attempts to sketch such a picture².

* Note: all translations from sources not in English are my own, unless indicated by a citation of a published translation.

¹ I.e. Descartes to Kant. There is of course a certain arbitrariness in beginning with Descartes, and it is certainly arguable that elements of modernity are to be found in thinkers preceding Descartes, such as Galileo, Francis Bacon or Ockham. Some find many anticipations (if this is a coherent idea) of modern thinking in certain late medieval scholastic thinkers. I will have something to say about some of these anticipations below. I see Kant as the culmination of modernity, not as the initiator of a new pattern of thinking, which I would argue begins with Fichte. Contrary to some recent work that appears to show that there is little intellectual unity in the standard periodization of modernity, for example Ariew (2010) and Pasnau (2011), I believe there is a distinctive intellectual unity to be found in early modern thought which distinguishes it from earlier and later periods; this unity, is not, however, historically unique (see chap. four).

² For a sketch of the standard picture (of early modern thought as centered on epistemology), and its historical origins, see Haakonssen (2004). For a sketch of

To anticipate: I would like to propose that the logical structure of relation, in particular that of a binary or dyadic anti-symmetrical (i.e. one-way) relation³, can function as an interpretative framework for early modern philosophy. I also would like to propose that it is to characterizations of causality⁴ that we must turn to, if we are to fully understand early modern thought and the role of dyadic relations within it. I shall have more to say about causality in section 3.6, and the concluding chapter four, below. I believe that these characterizations are fundamental, and cannot be explained in any other manner, such as by explanations based on the introduction of the idea of laws of nature in early modern thought⁵; of revisions to medieval ontological concepts such as substance⁶; nor to the introduction of philosophies of corpuscularism or mechanism⁷; the abandonment of an Aristotelian picture of a self-governing universe and Aristotelian interpretations of causality⁸; nor to the purported rationalization and / or mathematization of thought allegedly brought about by modern thinking⁹, or to changes to concepts of space or time¹⁰. I

the history of the interpretation of early modern thought, especially in the English-speaking world, see Vanzo (2016). I discuss other interpretations below, of which the most important appear to me to stem from Heidegger's (and Husserl's) work in the history of philosophy, on the one hand, and those focused on reconfigurations of specific scholastic concepts, influenced by developments in the physical sciences. How these two approaches differ, despite some overlap, will be explained in chapter three. I must emphasize that my interpretation (chapter four) differs markedly from both of these.

³ A binary (two-place) anti-symmetrical relation is a relation R such that for any x, y , if xRy and yRx , then $x = y$. See also the historical note at the end of this section for some remarks on historical adequacy.

⁴ Characterizations of causality, as opposed to explicit theories of causal relations—I use the more general and ambiguous expression for reasons that will become apparent below. Briefly, such relations are not necessarily manifested as causal relations, but can regulate perception, temporality, and other domains, but at bottom are motivated by a view of the nature of interaction and dependence.

⁵ E.g. Ott (2009); for a survey see Henry (2004).

⁶ See section 3.2 *infra*.

⁷ See the discussion in the immediately following paragraphs, as well as section 1.1, and sections 3.2, 3.6 *infra*.

⁸ E.g. Heil (2016, 135).

⁹ Associated with Heidegger, Koyre, Burt, and others. See section 3.3 *infra*.

¹⁰ No doubt there were such changes (see 3.7 below); but they are neither sufficient (early modern theories of space and time carried over into the very different intellectual climate of the nineteenth-century), nor necessary (Aristotelian philosophy, in particular that of the historical Aristotle, as I hope to explain in

will examine some of these other interpretations of the roots of early modern thought in some detail in chapter three.

Apropos the fourth point above, the alleged early modern rejection of Aristotelian causality, I would like to comment on some contemporary debates in the metaphysics of causality, and on the question of whether such debates might be relevant for the historical issue that is at the centre of this essay¹¹. Contemporary metaphysics of causality comes in two main varieties: Humean and Aristotelian (or NeoAristotelian)—the first, an event-based view of causal interaction governed by regularity or laws of nature; the second, centering around causal powers and dispositions. It is fair to claim that Humean causation captures something of early modern accounts of causality, although not all were event based, but is the NeoAristotelian view genuinely Aristotelian (could it be said to accurately represent the positions of the historical Aristotle?), and does the opposition between the two represent a real historical conflict? Can we read the contemporary conflict between the two interpretations back into the past, into the genesis of the early modern system from the medieval?

I believe, contrary to Heil (2006), that we cannot, and that the contemporary NeoAristotelian view is not a correct representation of either Aristotelian, or in fact much of scholastic Aristotelian theories of causality. To be brief, I shall contrast the two in the following table.¹²

Table 1-1: Classical and Contemporary Dispositionalism

Classical and Medieval Aristotelianism	Contemporary NeoAristotelian Theories of Causality
Substance Oriented	Process Oriented
Causal interactions are uni-directional and uni-local (from agent to patient, located in the patient)	Interactions are mutual ¹³

chapter four, is much less opposed to early modernism than conventionally thought).

¹¹ The commentary that follows is largely in response to the "historical interlude" in Heil, *op. cit.*

¹² The right side of the table is largely taken from the accounts in Heil (2016) and Mumford (2014).

¹³ "Since the process of production is depicted as an equal partnership, the view [advocated here] jettisons the Aristotelian idea that one partner is passive and the other active." (Mumford 2014, 327.)

Unity of matter and form imply an at least weak form of compositionality	Non-linear and non-compositional
There is only one unequivocally self-moving and self-governing substance	Dispositions are self-governing and self-moving ¹⁴

Contemporary dispositional theories of causality are largely process-oriented¹⁵; Classical Aristotelianism, despite its emphasis on actualization and entelechy, remains, arguably, a substance-oriented philosophy (as can be seen in the scholastic dictum *operari sequitur esse*, activity follows upon being). Contemporary dispositionalists tend to see causal composition as non-linear and non-compositional¹⁶, while, in classical Aristotelianism, components of composites retain a kind of identity as powers or potentialities within the composition. For example, according to the classical Aristotelian account of compositionality¹⁷, the corrosive power of chlorine should remain in the sodium-chloride composite of salt as a kind of corrosive potentiality within the salt, even if the chlorine itself does not remain (as a separate, unbonded element). Not so according to current dispositionalism—the whole of the salt is greater, and different, from the parts, and the properties of the compound cannot be analytically deduced or predicted from the properties of the isolated parts. Furthermore, the identity criterion of properties of powers differ greatly between the two accounts; Heil (2016, 131) prefers a "multi-tracked" account of powers that individuates powers according to circumstances, so a single power may have many different manifestations; classical Aristotelianism tends to identify powers with particular properties or

¹⁴ "It has become common to think of dispositions as standing in need of stimuli. They are depicted as capable of doing nothing on their own [...] there is, though, something that is problematic about this as an account of the activation of power [...] potentialities do not need stimulating but, rather, they come to be realized if nothing prevents them." (*idem.*, 323).

¹⁵ "The notion of process becomes crucial, which is why some dispositionalists have an interest in Whitehead's (1929) process metaphysics." (*idem.*, 330).

¹⁶ "There are of course reasons why salt is neither combustible nor poisonous, due to its other properties and their interaction, but that doesn't detract from the point the case makes: powers do not simply add." (*idem.*, 335).

¹⁷ *On Generation and Corruption*, I, 10. The example of salt is obviously not from Aristotle. It is taken from Mumford, *op. cit.*

manifestations of substances. I leave it to the reader to judge which is the more accurate theory, but it should be remembered that the Aristotelian understanding of the micro-structure of the world is very different from ours—Aristotle's comparatively simpler account of the physical world, lacking the complex structures revealed by modern science, has less resources for accounting for the hugely varying range of manifestations that a multi-tracked account would admit, without sacrificing coherence and unity of explanation.

Finally, the contemporary theory usually prescind from the Aristotelian cosmos and theology, which is a vitally important part of the classical Aristotelian picture.

There is a genuine conflict between event-oriented theories of causality and dispositional theories, and I don't mean to doubt that this conflict played a role in the genesis of early modern causal theories. There is also a conflict between the orientations of the left and right sides of the table, but this conflict is not the same conflict as the first. In fact, it should be noted that many contemporary versions of Humean causation adopt the positions on the left side, that is of classical Aristotelian causality, rather than the positions of NeoAristotelian dispositionalism, on the right, and I believe that much of this motivates the contemporary debate¹⁸. NeoAristotelian dispositionalism is really a dispositionalism filtered through contemporary metaphysical concerns and pre-occupations. Thus, we should not read the contemporary conflict between disposition-oriented theories and Humean or regularity theories, a conflict which is, in addition, one between the orientations of the outlooks of the left and right sides of the table, into the differences that existed between medieval Aristotelianism and early modernism, which is likely better characterized as a debate centered purely around dispositionalism vs. event causality, without the extra conflict of what I will here call "right" vs. "left".

That being said, I do think that the genesis of early modern causal theories involved something rather more than the replacement of medieval dispositional theories by regularity theories¹⁹; in fact, I believe that the left-right conflict in the table above was more central to this genesis than the dispositional-regularity conflict. The important conflict of the time was

¹⁸ Heil (*op. cit.*, 131, n. 7) attributes the standard account of single-tracked powers to over-dependence on the role that counterfactual and subjunctive conditionals (which are usually associated with contemporary Humean accounts of causality) play in accounting for powers.

¹⁹ Contrary to Heil (2016). Heil interprets dispositionalism in the NeoAristotelian manner, and so brings in the extra layer of interpretation mentioned here.

not, however, a conflict between early modern thinking and Aristotelianism (which did indeed motivate the other, dispositional-regularity conflict), but between certain directions in late scholasticism (and Renaissance thought), and early modernism (not limited to theories of causality), a conflict which I have tried to anticipate somewhat here by what I have called the left-right conflict. I shall have to leave a fuller exploration of these thoughts to the final chapter of this essay.

In this introductory chapter, however, I would like to return to the question of schemes of interpretation of early modernism, and anticipate the discussion in chapter three by examining a number of problem areas that typify many of the responses to the interpretive problem of early modernism. The first is an attempt to account for early modern explanations of causality in terms of mechanism. The second examines a certain trend in work in the history of philosophy that finds early modernism best explained by the emergence of rationalizing tendencies in causation and ontology. Certain aspects of the latter approach not directly connected with relations (subjectivity, representationalism) will be explored in sections 3.3 and 3.4.

An historical note: It must first be mentioned that the early modern conception of relation differs markedly from the conception familiar to most contemporary philosophers (and which will be used in the present exploration). The standard picture of a dyadic or binary relation, familiar from modern mathematics and physics, is that of a two-place relation xRy . Yet this analysis is not what most philosophers, from antiquity to the 18th century would have understood as an appropriate formal analysis of relation. Instead, compatible with the traditional substance-accident understanding of entities, the traditional category of relation identified what might be called directed accidents (or relatives), that is, monadic properties of substances that somehow contained an internal orientation to the other pair or pole of the relational (purely mental) structure. In place of the relationship of fatherhood, for example, that a contemporary thinker might posit existing between a father and a son, the traditional analysis would instead claim that this relationship was constituted by a single monadic accident, inherent in the father, that enabled this relation to occur. As a relative property, then, fatherhood, consisted of a real, relative accident inherent in one subject; but the two-place relationship that corresponded to it was merely a being of reason, existing in the mind only.

Despite the challenges and revisions to many medieval concepts in the early modern period, such as to the concepts of substance and causality (to

be noted below), it appears that early modern thinkers by and large followed the traditional account of relation²⁰, an account that was not to be fully revised until the development of mathematical logic in the nineteenth century. My attempt to use the contemporary concept of dyadic relations as a heuristic guide to understating early modern thought may therefore perhaps be charged with anachronism. Indeed, it seems rather foolhardy to claim that such relations are key to early modern thought, when it is kept in mind that not only did early modern philosophers adopt a reductionist point of view concerning the reality of relations, but they even lacked the vocabulary or logical language to express what we would now call polyadic relations, or at least lacked the willingness to create a logic out of such expressions, seeing them as parasitic upon traditional subject-predicate logic.

In my defense, (I shall have more to say on methodological concerns in the concluding section, so here I will be brief) I would like to point out that willful anachronism does not always lead to misunderstanding; indeed, it is generally necessary to interpret that past with the tools available to us in the present. The so-called hermeneutic circle could hardly be a problematic issue, were this not the case. As will be pointed out below (section 3.4), the longstanding discussion of early modern representationalism has proceeded, despite the lack of a strictly equivalent term for representationalism (a position many early modern thinkers have alleged to have held) in the early modern philosophical vocabulary. In fact, many of the most familiar problem areas of philosophy take their names from terms that are much more recent additions to the philosophical vocabulary than commonly supposed: no-one hesitates to speak of Aristotelian metaphysics, ontology, epistemology, or aesthetics, for example, despite the fact that these terms (or their equivalent in any European language) didn't emerge until the 1st, 17th, 19th, and 18th, centuries, respectively. One also might remark that, if half-forgotten concepts of the past can occasionally shed light on the problems of the present, as has sometimes been claimed, it may not be unreasonable to claim that the reverse state of affairs may also claim a certain amount of plausibility.

Further, despite the pull of the traditional account, one of the goals of this monograph is to show that there are in fact a number of developments in early modern thought which point to the beginnings of a different picture; these developments are covered, among other issues, in chapter three. According to some, these latent tendencies toward a more modern

²⁰ Weinberg (1965, 112 ff). But see Brower (2016) for a counter-perspective.

conception may have been hindered by the persistence of the language of substance and accident²¹. More perspicaciously, one might suppose that the lack of an adequate vehicle on which to base external relations might have played a part. With the growth of the concept of laws of nature, of the independent reality of space and time, of the gradual identification of the causal and temporal orders²², and of the development of the language of mathematical physics, came grounds, in the end, for the modern view. Note, however, that any one of these can supply grounds for the reality of external relations: the modern account developed by Russell, and the Humean account of causal relations (with the caveat that the reality of the latter are restricted by Hume's phenomenological account of time) originate with the last and second last of these. It would seem inappropriate, therefore, to look to any one of these developments for the modern conception, and part of what I want to argue for here is that what one might call the governance of the idea of dyadic relations in early modern thought is independent of any of one or any set of these developments, independent as well from causal regularity theories, although a full expression of the modern view no doubt requires some such vehicle for its expression.

Mugnai (2016), in his study of the origin of the modern conception of polyadic relations, writes that, "If a necessary condition for developing even the most elementary logic of relations is that of being acquainted with some fundamental properties belonging to relations, like symmetry, reflexivity, transitivity, etc., then it is quite natural to conclude that the scholastic logicians did not possess a logic of relations". Although they may not have been recognized as such, I think we can discern the beginnings of concerns with such properties in the early modern period, along, perhaps, with a sense that such properties did not match traditional understanding, that there was indeed something new about these positions: For example, the doctrine of *causa sui*, or the self-causation of God, (section 3.6 below), claimed by Descartes, and after him, Spinoza, despite the traditional claims that self-causation is not a coherent concept, as causation must be an irreflexive property²³. The symmetrical principle of

²¹ This is the view of Weinberg, *op. cit.*

²² For this latter, see Fox (2006), chap. 3.

²³ For example, Arnauld, in the fourth set of objections to the *Meditations*: "I think it is a manifest contradiction that anything should derive its existence positively and as it were causally from itself [...] there is a mutual relation between cause and effect. But a relation must involve two terms." (Descartes 1984, 146, 147: AT VII, 208, 210.)

action (Newton's third law), differs from the traditional Aristotelian understanding of action as a unidirectional influence from agent to patient. The well-known conservation principles of physical quantities (such as motion, momentum, and energy), which began to be formulated at the beginning of the early modern period, such as Descartes' principle of the conservation of motion, have also been associated with principles of symmetry²⁴ or invariance. In classical physics, for instance, invariance with respect to place (that the laws of physics do not change with spatial displacement) is equivalent to the theorem of the conservation of momentum (by Noether's theorems).

It might seem to be putting the cart before the horse to look towards something like structure (e.g. uninterpreted dyadic relations) as an explanatory factor, instead of towards specific embodiments of structure, in particular, to the concrete changes in doctrines of natural science that are so characteristic of the era. But the plurality of various explanatory approaches to modernism (which will be explored in more detail, and partially criticized, in chapter three), and in particular the way many appear to converge on the distant focal point of these dyadic relations, but not to any one particular version of these relations, argue for a different approach. The Suarezian systematization of ontology and prioritization of efficient causality, the Leibnizian equation of causality and rationality, the Humean causality of relations of temporal succession, or the mechanization and mathematization²⁵ of causality as evinced by Galileo, Descartes, and Newton, have all at one time or another been separately claimed to be the ultimate expression of early modern thinking concerning causality, and so of early modernism itself. It is arguable that many of these interpretative threads have emerged out of distinct schools of interpretation of the history of early modern thought²⁶. As in so many instances of group-oriented doctrinal disagreement, there has been little inter group communication, or even awareness, of the other side.

²⁴ The observations I make here about the growing prevalence of symmetrical interactions might seem to undermine my proposal concerning anti-symmetrical relations; such symmetry, however, has a different source: Not the directedness of the underlying causal interactions (which are anti-symmetrical as they are in Aristotle), but the ontological reductionism entailed by their dyadic structure. Causes can become effects, and vice-versa (a culminating example is a being which can be its own cause or *causa sui*), not typical in Aristotelian hylomorphism.

²⁵ I merely mention this viewpoint here; the question of the mathematization of early modern natural philosophy is discussed and criticized below in section 3.3.

²⁶ For a sketch of these interpretations of early modern thought, see Vanzo (2016).

I hope to offer at least a sketch of my own answer to this problem in the conclusion. In another place (Taborsky 2010, chap. 3), I attempted an in-depth exploration of what was called therein the causal paradigm, (one of three models of causality) in terms of approaches to causal dependency, identity, time, and growth. A full exploration of this model would go beyond the bounds of this essay (and of early modernism). I trust that the explanations in the conclusion will suffice to make my approach plausible at least.

Finally, my concern centers not so much on the category of relation as such, but with the dyadic (and anti-symmetrical) properties of the particular kind of relation proposed here, as opposed to monadic²⁷ and triadic relations, on the one hand, or to other kinds of dyadic relations, such as symmetrical dyadic relations. This opposition governs other areas of philosophical controversy, as we have seen. The conflict, as I have mentioned regarding classical and NeoAristotelian causal theories, can even appear within dispositionalism itself: e.g. the question of whether dispositional powers are best seen as having a characteristic manifestation (single-tracked, and so able to fit into an anti-symmetric dyadic scheme of power→manifestation), or many different kinds of manifestation (multi-tracked, and thus not so schematizable); or whether the manifestations of such powers are to be understood causally as effects, or instead as the products or outcomes of mutual symmetrical interactions²⁸. Heil (2016), choosing the second of each of these options in his interpretation of powers, rejects the idea that causality is an external relation, for such relations can only be based, in his opinion, on a mistaken understanding of powers as both single-tracked and not mutually interactive. Heil thus rejects the idea of causality as an asymmetrical external relation, or, to put it in another way, according to Heil, truthmakers for causal interactions are based on non-relational features of the universe. Note, however, that for Heil this is a conclusion that derives from the nature of powers, not from that of causality or relations; powers (and their manifestations) are to explain causal relations, not vice-versa. More specifically, it is the multiple realizability and mutual reciprocity of powers, the "dispositional matrix" of the totality of powers that motivates Heil's analysis of causal relations. Such a matrix cannot be mapped on to a bijection of causes to effects that occurs when causal relations are dyadic and anti-symmetrical. For Heil, this fact seems to preclude any sort of relational analysis of

²⁷ Somewhat counterintuitively, properties or qualities are sometimes thought of as monadic relations (e.g. Mendelson 1987, 5).

²⁸ For both of these, see Heil (2016).

causality, yet it appears to me that it is not so much relations that Heil objects to, but the dyadic, anti-symmetrical nature that he appears to believe must characterize any sort of relation based on causality (indeed it is telling that Heil explicitly distinguishes his language of powers and manifestations from the language of causes and effects—for Heil, an ontology of powers is supposed to explain causation, not instantiate it. That is, a manifestation can only be considered to be an effect by analogy). In other words, Heil adopts a NeoAristotelian, and not classical, dispositionalism.

I would like to claim that the early modern thinkers are motivated by a similar (or rather, opposing!) commitment to the dyadic and anti-symmetrical nature of key features of reality, rather than to relations as such. The convenient, and conventional contemporary interpretation of such features as relations has motivated my discussion. Given this, it is likely best to work with a contemporary understanding of relations, rather than adapting or resurrecting an unfamiliar idiom.

1.1 Early modern philosophy and mechanism

It is often claimed that early modern thought is to one extent or another an outcome of what has been called, in Boyle's phrase, the "mechanical philosophy"; in other words, the early modern age is an age of mechanical causation²⁹, early modern thinkers having reduced the Aristotelian and

²⁹ "Mechanism" is a notoriously ambiguous term. Pasnau's version (Pasnau 2012, 8; 91), taken from Boyle, that causal behavior of bodies is to be explained by local motion and contact (roughly, the "billiard ball" model) is too restrictive, as it would exclude Newtonian celestial mechanics, and likely much of 19th century continuum mechanics (which is not based on the interactions of discrete particles). The least one can say is that mechanism, as a model, is related to the functioning of machines, but exactly what this implies depends on both the facts of, and our interpretation of, what machine behaviour comprises. For example, it is often taken for granted that mechanical interaction is of necessity linear and deterministic, but this is not the case. Classical continuum mechanics, as developed by Cauchy, for example, largely concerns the non-linear phenomena of stress and strain. The historian of classical mechanics and continuum mechanics physicist Clifford Truesdell has even seen fit to claim that "Mechanics as whole is non-linear." (Truesdell 1968, 353). The relationship between mechanism, determinism, linearity, and dyadic causal relations is not easy to determine, but these features should be kept conceptually separate. Part of my point here is that if linearity is to be found as an implication of a particular mechanical theory, it is not due to "mechanism" itself, but to other factors, such as conceptual simplification, or the philosophical commitments of that particular model.

scholastic four causes (material, efficient, formal, final) to one type of cause, efficient causation, by dispensing with the baroque scholastic ontology of powers and essences. Just what this characterization means, and how to interpret the causal doctrines of the early modern thinkers has been a source of controversy—as Margaret Wilson has noted, although causality appears to be central to many of the doctrines of the early modern period, few early modern thinkers appeared to have given precise and detailed accounts of their understanding of the functioning or nature of causality (Wilson 1999, 141). To complicate this picture further, it would seem that none of canonical figures of early modern philosophy (Descartes, Spinoza, Malebranche, Leibniz, Locke, Berkeley, Hume) would appear to have unequivocally espoused a purely mechanistic account of causation. O'Neill (1993), for example, notes that of the three primary forms of causal influence contemporary to the philosophizing of the early modern period, as recounted and to an extent canonized by Leibniz, *viz.*, occasionalism, pre-established harmony, and the doctrine of physical influence (*influxus physicus*), only the first two, not usually understood as mechanical, occupied most of the attention of early modern thinkers. Only the last and least discussed of the three could be reasonably directly interpretable in terms of mechanical causation; yet it turns out, to further complicate the picture, that the doctrine of *influxus physicus* (as understood by Leibniz as a designation for certain causal theories other than his own) is actually a rather complicated portmanteau of late scholastic ideas (such as the idea of the intension and remission of forms), alchemic inner propensities and powers, and ideas which would more naturally be thought of as involving materialistic interpretations of causality (i.e. those that do not postulate active powers to matter).

As O'Neill's argument well illustrates, it is not exactly clear who we are to understand as proponents of the so-called physical influx model, given that, as coined by Leibniz, it is essentially what anthropologists would call an "etic" term (i.e. not a self-designation). It might be thought reasonable to suppose, however, that early modern atomists or neo-Epicureans such as Gassendi could be thought of as likely supporters of such a doctrine.

Yet it is important to note that in Gassendi, for instance, there are deviations from a purely mechanical account of nature. Gassendi, for example, while maintaining purely material accounts of a wide range of natural phenomena, much as Descartes, is nonetheless interpreted by some as having maintained a doctrine of continuous atomic motion, seeing

atoms (and apparently *a fortiori* matter) as somehow inherently mobile³⁰, thus complicating the relationship between matter and motion, usually taken as two independent aspects of mechanism, indeed imputing an active power to matter (or at least to atoms), unlike the Cartesian understanding of matter as pure extension. And despite Gassendi's thoroughgoing atomic reductionism, many of Gassendi's purported mechanical explanations of natural phenomena, despite their reliance on explanations in terms of interactions between atoms, ultimately rested on non-mechanical principles, regularly bringing in explanations that relied on action-at-a-distance, or on tendencies or innate properties that resembled the "hypostatical principles of the chemists" (to quote Boyle). Gassendi's explanations of the phenomena of gravitational attraction, for example, or the tendency of the sense organs to react in certain ways to certain sights or tastes, reintroduced (or unwittingly relied on) the kinds of explanation on the atomic or micro-level that mechanical explanations had obviated on the macro-level³¹. As Osler (2001) notes in this regard, "Gassendi moved the problem of sympathy and antipathy from the level of macroscopic objects to the realm of microscopic particles affecting the senses, but he did not succeed in giving them purely mechanical explanations." (435). Another example of this tendency: Ariew and Waugh (2014) report that a number of other early modern atomists (Nicholas Hill and Sebastien Basso) could realistically only be considered to be quasi-mechanists, because of their admittance of apparent concurrentist or occasionalist notions such as the necessity of allowing for the need for divine action in order to account for the motion of atoms, and notions such as an ether or world soul. In fact, according to Ariew & Waugh, "The philosophical horizon before 1640 does not provide much evidence for pure deflationary mechanists."

However, given the complexity and variety of the phenomena in the natural world, and the simplicity of the available mechanical structures and models of matter (especially as compared to what we now know about the structure of the physical world), it is to be expected that a simple mechanical model of the entire range of material interaction would face severe explanatory pressures, leading to explanatory gaps that were inadvertently filled-in by familiar and traditional non-mechanical explanations. To this extent, it is hardly surprising that many of the models of the atomists would end up resembling the hypostatical models of the alchemists, or that Leibniz and others would eventually propose revisions to the Cartesian hydrostatic model of dynamics that were to eventually

³⁰ See e.g. Lolordo (2007, 150-1), and the references therein.

³¹ This summary is largely taken from Osler (2001).

undermine the purely matter-in-motion picture of Descartes and his followers.

Perhaps due to these frustrations, later in the seventeenth century, the occasionalism of Malebranche and others such as LaForge shifted the locus of causal explanation entirely away from matter and material bodies to the divinity. By the end of the early modern period, the phenomenalism and idealism of Hume and Kant become the predominant interpretations of causality. What had become of mechanical causation, if indeed it ever was?

Ott (2009) attempts to resolve this problematic absence of evidence by offering a unified account of the development of the idea of laws of nature as an explanatory factor of causality³². In Ott's interpretation, both occasionalism and the quasi-mechanistic explanations of the early modern corpuscularians can be fully brought into a strictly mechanistic picture by distinguishing between two versions of mechanism: "Ontological" mechanism and "course-of-nature" mechanism. Ontological mechanism (which Ott links to what he refers to as a "top-down" version of laws of nature), as the name suggests, implies something about the structure of physical reality—that physical entities are constituted from a short list of what might be called mechanical properties, such as extension and motion—but leaves open the question of what determines the cause of their behavior or motion (there may be other powers outside of finite entities that account for their activity, such as laws of nature or God). Course-of-nature mechanism, on the other hand, deals not with the physical make-up of things, but with their behavior. According to the course-of-nature mechanist, bodies behave the way they do solely on account of their own physical, bodily properties, and for no other reason, such as divine action, constituents or parts of objects which are not intrinsic properties, such as forms, or laws of nature (though bodies may behave in accordance with natural laws, their behavior is so not on account of these laws, but to their own natures). Ott connects this latter view with what he terms bottom-up laws of nature: laws that are explanatorily dependent on the essences (in particular, material essences) of things. Ott thus leaves us with two semi-mechanisms (my terminology): One, a mechanism restricted to the make-up, but not to the behavior or properties linked with bodies, and another, which restricts causes of physical

³² It should be noted that Ott restricts himself to an examination of causal powers as they play a role in the concept of laws of nature. Thus Ott has little to say about other notions of causality in the early modern period, for example those to be found in Leibniz and Spinoza.

behavior to bodies alone, but may admit of a potentially broader ontology in the make-up of physical things (e.g. this position does not necessarily exclude various capacities such as powers or potentialities being attributed to bodies, as long as they can be conceived of as intrinsic properties of matter alone). Both kinds of mechanism, can, according to Ott, serve as an explanatory basis for laws of nature, of either the top-down or bottom-up variety, respectively. Additionally, these two versions of mechanism ground two versions of, not simply causality, but causal necessity, which Ott sees as a further important characteristic of early modern interpretations of causality³³: the cognitive and geometrical models of causality. Briefly, according to Ott (and others), if causality must be understood as necessitarian, (i.e. effects necessarily follow from their causes) and if it can be argued that ontological mechanism offers no *material* basis for effects to necessarily follow from their causes (because for example there can be no necessary connection between one part of extension and another), then this necessity must have non-material grounds, which must be in the only other kind of substance accepted by early modern philosophers, that is, mind (whether finite or divine). This model of causal necessity Ott calls the "cognitive" model. In addition, Ott finds room for another model of causation, which he calls the "geometric model"; this position comprises a fusion of the two forms of mechanism, uniting both ontological and course of nature mechanism, yet—as a variety of mechanical causality—avoids the baroque scholastic ontology of powers. This thorough-going version of mechanism, that combines both the ontological parsimony of the ontological view with the naturalism of the course-of-nature view, functions only by grounding dispositions (which would appear to exceed the capacities of the simple properties permitted by ontological mechanism) in a sort of relational situatedness; that is, by permitting a certain degree of reality to be granted to inter-material relations, or more accurately, to the truth-makers of such relations, (the two relata) which allow material bodies to have a kind of causal fit with

³³ Lin (2014) stresses this aspect of the early modern aspect of causality as well. Even Hume can be included in this characterisation, if we recall that, according to Lin (2014, 165–166), "[Hume] assumed that, [if causality were in fact a necessary connection] it would be absolutely or logically necessary". It must be noted, however, that there is a strong element of contingency in the Cartesian account, at least, of the laws of nature themselves (see *infra*. sections 3.3 & 3.6), which ground causal laws. Thus, while it might be correct for a Cartesian to conclude that *aquae regis* (A) dissolves gold (D) necessarily, this statement itself is not necessarily so. In symbols: $\Box (A \rightarrow D)$, but $\Diamond \sim \Box (A \rightarrow D)$.

each other. This fit is then interpreted as a disposition. Locke gives the example of a lock and key: a particular key will fit a particular lock, and no other (*Essay*: IV, 3, 25). This fit, according to Ott's interpretation, resides in neither the key nor the lock, but in the relation between the two, which itself is nothing but the key and the lock taken together. The Geometric model, then, is Ott's term for a rather unique version of causal necessitation that is based on a comprehensive form of mechanism that manages to fuse both ontological mechanism and course-of-nature mechanism, thereby avoiding both occasionalism, on the one hand, and the kind of realistic dispositionalism that characterized scholastic ontology³⁴.

Both varieties of mechanism preclude something like a scholastic ontology of powers. Ontological mechanism, because of its restrictive, materialistic ontology (powers of bodies are excluded forthright); course-of-nature mechanism due to its elimination of metaphysical parts³⁵ of entities (powers and relations may exist, but must be material or due to material constitution, and not due to form or other kinds of explanation). According to Ott, by these two varieties of mechanism most of the causal doctrines of the early modern period can be understood to be mechanical in one way or another—the occasional causation of Malebranche and other Cartesians, for example, is mechanical in the ontological sense in that these thinkers adopt the Cartesian perspective on the physical world (i.e. bodies consist of extension alone, excluding powers, secondary qualities, and so on). Course-of-nature mechanism characterizes the philosophy of others³⁶ who likely (out of an attempt, perhaps, to avoid occasionalism as a

³⁴ Whether Ott's geometric model is an accurate interpretation of Locke is something I shall leave aside. I take it that Ott's interpretation imputes to Locke a form of what Pasnau (2011, 519) calls "bare dispositionalism", an interpretation which Pasnau rejects, on the grounds that relative or non-categorical properties were never recognized by early modern thinkers, though they may be part of contemporary vocabulary. Be that as it may, my point (to be explicated below), is that a comprehensive interpretation of mechanism, such as Ott's, which can account for the philosophies of both Descartes and Locke (Pasnau rather sees Locke as a nominalist, closer to Berkeley and Hume than to 17th century thinkers), is in fact too comprehensive, in that it fails to isolate what is particularly distinctive about early modern mechanism, as compared to both earlier and later varieties of mechanism.

³⁵ See section 3.2 below for an explanation and discussion of metaphysical parts.

³⁶ Ott is not entirely clear as to which philosophers of the early modern period accept course-of-nature mechanism while rejecting its ontological version, but among the philosophers that Ott mentions, likely Gassendi and Cudworth could be included in this group.

consequence) impute a larger range of properties to bodies, but who still attribute the behavior of bodies to bodily nature alone. Some thinkers (Ott mentions, in addition to Locke, Pierre-Sylvain Régis) attempt to merge the two positions, as we have seen; others, such as Berkeley and Hume, adopt a non-mechanistic form of causality that is nevertheless compatible with the law of nature perspective.

However, is mechanism, in either of these senses, sufficient to account for the kind of causality we encounter in early modern philosophy, not to speak of the genesis of the idea of laws of nature? A number of thoughts about Ott's two versions of materialism immediately suggest themselves³⁷. First, there are many examples of philosophical systems that subscribe to a version of ontological mechanism in their account of the physical world, but are nevertheless part of philosophical systems very different from the early modern systems that Ott intends to explicate. Anaxagoras' corpuscularian account of the natural world, for example, is arguably a version of ontological mechanism, in that it combines a limited set of material or bodily capacities with a non-material, non-formal causal agency (*nous* or mind) for the purposes of explanation of physical reality. Yet Anaxagoras' philosophy appears to be far removed from the occasionalist philosophies of the seventeenth century that would be its putative philosophical companions under this interpretation. Another, more contemporary example of such an approach is modern chaos theory, or rather certain interpretations of the relationship between this theory of certain specific physical systems and traditional scientific values such as law-like behavior and predictability. Chaos theory, as a part of modern statistical dynamics, studies the behavior of certain physical systems entirely governed by well-known laws of physics, yet which yield complex, unpredictable behavior at sufficiently large scales. Since the entities studied by chaos theory are governed by laws entirely within the domain of modern mechanical physical theories, it is certainly acceptable as a form of mechanism (in contemporary terms). Yet chaos theory has been interpreted by some as an example of a radically new form of science that precludes law governed behavior and predictability as they are conventionally understood within science. An example is the well-known property of chaotic systems, sensitivity to initial conditions, responsible for the so-called butterfly effect. In a chaotic system, a suitable small

³⁷ I note, of course, as Ott's question is "What makes an early modern philosopher a mechanist?" (Ott 2009, 35) and not "What makes mechanism an explanation of, or a model for, early modernism?", none of what follows should be taken as a criticism of Ott.

difference in initial conditions, smaller than any acceptable level of observational measurement error, can lead to widely divergent paths of development of the entity as a whole, and hence to unpredictability. In this sense, chaotic systems are inherently epistemically indeterministic, that is, in terms of our knowledge of their future states, as there may be no acceptable level of observational error that can be compatible with predictability. Needless to say, without predictability, laws of nature are moot.

It might be objected that these two examples are really better understood as examples of the other kind of mechanism, course-of-nature mechanism. But recall that in this second sort of mechanism, the causal behavior of bodies follows solely from the properties of those bodies. This is clearly not the case for the Anaxagorean model; one might think that it would be easier to make this case for the chaos model, but if we take knowledge and predictability into account, as all scientific theories must, then this would not be the case. It is true that, since the underlying laws governing the movement of the individual particles or elements that go to make up chaotic systems are strictly mechanical and deterministic, particular states of such systems depend only on immediately previous states. However, our knowledge of such states can never be precise enough, leading to our inability to predict large-scale, aggregate behavior. In this sense, previous states cannot determine subsequent states; thus, chaotic systems can be mechanical only in their constitution, not in our knowledge of their behavior.

Given these two examples, it would seem that ontological mechanism cannot be a sufficient condition for the development of either early modern causality or a law of nature perspective, for neither the ontological mechanisms of Anaxagoras nor of chaos theory yield anything like early modern accounts of causation or of laws of nature. And while it might be reasonable to suppose that the cognitive model might work for Anaxagorean causality (presumably as it would be based on mind or *nous*), it clearly cannot be a model for causality in chaos theory. Exactly what constitutes or grounds causality in chaos theory may be something of a puzzle (as much as it is in other areas of dynamics that deal with large-scale, non-classical behavior, such as thermodynamics or indeed the entire field of statistical mechanics), but as part of modern physical theory it can in no way be claimed to have a cognitive basis³⁸.

³⁸ One might object here that chaos theory (along with the entirety of modern statistical mechanics) does not work with a necessitarian understanding of causality, which is as we have seen one of the key characteristics of early modern

Similar examples and observations can be made for Ott's second version of mechanism, naturalistic or course-of-nature mechanism. For example, Hellenistic materialism, the materialistic philosophies of the Hellenistic period of classical antiquity (the two or so centuries following Aristotle), especially that of Stoicism, can be reasonably held to be examples of course-of-nature mechanism³⁹. According to Stoic doctrine, both material and immaterial entities exist, but only bodies can be causally active. Stoic physics is thoroughly materialistic in that causal explanation must be limited to bodily interaction—although there are immaterial entities in the Stoic cosmos (such as the void, or the objective correlate of meanings known as *lekta*) they have no capacity for causal activity. Yet the Stoic account of causality differs in important respects from anything to be found in early modern thought⁴⁰. In particular, the Stoic *aition sunektikon* or "containing" cause is unusual from an early modern perspective in that it is both co-temporal with its effects (coming into existence along with them, and ceasing when they cease), and held to be the cause of the identity or unity of an object. Neither of these aspects (co-temporality, unity) are familiar aspects or functions of material causes as they were understood in the sixteenth and seventeenth centuries. The containing function of the containing cause, in particular, has led some to compare it to Aristotelian form.⁴¹ Furthermore, although there are some who would see a role for formal causality in the work of some early modern thinkers (in particular, in Spinoza and Leibniz), it would appear that the function of formal causality in even these thinkers differs

causal models, and so would be precluded from being an adequate example of a version of ontological mechanism. But I would argue that this simply indicates other considerations must be added to the model of ontological mechanism to yield something adequate for early modern philosophy.

³⁹ Materialism is equivalent to mechanism, for the Stoics, as Stoic causes are comparable to Aristotelian efficient causes: "By 'mechanism' I refer to the support for a principle of causal closure, namely, efficient causes are necessary and efficient for their effects [...] materialism and mechanism are apparently taken by both the Stoics and Plotinus to be mutually entailing doctrines." (Gerson 2016, 45).

⁴⁰ In fact, *all* accounts of causality in classical antiquity differ from early modern accounts in that they are generally formulated in a triadic language of agent, patient (or locus of the cause), and effect, not binary language of cause and effect familiar now and in the early modern era (see section 3.6 below for a fuller account of this difference.)

⁴¹ Cf. Frede (1980, 145). The containing cause is only *analogous* to form. As only bodies have causal efficacy in Stoicism, and for Stoics all causes are active causes, it is likely closer to an efficient (or moving) cause in Aristotelian terms.

significantly from its putative role in Stoic causality. For example, according to Hübner (2015), formal causality in Descartes and Spinoza is best understood as a relationship which mediates between an entity's essence and its properties. A formal cause for Descartes is that capacity in an entity which somehow binds an entity's properties to its essence, "binding" being understood in a logical or inferential manner. Hübner calls this interpretation of formal causality the mathematical and inferential reading of formal causality⁴², in that it adopted mathematical and inferential models from geometry and from Aristotle's *Posterior Analytics*, at the same time freeing it from the ontological commitment of assuming the existence of scholastic forms.

The Stoic containing cause, however, appears to play a somewhat different role in relation to the entities among which it functions. According to Galen, for instance, the Stoic containing cause is that which acts to bind material bodies together, much like glue binds wooden artifacts or bones and tendons bind the bodies of animals.⁴³ The Stoics, Galen continues, equated these kinds of causes with certain kinds of physical elements, the dynamic elements fire and air, which according to them functioned by holding the material elements such as earth and water together by thoroughly pervading bodies made up of the latter.

This function of containing or sustaining⁴⁴ then is quite different from the logico-mathematical function of formal causality as it appeared in Descartes and elsewhere in early modern philosophy. Containing causes appear to be primarily a source of the unity or even of the existence of an object⁴⁵; early modern formal causality rather functions as a source of continuity⁴⁶ or possibly of the production or linking of properties and essence. A linguistic illustration might help: In the sentence "Socrates is

⁴² Hübner ultimately calls her model a formal-causal account, as she stresses that formal causality in Descartes and Spinoza has ontological implications that a purely logical reading lacks, but these consequences can be left aside here.

⁴³ See e.g. Galen, *De causis continentibus (On sustaining causes)* 1.1–2.4, in (Long, A.A. & Sedley, D.N. 1987, vol. 1, 334–335.)

⁴⁴ Both words have been used to translate the Greek *sunektikon*, the first via the Latin *continentibus*, Galen's manuscript on containing causes having survived only in Latin and Arabic translations.

⁴⁵ "Primarily [...] the sustaining cause is the cause of existence, since an object's persistence as a single entity depends entirely on the qualifying activity of breath." [breath (*pneuma*) is a containing cause]: (Long, A.A. & Sedley, D. N. 1987, vol. 1, 341).

⁴⁶ As stressed by Bobro (2016), in his account of Leibniz' understanding of formal causality (in perception).

short and pale", the containing cause might be likened to the conjunction "and" in the sentence, in that it takes up and binds the properties of Socrates (short, pale) into one untied entity, thereby giving him identity, and as a consequence, a kind of at least logical form of existence. The logico-mathematical version of formal causality, however, might be likened to the action of linking or predication in the copula "is", which binds previously existing or identified properties with their subject or centre. It also ensures (logical) existence, not via unity as the containing cause does, but by manifestation or exemplification, by the predicative properties of the verb "to be".

The kind of causality, therefore, exemplified by the Stoic *aition sunektikon* or containing (sustaining) cause would appear to have no parallel within the early modern language of causality, even if we grant that formal causality might have been part of that language. I conclude, then, that course-of-nature mechanism is not by itself sufficient to furnish a model for an early modern account of causality, for the Stoics were also course-of-nature mechanists, yet they worked with a kind of causality that has no counterpart in early modernism.

What of the peculiar fusion of ontological and course-of-nature mechanism that Ott claims to be found in Locke and others, the "geometrical model"? Here we would seem to be on solid ground, in that the geometric model does appear to isolate a form of mechanism uniquely early modern; in Ott's presentation the geometrical model is something of a culmination of early modern thinking concerning causation, for this model resolves the tensions that had existed between the two forms of mechanism, which had forced earlier thinkers into one or another form of quasi-mechanism, forced (according to this narrative) into either conceding too much to a non-naturalistic picture of the world, and accepting divine concurrentism (and occasionalism), or too much to an unsystematic list of unverifiable material powers such as postulated by the "alchemists". Ott (232) notes that Locke's version of causation had become almost "common sense" by the time of Hume, and it is possible to see Humean and even Kantian versions of causality as phenomenizations of Locke⁴⁷. To understand Hume (and presumably Kant), it is not enough to turn to Berkeley and Malebranche, but to the fully mechanical model of Locke and other casual realists, claims Ott.

However adequate this model may be as a portrait of early modern

⁴⁷ In Ott's interpretation, Hume turns Locke's "conceptual foundationalism" into "psychological foundationalism", by turning the natural relational fit between ideas into one of association.

mechanism (and of the idea of laws of nature that succeeded it), my question here is slightly different: is such a model, the geometrical model, which ties cause to effect in the manner that a key is tied to a lock, via a relational fit, really inherent in a fully worked out mechanism, a mechanism that is at once both ontologically simple and naturalistic? To answer this, I note the following: Contemporary chaos theory is both naturalistic and ontologically simple (chaotic behaviour is emergent behaviour, and so presumes nothing external to classical rigid body mechanics), yet is not "geometric" in Ott's sense, as Ott's geometric properties (relations grounded in more than one relata) are not emergent properties, as properties are in chaos theory. Thus, in chaos theory, we have an example of a mechanism that is both ontologically simple and naturalistic, yet that does not fit the model of causation that Ott assigns to its early modern realization. Whatever it is that the geometric model isolates, there must be something additional to it, additional to causal naturalism and ontological simplicity, for the example of chaos theory (and, indeed, all of statistical mechanics) shows that it is not a necessary consequence of these two features.

I conclude, therefore, that even a broad "family concept" interpretation of mechanism such as Ott's (and the internal tensions in that family concept that Ott discerns) is not adequate to isolate what is particular to early modern mechanics, and much less, early modern philosophy, for these characterizations can apply to much mechanics that have gone before and have succeeded the early modern varieties, versions that are clearly significantly different from their early modern counterparts.

1.2 Analytical Heideggerianism: Rationality and systematization

There is another, continental, tradition of interpretation of early modern metaphysics which I will call Analytical Heideggerianism, for reasons to be explained below. Discussion of mechanism and laws of nature as an interpretative key to early modernism forms no part of the work of this tradition.

A number of these (largely) French historians of philosophy, such as J-F. Courtine and V. Carraud, have developed systematic and comprehensive interpretations of the development of early modern thought. Courtine and Carraud examine the development of systematic ontology, and the identity of causality and the principle of sufficient reason in early modern thought, respectively, in place of the examination of developments in modern science or mechanism.

Both Courtine and Carraud identify a kind of rationalization as the key characteristic of early modern thought, but rationalization understood as systematization of a number of key philosophical concepts, such as causality and being, not rationalism in the sense of an epistemological foundationalism that has often been attributed to early modern thinkers.

Another important French philosopher, the phenomenologist and historian of philosophy Jean-Luc Marion, has, in a number of his Cartesian studies, (developing the thought of F. Alquié) advanced an existential interpretation of Cartesianism. For Marion, esp. (Marion 1975), Cartesian ontology substitutes the category of relation or the relative for that of traditional substance, at least in a methodological, if not strictly ontological, sense. Marion also places importance on Descartes' declaration, in his letters to Mersenne in the 1630s, that eternal truths, such as those of mathematics, are at the same time arbitrary (and so, in some sense, potentially false), in that they depend on the arbitrary will of God for their establishment. At the same time, God is not (according to Marion) only a source of transcendence, for God's susceptibility to causality—that is, to the possibility of the applicability of causal laws to God—indicates that the divine nature must in some sense be dependent on the non-arbitrary conceptualization of causality embodied in laws of causality and in the concept of self-causation or *causa sui* by which Descartes characterizes God.

All of these thinkers have been, arguably, influenced by Heidegger's interpretation of Descartes and of early modern philosophy, although at the same time they have managed to detach these analyses from Heidegger's general programme of the recovery of the meaning of being, the interpretation of truth, and so on. As suggested above, one might group these thinkers under the rubric of Analytical Heideggerianism; the name is intended to evoke the specific problem-oriented and selective aspect of their analyses, retaining some ideas developed by Heidegger while ignoring the general trajectory of the development of being in terms of Heidegger's project.

For example, for Heidegger, Cartesian (and modern) thinking, is, in contrast with medieval thought, a form of rational *mathesis*, grounded in a method that attempts to turn knowledge of the natural world into an example of rational *mathesis* itself. We can see something of this idea reflected in the work of Courtine and Carraud, who both draw a picture of modern thought that culminates in a systematic rational structure. Not, to be sure, a systematic deductive or foundational analysis⁴⁸ in the manner of

⁴⁸ Or more properly, what early modern thinkers would have called a synthesis,

Spinoza's *Ethics*, or even a transcendently grounded intuitive structure (in the manner of Hegel's portrait of Cartesianism as centred around the positing of the object as an expression of pure understanding), but as the outcome of a process of rationalization, the rationalization of the idea of causality or of a non-theocentric ontology. Courtine and Carraud leave aside the elements of idealism imputed by Heidegger to early modernism (subjective transcendentalism, representationalism), while retaining others, in this case the idea that early modern thought is somehow the outcome of a process of rationalization.

I note that the concept of rationality involved in this characterization is what might be called a limiting concept, that is, a concept which admits of greater or lesser realization and as such may be said to be subject to a kind of teleological orientation. By this I mean that such a concept can be instantiated or manifested by degrees; the instantiation itself may follow a continuous trajectory towards greater (or lesser) exemplarship, culminating in the maximum (or minimum) degree of such a concept. For example, Courtine first finds the origins of systematic ontology (as opposed to a theologically oriented metaphysics) explicitly in Suarez, but most fully realized in early modern thinkers such as Leibniz and Wolff, these latter two unhindered by Thomistic and Jesuit doctrine which worked to constrain (according to Courtine) its full expression. Courtine furthermore finds anticipations and hints of the Suarezian systematizing of ontology in predecessors such as Scotus and even in Aquinas himself (in particular the idea that theology or *sacra doctrina* must be a itself be systematic science, that, were we to have full knowledge of the deity, would function as first philosophy in place of metaphysics, the latter which does not have a complete concept of divine nature available to it, and so in this respect is hindered, only able to incorporate God as a cause and not in his full nature).

In contrast, non-limiting concepts, such as the familiar categorical concepts of substance, relation, cause, or similarity or analogy, are generally understood not to admit of more or less, as Aristotle was the first to remark (in the case of substance). Something cannot be more or less of a substance, or more or less a relation. Neither can a comparison be more or less analogical, nor can two things (in terms of a single facet of comparison) be more or less similar (similarity in this sense is understood to be identical with equivalence or congruence in terms of a certain parameter). Non-limiting concepts are binary—they either apply or do not

that is, a series of theorems ordered according to deductive consequence, or what in more modern terms would be called a formal theory.

apply. Most of the more recent attempts to isolate a set of concepts crucial to the development of modern thought have centered around such non-limiting concepts—for example, Lagerlund's postulation of the importance of a mereological, as opposed to hylomorphic or compositional notion of substance (see below, section 3.1), or Schmaltz' and Laudan's discussion of the importance of a dissimilarity principle in modern thought (section 3.5), not to speak of most of the ideas in Ott's approach (mechanism could have been a potential exception, but I note that Ott, positing two distinct varieties of mechanism that are neither more nor less mechanical, nor related by any relations of inclusion or abstraction, does not treat it this way).

There is an important consequence of this difference in focus. By the use of such non-limiting concepts, the latter group of thinkers are theoretically committed to a sharp divide between systems of thought which employ such concepts, and those that don't. Conceptions of substance cannot be more or less mereological; the objects of sensual perception cannot be more or less similar to the ideas which express them. If a distinction between systems of thought is founded on such contrasts, the systems of thought themselves must be discrete and such a distinction must be both sharp and absolute. If modernity is based on a mereological conception of substance, different from the hylomorphic orientation of later medieval thought, then, (given the centrality of conceptions of substance) we are forced to draw a sharp distinction between modernity and medieval thought⁴⁹. These differences could well serve as the foundation for a paradigmatic distinction between these two historical eras, should one be inclined to draw such a distinction. Thus according to Lagerlund's own criteria, Buridan and Ockham, as the originators of the mereological conception of substance, are modern, and not medieval thinkers. It is true that Lagerlund and the others often do not fully follow through with such consequences, but that may be due to their interests presumably lying elsewhere, in charting the development of certain concepts key to modern thought, rather than in a synoptic historical taxonomy of philosophical systems. Nevertheless, the potential for such a taxonomy remains.

But what I call limiting concepts, such as rationality (under the broadly Heideggerian interpretation of Courtine and Carruad), do not admit of sharp distinctions and in this way have the potential to find themselves in conflict with consequences that could be drawn from the other set of ideas should we wish to explore such paradigms. Moreover, limiting concepts

⁴⁹ To be clear, I accept that such a sharp distinction exists.

carry over many of the features of concepts in Heidegger's thought, especially phenomenological ideas such as a horizon, or the capability for presence and absence, which fall into the same family of limit concepts, admitting as they do of gradation. Thus, although analytical Heideggerians such as Courtine and Carraud appear to have left much of the Heideggerian discussion of the trajectory of being behind, I would contend that much of it remains in their discussions of systematicity and rationality, in terms of the form or general category of these concepts. In fact, the roots of these presuppositions can likely be traced back to 19th century German *Lebensphilosophie*, for which rationality and systematization were to be seen as the outcomes of a narrowing, abstractive process. As Staiti (2015) explains in elucidating the functioning of this way of thought in Dilthey,

On Dilthey's account all philosophical concepts, even those that appear most dry and neutral at first glance, resemble a chemical precipitate, in which life and its dramatic struggle for self-understanding are somehow sedimented, often in disguised form. The really interesting philosophical work is not the one done with philosophical concepts, combining them in novel variations in order to produce seemingly original ideas that will inevitably follow the destiny of past ones. Rather, the work should focus on philosophical concepts, or perhaps 'behind' them, trying to lay bare the life which endeavored to express itself in them and in so doing learn more about our human condition, which Dilthey considered constant throughout its historical vicissitudes.

Such sedimentation, as I interpret it, is a process that admits of degrees, of more or less, as the precipitation model would imply. Concepts can be sedimented and gradually precipitate, leading to a form of thought that is more or less removed from its original life which endeavors to express itself.

While Courtine and Carraud (and other Analytic Heideggerians) likely do not share some of these conclusions (especially the idea that there must be a constant human condition from which the end points of the sedimentation processes are, to a certain extent, deviations) it still appears to me that there may yet be shadows of these developmental assumptions present in their work. For example, Carraud's (and Marion's) reflections on the position of Descartes' thought in their respective interpretations of early modern philosophy appear to follow from several consequences of such limit concepts—that in fact less sedimented, or on the other hand, more formalized versions of these theories may be possible.

For Carraud, for instance, Descartes' relationship to the development of the rationalization of causation is ambiguous because of the ambiguities surrounding the interpretation of divine being and causality. Rationality

and causality appear to be less formalized in Descartes' thought, (as compared, for example, with Leibniz or Spinoza) because there is at least one domain of reality in which this causal relationship does not appear to admit of a precise semantic interpretation, the domain of divine causality (section 3.6 below). One could claim, with Carraud, that this ambiguity is due to the less formalized nature of the principle of sufficient reason in Descartes thought, found in its most fully realized form in Leibniz. Descartes thus can be claimed to have introduced the principle of sufficient reason into modern thinking, but yet at the same time to have held back from following through with the full set of its consequences, as Carraud claims.

Yet the idea that rationality (or indeed any similar principle capable of formalization) can be latent or lie sedimented carries its own difficulties, such as the following: Such concepts should in fact only serve as a basis for distinct epistemic paradigms when fully articulated, not latent; for the grounds of latent concepts are usually claimed to be able to generate concepts that are mutually inconsistent or non-compossible with each other. Likewise, the notion of latent rationality or systematicity itself is rather questionable, as will be clarified below (chapter two).

If we are to square these limit ideas with the other set of what might be called doctrinal developments, we need to move away from limit concepts, or the limit interpretation of such concepts (carrying as I believe they do in this case, a great deal of likely unacknowledged Heideggerian / *Lebensphilosophischer* presuppositions), as well as from a number of other Heideggerian characterizations of modern thought: the centrality of subjectivity, and of representationalism.

For there is evidence that early modern philosophy is not a philosophy of subjectivity, nor was it troubled by problems associated with representationalism (sections 3.3; 3.4). As for the particular ideas that I have in this instance called limit concepts, I believe that there must be another way to formulate them so that they do not suffer from the Heideggerian / *Lebensphilosophie* presuppositions mentioned. Taking hints from both Marion and Foucault, I suggest that the model of a dyadic relation furnishes the most suitable interpretation. Relations are non-limiting concepts, and an interpretation of rationality grounded on such a non-limiting concept yields the following: the rationalizing aspect of early modern philosophy, identified as a feature of early modern philosophy since at least Heidegger, is not to be understood as a precipitate, as the outcome of a process of systematization or ordering as such (and still less with mathematization in Heidegger's sense), but with the universalizing or domain broadening aspect that follows from the replacement of class-

based interactions (typical of type-based theories such as medieval hylomorphism), with unmediated, brute dyadic relations that do not fall into classes or types, and take the entire extent of reality for their domain and range. In this way, the systematizing aspects of continental rationalism can be brought into explicative harmony with the Humean maxim that "anything may produce anything"⁵⁰ and, potentially, with the rest of British empiricism, a connection that hasn't previously fit well within the kinds of explanations given for the alleged rationalization of modern thought. In this way, British empiricism can be seen to be a kind of rationalism as much as and in the same way as so-called continental rationalism.

As well, this kind of model is the only explanation for the appearance of this kind of structure in so many different problem areas in early modern philosophy, not only in causality, but also in the domains of sensorial perception, the interpretation of language, and the make-up of substance. None of these latter manifestations can be claimed to be instances of rationality as such: how is a dissimilarity-based model of sensory perception (as in Descartes), or the gradual "disappearance of analogy" in early modern thought, as documented by Schmaltz (2000), be more or less rational than their alternatives? Nor can these changes be linked to explanations of the development of the idea of laws of nature.

I will briefly contrast (in the concluding chapter) the sense in which I intend to employ the concept of relation in my explanation with a somewhat similar foundational project of Ernst Cassirer in *Substance and Function*, wherein Cassirer attempts to explain the modern (contemporary) theory of concepts in terms of "function, series, and order (relational structure)" (Friedman 2016). More precisely, Cassirer (1923, 9) tries to form a contrast between what are, in his terms, "the two chief forms of logic", which are distinguished by the attention paid to "things-concepts", on the one hand, and "relation-concepts" on the other. The former characterizes traditional logic; the latter, modern. It should also be understood that the contrast between the two forms is not restricted to the domains of either logic or concepts, but has implications for the whole of the knowledge systems of which they are a part. Yet despite this apparent

⁵⁰ Hume, *Treatise*, 1.3.15. I take it that this universalizing and de-hierarchicalizing of the causal domain is also behind Kant's third analogy of experience (that all bodies perceived as existing simultaneously must be thought of as in mutual interaction), and his notion of causal community. As noted in the next footnote below, I also think community can be interpreted in another sense, which I shall explore more fully in the conclusion.

similarity, Cassirer's conception of relation is closer, I would contend, to Kant's third category of relational structure, that of community⁵¹, rather than the dyadic, anti-symmetrical relations discussed here, which in turn better exemplify Kant's second category of relation, that of ground and consequence.

I should also like to say that I am not advocating a structural realist approach to the interpretation of early modern philosophy, nor proposing that early modern scientific theories are amenable to contemporary structural realism; structural realism is an attempt to preserve a kind of minimalist realism in the interpretation of modern scientific theories (primarily in physics), against skeptical claims motivated by the historical truth-variability of such theories (the so-called problem of meta-induction or pessimistic induction)⁵², by postulating that structure, in some manner or other, is more foundational than entities. Unlike the structural realist, I am not attempting to preserve the truth of an interpreted theory by postulating a realm of objects (either real, as in ontological versions of structural realism, or propositional, in epistemic versions) to which such theories under consideration putatively apply. As we saw earlier with Marion, Descartes' substitution of the relative for the simple in the category of substance was really an epistemological and methodological substitution of one category for another; a cause was to be treated as if it were a relation, and not a simple thing, but solely for the purposes of knowledge. Likewise, I am not attempting a revisionary interpretation of early modern metaphysical systems by claiming that the objects of the metaphysical inquiry of Descartes and Malebranche are really, or are best understood as, relations in some way or another. Instead, I suggest that relations (or more accurately, a particular interpretation of a certain kind of relation) can serve as a heuristic guide for interpreting many of the philosophical choices made by early modern thinkers, not simply in ontology, but in epistemology, theories of sense perception, and duration, as we shall see. In a sense, one could claim that all concepts are relational, in that they involve connections with other ideas⁵³. Indeed, Marion (1975)

⁵¹ Understood, that is, as a competing model of causality, and not as a complimentary aspect of it (as in Kant). More explanation in chapter four, below.

⁵² See e.g. Ladyman (1998), or in the present context Domski (2013).

⁵³ In fact, this is an old idea with classical antecedents. Simplicius reports that Andronicus of Rhodes claimed that quality, quantity, and indeed all of the other ten Aristotelian categories, with the exception of substance, were relational categories (*in Cat.* 63, 22–26). Aristotle himself speculated about the possibility that some substances could in fact be relatives. (*Categories* 7, 8a14–8b24).

shows that this was explicitly argued for by Descartes in his early work on the rules of philosophical method (the *Regulae*) for at least a certain number of traditional concepts. Descartes, however, knew only one kind of relation, the two-place, unidirectional or anti-symmetrical relation⁵⁴ (such as cause and effect, or of property inheritance). Modern logic and mathematics has, however, greatly expanded the concepts of relation and relational order to include polyadic relations, not to speak of the identification of relational meta-properties (i.e. properties of relations themselves) such as transitivity, symmetry, etc., which allow for the identification of complicated relational orders such as partial orders. This is not to say that earlier thinkers did not employ concepts that we would identify as exemplifying partial orders or polyadic relations. But the developments in modern logic and mathematics enable us to advance a comprehensive theory of such relations in purely logical terminology. It is my contention that a number of these relational structures (three, in fact, similar to the three relations in Kant's table of categories of relations from the first *Critique*⁵⁵) act, and have acted, historically, as a heuristic guide for the interpretation of causality, being, and identity. Thus, by claiming that dyadic relations ground early modern thought, I am not attempting to claim that early modern thinkers anticipated a form of structural realism. Rather, I would say that all philosophical thinkers whose work makes causal or ontological assumptions operate with one of these three causal models, and that these models act as a heuristic guide for the kinds of relations that serve as the focus for such work; relations that, as nearly all concepts can be thought of as relational in some way or another, are involved with other sorts of concepts, such as those concerned with being, substance, and causality.

Somewhat speculatively, I suggest that these concepts act in the manner of parametric regulating concepts, in a kind of conceptual language, or language of thought, much as certain grammatical parameters have been alleged to function in language, according to the principles and

⁵⁴ Descartes was arguably aware of at least one other kind of relation, the reflexive relation of divine self-causality or *causa sui*. Descartes' struggle to interpret the coherence of this concept, however, should be noted (see Carraud, 2002, and below, section 3.6).

⁵⁵ I.e., the relations of inheritance, causality, and community. However, in this analysis, unlike Kant I interpret all three in terms of causality, providing three mutually exclusive models of causal interaction. See Taborsky (2010) for a fully worked out explanation of this model, as well as its grounding or schematization (to borrow Kantian terminology) in models of growth.

parameters theory in linguistics (as in the quote from Baker at the beginning of this section). According to this theory, certain linguistic features, such a language placing the class of words that are called prepositions in English (at, by, on, and so on) before their object (as in "under the bed"), or after them (in which case they are called postpositions) as in certain other languages (e.g. in Chinese the former example becomes "床下" [*chuang xia*]—"(the) bed under"), function as a kind of binary switch, separating languages into classes, depending or not whether a condition is fulfilled or not fulfilled, creating a "finite system of discrete differences" out of the set of all languages (Baker 2003, 5). According to this theory, geographically and linguistically separated languages that have no evolutionary relationship with one another can in fact be close cousins, depending on which parameters they fulfill or do not fulfill and the extent to which these parametric choices affect the phenomenal character of the language, that is the extent to which these choices affect the overall linguistic character of the language in question. Because these parameters are not the result of linguistic derivation (close linguistic cousins, such as English and French, can make different parametric choices, while unrelated languages can make the same choice), they are not tied to a lexicon (a language's total word set), and thus have little to do with the meaning or semantics of the language. I suggest that the causal models mentioned above function in a similar way: they are purely structural features of thought, and so do not answer philosophical questions or respond to philosophical choices⁵⁶, unlike certain other ways of partitioning philosophical theories (mentalities and outlooks), which I shall discuss in the next sub-section.

And finally, I wish to advance the somewhat speculative assertion that early modern thought is as much a reaction against certain late medieval philosophical orientations or developments than it is against Aristotelianism, as is conventionally claimed. Specifically, I contest that the dyadic structure of early modern thought places it in conflict with some theses of Scotism, in particular Scotistic modal theory (although there may very well be other aspects of Scotism that have had an enormous influence on and carry over into early modern thought, as has been documented by many scholars). Scotism, in other words, largely follows a different relational model than most of early modern thought; I will discuss this in more detail in the concluding chapter.

⁵⁶ Unless one takes the phenomenological experiences of growth, decline, and stability to be the result of, or to be able to influence, philosophical choices—but I must leave this question aside for the purposes of the present study.

1.3 Outlooks, mentalities, and universality

First, a few methodological preliminaries: In order to begin this investigation, it is important to look at thought that is properly philosophical. Doing so excludes intuitive unities such as mentalities or *weltanschauungen*, as well as what I will (in chapter two) call outlooks, which are, roughly speaking, complete or comprehensive metaphysical perspectives that prescind from the kinds of causal structures or schema that I outline in the concluding chapter⁵⁷. Likewise, though the rise of modern philosophy is closely tied to developments in modern science, it is necessary to understand the extent to which philosophical developments are independent of scientific developments, if philosophy is to preserve its independence as a separate universalizing dimension of thought, not tied to any particular intellectual discipline such as physics or ethics⁵⁸. I would thus like to bracket scientific developments. Though I do pay significant attention to philosophical ideas closely connected with the development of science (collected together in the third of three groupings of interpretations of early modern thought, below), in order to relate them to other developments and interpretations, I believe that scientific developments and discoveries must be understood as a pole around which philosophical positions can coalesce or emerge out of, not necessarily as fundamental to that development⁵⁹. Thus, although there is no doubt that scientific developments must be included if we are to understand what is distinctive about early modern philosophy, the final version of this interpretation should be comprehensible independently of scientific developments; that

⁵⁷ Outlooks differ from mentalities in that the former are systematic, and intended to be rational and consistent. Outlooks differ from the kind of thought structures which I wish to examine here in that outlooks, established by rational debate, have or revolve around debatable contraries (e.g. various versions of realism and idealism or anti-realism, or sceptical and anti-sceptical positions), unlike quasi-rational unities such as early modernism, and wholly intuitive unities such as mentalities and *weltanschauungen*. For further explanation see chapter two, below, as well as the discussion of rationality in section 3.6, and chapter four.

⁵⁸ For philosophy as a universalizing mode of thought that may arise out of, and find expression in, various particular intellectual fields such as physics or economic organization, see (Reding 2015, 22).

⁵⁹ Something of this ambiguous relationship between science and interpretation can be seen in some of the viewpoints discussed in sections 3.1 and 3.5 below: Lagerlund et al. insist that developments in metaphysics eventually led to revisioning of science; Gaukroger and Laudan, however, see this relationship reversed.

is, it should not be necessary to use the vocabulary of science to articulate exactly what is characteristic of the philosophical approach of this period. Science, and specific scientific theories, like language, rather act like a superstructure that enable continuity over time, as they act as social storehouses of knowledge, and are compatible with widely varying philosophical positions.

At the same time, I think it is important to realize that philosophical thought differs from the thought of other intellectual disciplines in that it is, I believe, inherently cross-disciplinary; in fact, in a certain sense it is incorrect to think of philosophy as a particular academic discipline at all, in the same sense as other disciplines in the social sciences and humanities. Here is a model that may serve as an example: medieval logicians identified a small number of logical or what might be called quasi-logical concepts, which they called transcendental, on account of their ability to be universally predicated; that is, these concepts could be said of objects in every realm, or rather over every type of potential subject matter—they could be predicated of every so-called category of terms. Thus, beings, as well as qualities, or quantities, could possess unity, or be one. Likewise, relations, or qualities, or states, can all be the kinds of things which can be good, or something, or existent, in some way or another. To put it another way, all of these categorical realms or domains (such as those of substance, relation, quantity, etc.), which together encompass all of reality, have the potential to be, individually, the domain of the transcendental, in that they can each give rise to things that can be called one, or good, or something (which concepts actually belonged to the list of transcendental concepts was subject of some controversy, but usually included at minimum being, unity, and goodness).

I think it fruitful to think of philosophy in this way, as a science of transcendentals. This is not because it might be allegedly universal in the way one might speak of linguistic or predicative universals, or as a kind of *philosophia perennis*. That, of course, would be historically naïve, and as we have seen, the list of such transcendentals was itself a matter of dispute. The sense of universal which I intend to be understood in the concept of transcendental is that of trans-categoricity, that is, universal applicability, or the potential to be predicated in every category, as just indicated, if we think of the categories as the various sorts of subject matter that are investigated by the other organized systems of knowledge. In terms of philosophy's relationship with other disciplines, this should be understood in the following way: philosophical concepts (which we needn't for the present identify precisely) are those which have the potential to arise in nearly every domain of organized thinking. Nearly

every domain of thought deals with being, or existence, or causality, or relations, or temporality (for example) in one way or another. By "deals with" I mean that these domains (or their practitioners) make assumptions concerning how these concepts are to be interpreted or realized. A version of sociology, for instance, which makes much of relational networks or emphasizes emergent phenomena⁶⁰, obviously places a certain emphasis on the importance of the category of relation, as opposed to that of individual or separable substance. Relation and substance are both properly philosophical, and hence, transcendental, concepts, in the sense in which I mean for them to be understood here. Now we can see that in actual practice a short list of disciplinary transcendental concepts will more likely resemble the traditional list of categories themselves (i.e. the traditional ten Aristotelian categories such as substance, relation, quantity, etc.) as opposed to those of the usual lists of transcendentals, (being, good, one, thing, etc.). In this sense, my argument for the parallel between the transcendental concepts and what I have called disciplinary transcendentalism is only analogical. Nevertheless, I think the comparison is useful, for it highlights a way in which the universality and interdisciplinary nature of philosophy can be understood, indeed in which the latter, the interdisciplinary nature of philosophy, can be conceptually separated from age-old questions about the existence of a *philosophia perennis*.

It has become fashionable to question the universalist aspirations of philosophy (and indeed I begin chapter two below with a suggestion that the concept of a single correct or perennial metaphysics is not a goal we should aspire to). The history of philosophy has well illustrated the variability of philosophical goals, concepts, and problems. Indeed, this tendency is well illustrated by much Anglo-American scholarship in the history and historiography of philosophy⁶¹, which appears to see philosophy primarily as a specific historical body of literature or a product of a specific intellectual discipline, or, (in an attempt at a sort of cross-disciplinary contextualism) a variety of different disciplines. Such contextualism is taken to be a kind of antidote to an over-rationalized absolutism or "appropriationalism" (Laerke, Smith & Schiesser 2013, 1), which envisions philosophy as a non- or a-historical form of perennialism⁶².

⁶⁰ For example, the actor-network theory of Bruno Latour.

⁶¹ See, for example, the essays in Laerke, Smith & Schiesser (2013).

⁶² Strictly speaking, appropriationalism refers to an approach that sanctions the use of past philosophical arguments to bolster present needs; but some sort of perennialism, if only on the argumentative level, is a consequence.

But one problem with the contextual approach, as I see it, is that it identifies philosophy only as a product, as something finished (or, at most, as something in the process of being generated out of non-philosophical contexts⁶³), not as something which has the capability to generate thought itself, that is, to build and not simply to be built. I think the dangers of absolutism / appropriationalism are real, but as I have said and tried illustrate, there is more than one way to understand universality. The kind of universality I have in mind for philosophy is not that of perennialism, but of trans-categorality. In this, way, I believe, we can avoid the dangers and over-simplifications of the problems associated with absolutism, but still preserve a sense of the universality and inherent, as opposed to merely accidental, trans-disciplinary nature of the philosophical enterprise.

1.4 Overview: A look ahead

I shall have slightly more to say on such methodological considerations in chapter two, below. In chapter three, I return to the subject matter proper of this study and shall look at a number of traditional interpretative approaches to early modern philosophy compatible with my methodology. They are listed below (authors associated with these approaches and discussed in the sequel are in parentheses):

- Suarez, Scotus, and the development of systematic ontology. (Honnenger, Courtine)
- Corpuscularianism and the mereological revisioning of substance. (Lagerlund, Pasnau, C. Wilson)
- Modern philosophy as an expression of subjectivity (Hegel, Heidegger) or mathematization. (Heidegger, Koyré, Husserl, Burt)
- Early modern philosophy as form of representationalism. (Heidegger, Rorty, Foucault)
- Early modern philosophy as the outcome of a process of rationalization—the revisioning of causality in light of the principle of sufficient reason. (Carraud)
- Modern philosophy as grounded in a "principle of dissimilarity", or by the loss of certain kinds of analogical arguments. (Laudan, Schmaltz, Marion)
- The development of new attitudes to temporality and dynamism. (Burt)

⁶³ See e.g. Vermeir's (2014) "geneological" approach, in Laerke et al., *op. cit.*

The first, third, fourth and fifth interpretations have roots in post-Kantian interpretations of the history of modern philosophy, especially in the thought of Hegel and Heidegger. The others are closely tied to developments in modern science and more recent historiography.

These interpretations can further be divided, by partitioning the first distinction above. One set (the first and fifth items) is connected with the systemization and rationalization of concepts related to being and causality. The second set (the third and fourth items), are part of a certain trend or tendency of interpreting early modern philosophy as especially concerned with developments in epistemology. Developments related to or connected with the development of early modern science (the second, sixth and seventh items) will then form the third set of interpretations. We are thus left with three at least partially distinct interpretive approaches.

Let us look at the second set first. I shall argue below (section 3.3) that early modern thought cannot be seen as the outgrowth of a turn to idealist subjectivity, an interpretation that has roots in Hegel's interpretation of Descartes' role in the development of modern philosophy, an interpretive tendency that was later taken up (with some modifications, such as connecting modern subjectivity with mathematization) by Heidegger. Since Hegel's influential *Lectures on the history of philosophy* at least, the cogito argument in Descartes has been taken as emblematic not only of Descartes' philosophy, but, in terms of the subjective orientation it is taken to represent, of early modern thought as a whole⁶⁴. It has been argued, by Schmaltz, Ariew and others, that the cogito had played less of a role in both the historical development of Cartesianism and early modern philosophy than often thought; I hope to show that some proponents of the idea that early modern thought has been a process of rationalization (interpretations three and four) undermine the subjectivity argument in the development of their own standpoint.

The idea that early modern thought adheres to a form of representationalism or a "way of ideas", an interpretation put forth by Thomas Reid in the eighteenth century and later taken up by Rorty, has likewise been subject to recent reevaluation. Some have argued that the picture of early modern thought as plagued by representationalist dilemmas may have been due to preoccupations of early-twentieth century

⁶⁴ The so-called epistemological interpretation of early modern philosophy has roots in Kant, not to speak of the work of historians of philosophy such as Tennemann and Victor Cousin (see Haakonssen (2004) for a survey of the historical origins of this perspective), but the idea of specifically subjective turn likely had to wait for the German idealist perspective on the critical philosophy.

analytic philosophy⁶⁵, but it should be noted that the representational picture has had "continental" defenders as well, such as Heidegger and Foucault. Here (section 3.4) I hope to show only that Foucault runs into serious consistency problems when using representation as an interpretive key to early modern thought. I shall also expound this critique of Foucault's interpretation in more detail at the end of the next chapter.

If subjectivity and representationalism are excluded as keys to early modern thought, this leaves early modern thought at the intersection of the remaining two interpretative approaches—competing approaches that disagree to an extent, yet overlap. Where does this leave the question of the unity of early modern thought? What lies at the centre of this intersection? As I will suggest, in order to reconcile the first and fifth interpretations (the rationalizations of being and causality, respectively) with the ones that remain, the first set must be reinterpreted to fit the orientation of the final interpretive set. How does one align systematicity and rationalization with interpretations that centre around transformations of concepts that arose (in early modern thought) against the background of natural science—that is, interpretations that have to do with temporality, the composition of substance, the reduction of the four Aristotelian causes to efficient causality, and the like? The first set of interpretations, focused on systematization and rationality, would appear to include intentional components (rationality, the concept of a system) that the second set lacks. Thus, a reinterpretation of these intentional components is called for, should that be possible. As a start, I believe that the generalization that is involved in rationalization can indeed be understood in a different way; this will be explored more fully in the conclusion.

In a way, however, we have already seen (or will see, below) something of such a re-interpretation in the works of Courtine, and Carraud, mentioned above. Both of these authors have taken an interpretive approach to early modern philosophy that I have called Analytical Heideggerianism. The idea that early modern philosophy developed expressly as a process of systemization and rationalization of certain scholastic metaphysical concepts, prolonging certain developments in late scholasticism (especially Suarez) derives from Heidegger's work. Courtine and Carraud, however, are able to detach these concerns from other elements of Heidegger's philosophical project, retaining, for instance, traditional conceptions of truth, and avoiding Heidegger's negative valuation of rationalization and systematization, as well as detaching these developments from the

⁶⁵ For a brief discussion of some of these distortions, see (Ayers 2010, 275 ff.) See also (Pyle 2010, 128–130), in the same volume.

trajectory of the interpretation of being suggested by Heidegger. Part of my suggestion is that this analyticalization of Heidegger (which is *not* a form of rationalization, as I will explain below) can and indeed must be taken further, if we are to make sense of other interpretative approaches to modern philosophy. For if we are to reject the idea, as I think we must, that a mereological approach to substance, for instance, is more rational or rationalized (in the Heideggerian sense) than, say, allegedly pre-Socratic approaches to being and substance, then we must find another way to interpret the changes in modern thought outlined by Carraud and Courtine. I suggest, then, that systematization and rationalization do not adequately define the narrative of early modern thought (as developed by these two authors), and, *pace* Carraud, the principle of sufficient reason must be seen as merely an instance of, and not the end point, of these developments.

To do so, I will take some suggestions from the work of Foucault and Jean-Luc Marion (the work of both might also be seen as belonging to Analytical Heideggerianism, in that they adapt ideas from Heidegger, while abandoning what might be called his "eschatology"). Both Foucault and Marion emphasize the importance of the idea of order or relation to early modern thought, an important insight which I shall try to develop in the concluding section. At the same time, both adopt interpretive frameworks that are, I believe, problematic. I shall discuss Foucault more systematically in the next chapter, and in the conclusion. Marion's work will be touched on in the discussion of subjectivity (section 3.3) and in the conclusion as well.

Early modern philosophy encompasses a great variety of thinkers. For reasons of space and focus (and my own competence!) most of the discussion here is confined to a few central figures, primarily Descartes and Malebranche: Descartes, as his work is the focus of so much interpretative work in early modern philosophy, and Malebranche, who shows us both the limits of, and other, less recognized possibilities of Cartesianism.

CHAPTER TWO

PHILOSOPHICAL SYSTEMS AND RATIONALITY

A metaphorical expression is always obscure.

—Aristotle, *Topics*, VI, 2

The only generalization to make about language and science is, therefore, to make no generalizations.

—Yuen Ren Chao, *Notes on Chinese Grammar and Logic*.

The idea that metaphysics might not only have a history, but might at bottom be a fundamentally historical discipline¹, has become an all too familiar, albeit controversial, idea.

For example, at the beginning of his study of Suarez and the development of modern ontology, J-F. Courtine (1991, 5) tells us that

Par où [the history of metaphysics] nous entendons toujours concrètement, non pas quelque improbable *philosophia perennis*, mais la tradition, riche en métamorphoses, des *Métaphysiques* aristotéliennes, c'est-à-dire des traités, relativement disparates, réunis après coup, sous ce titre embarrassé.

[By the history of metaphysics we always specifically understand, not some improbable perennial philosophy, but the tradition, rich in transformations, of the Aristotelian *Metaphysics*, that is to say those treatises, relatively disparate, thrown together under this problematic title.]

Thus, for Courtine, metaphysics is a tradition of metamorphoses; it is not only a domain with a history, but this very history or tradition itself, with a problematic (*embarrassé*) unity. Courtine is also, of course, alluding to the problematic unity of Aristotle's *Metaphysics* itself, a work whose unity now appears to have been more accidental than planned, titled after an expression ("metaphysics" = *ta meta ta physica* = after the lectures on physics), which is not present in the work that bears its name (a name

¹ I.e. that there is no truth value to metaphysics independent of its particular, historically situated formulations.

which moreover may have originally been no more than a mundane label²). The two histories (of metaphysics, and of the reception and transmission of Aristotle's work of the same name), are, for Courtine, comparable.

The idea that metaphysics might be a historically situated or grounded discipline is not new (it can be traced at least to Heidegger, if not even further back to Hegel). It is no less clear that this picture is any more adequate than the older idea of metaphysics as *philosophia perennis*, but this idea does at least suggest that there may be other kinds or sources of unity in philosophical thought that may have been overlooked.

Taking the historicity of ontology as a provisional suggestion, I would like to make some preliminary attempts to look into sources of unity in early modern philosophy and metaphysics; for we must remember that, as Courtine has pointed out, historicism allows for unity as well as disparity and metamorphosis. It may well be that the *Seinsfragen* has no single answer, but this is not to say that the set of variations of whatever may take the place of a single answer is unlimited, or that these replacements have no centrality or unity.

And I should like to emphasize that I am concerned here with internal sources of unity, much as Courtine and Heidegger were, and not with external sources, such as might be exposed by sociological and historical studies. For some might claim that present-day history and sociology are themselves grounded in contemporaneous interpretations of metaphysics. At any rate, it is not obvious that such hermeneutic circles can be avoided by an externalist approach, which might in fact leave us at the same place where internalist approaches begin.

At this point, I would like to lay down a few methodological principles or guidelines that will roughly govern what follows:

To begin with, I think that philosophy must be sharply separated from "mentalities"³ or *Weltanschauungen* such as one might encounter in examining intellectual or cultural environments such as art, political thought, etc. As Vuillemin says (Vuillemin 1986, viii), in answer to the question of what constitutes a philosophical system, "I deny that a *Weltanschauung* is a philosophy, since publicity entails neither consistency nor a wish for consistency". Philosophical systems are ordered, reflexive systems of thought. They may be related to, but cannot express a *Weltanschauung*, for the latter may include conflicting elements as well as positions that have not been fully worked out. Philosophy, and any meaningful exploration of

² "Postscript to Natural Science" in Richard Hope's phrase (Hope 1952, vi).

³ For the general lack of explanatory power of mentalities, see (Lloyd 1990).

the intellectual and historical contours of philosophy, must thus avoid attempts to find grounding or explanation in suggestive but unsystematic thinking, such as is sometimes alleged to be found in a specific culture, historical epoch, or even language. For philosophy, as reflexive thought, is part of the attempt to refine and extricate thought from such unsystematic thinking, and we must beware of equating or drawing parallels where no such parallels or one-to-one correlations may exist. The medieval theological-philosophical *Weltanschauung*, for example, grounds quite disparate systemizations such as the nominalism of William of Ockham, on the one hand, and the realist approach of Aristo-Thomism, on the other⁴; likewise, the German language has given us both Kant and Heidegger (and Carnap), and Greek both Plato and Chrysippus. With this last example, let us beware indeed of speaking of a so-called Greek or "Western" mentality, a shibboleth (usually) that makes its appearance whenever larger contexts are broached. In comparative studies it has become something of a commonplace to find the equation of "Western" logical thinking with Aristotelian syllogistic (and whatever non-logical consequences are supposed to follow from it), in complete ignorance of other equally Western logical traditions such as Stoic logic, medieval theories of consequences (in which syllogistic logic played merely a small part), or modern mathematical logic, not to speak of the historical variability of the interpretation of Aristotelian syllogistic itself, which has yielded logical theories so different from one another that one might conjecture that the syllogism, rather like religious systemizations such as Buddhism, has over time become all things to all people⁵. At this point it is worth mentioning the remark of Regamy: "Whatever you can affirm about Eastern or Western thought, it is always possible to quote a doctrine which

⁴ Unless, that is, one subscribes to the old and familiar NeoThomistic picture that identifies this *Weltanschauung* with the thought of Aquinas and sees all else as mere anticipations or deviations (which, for one thing, would have the effect of turning scholasticism into a philosophy, rather than a methodology or even a kind of language). But as Pasnau (2011, 429) remarks, this picture has become a dated one.

⁵ See the first chapter of Lukasiewicz (1951), for a discussion of much of the traditional "Aristotelian" logical lore that has no place in the historical Aristotle. For example, the time-honored syllogism which begins with "All men are mortal" is really an example of the logical rule now called substitution and detachment, not syllogistic inference (which never includes particulars such as "Socrates"), and is not to be found anywhere in Aristotle. Aristotelian syllogistic validity has been interpreted as an example of both classical validity, and one of its modern rivals, relevance logic (Woods 2014).

says exactly the opposite." (quoted from Reding [2004, 1]).

Likewise, the differences between what I have called in Taborsky (2010) an outlook, and a philosophical system or paradigm are just as crucially important. A paradigm or philosophical system⁶ with sufficient breadth, depth and robustness may have many different articulations and can come in many varieties; for example, one can fruitfully talk about the different varieties or interpretations of Cartesianism⁷ or Platonism that have occurred in the historical development of these philosophical systems, not to mention what has often been merely done in their name. These varieties will differ in certain aspects, but will have a determinate philosophical core or centre, encapsulated by a roster of characteristic doctrines. These historically grounded doctrinal systems, however, are to be further distinguished from outlooks, which differ from systems in that they (systems), much as mentalities or *Weltanschauungen*, are best characterized as patterns of thinking with a central focus, rather than as a clearly worked out set of doctrines (a set of doctrines may lack internal consistency).

Outlooks (for example: skepticism, realism, materialism, idealism), differ from mentalities, on the other hand, in that they reoccur many times in nearly every historical epoch; they are perennial, after a fashion, unlike mentalities, which are historically and locally situated unsystematic patterns of thinking. Paradigms and philosophical systems are often internally differentiated and divided by such outlooks, and in order to explore such *longue durée* patterns of thought, that persist over long historical periods, it is necessary to explore systems that can tolerate varieties of these forms of thought—this toleration is part of their very robustness and consistency. Thus what I would like to call a paradigm is public, in a sense, in that it, like a mentality, characterizes a manner of thinking that persists over time, being not confined to one thinker, yet differs from a *Weltanschauung* or a mentality in its self-reflexive

⁶ The "or" here is disjunctive; by a philosophical system I understand an interpretative approach grounded in a historically situated set of doctrines (or better, doctrinal language, since it is usually fidelity to the formulations that are important, not so much the actual ideas or doctrines themselves), usually identified with a particular philosopher. A paradigm is, like a *Weltanschauung* or mentality, more inclusive than a system; it differs from the latter two in that it possesses clarity and consistency.

⁷ By "Cartesianism" in what follows, I sometimes mean the philosophy of Descartes alone, sometimes that of his immediate followers, and sometimes both. I trust context makes it clear which of these senses I have in mind.

organization and consistency.

We must be equally wary of the idealist tendency to treat science as a philosophy or as a vehicle of a particular philosophy, for science (and the knowledge that it codifies) can persist across cultures and epochs, much as language can be transmitted across disparate cultures, often uniting very different communities, to the extent of often constituting the only continuity in a culture that has become culturally and genetically diverse. Scientific knowledge, like language, persists and carries over from culture to culture; Ptolemaic cosmology passed from classical antiquity to the middle ages without alteration, just as a certain core of algebraic knowledge and techniques made up the common intellectual storehouse of the otherwise very different pre-classical cultures of antiquity (Babylonian, Egyptian, Greek and Chinese⁸). I conclude that no science can express a philosophy or philosophic mentality, although it may help to engender one.

Given this, I think that historical, sociological, linguistic, and history of science approaches to the origins modernity must be bracketed, for the purposes of the present study; not that such explorations are never fruitful or can never shed light on philosophical developments. To the contrary, I believe they can. But philosophy, as a branch of systematic thinking, is best thought of as a reaction to such developments, as an attempt to deal with what has been given or inherited from culture and social forms of organization (including science), and as we all know, thought can react to such situations in radically different ways⁹. On the other hand, these very situations often selectively determine what of such worked out systemizations are eventually passed on and persist, carrying out an *ex post facto* selection from such systemizations into our cultural inheritance. In truth, the relationship between mentalities and philosophical systems is rather a complex dialectical one¹⁰, each influencing, but not equivalent, to the other. As I mentioned in the previous chapter, philosophy should be understood as something both built or constructed (in the finished philosophical works of whomever we identify as philosophers) and as something that builds, that is, as presuppositions taken from a particular choice from what I there called transcendentals. This dialectic needs to be taken into account in any exploration such as this one, which is not simply

⁸ See e.g. van der Waerden, (1983). This commonality holds independently of van der Waerden's diffusionist hypothesis.

⁹ For more on the reactive and reflexive nature of philosophical thinking, and its (at least partial) independence from cultural and linguistic backgrounds, see Reding (2004) and *infra*. sections 3.6 and the concluding chapter.

¹⁰ I take this idea from Hoyrup (1994, xv). See also Zarka (2005).

an attempt to isolate a particular taxonomy of philosophical systems as in Vuillemin (1986), but of a particularly historically situated one. So although what follows will be a strictly internal exploration, it has not been done without reflection on external situations, the interpretation of which itself often requires a kind of complex idealization and hermeneutics. For it is no straightforward task to interpret what is culturally or historically significant, especially for philosophical thought—indeed, such systems of thinking may need to be interpreted philosophically before their influence can be understood¹¹.

There are a number of consequences that follow from these methodological principles, which will help to address several questions that will arise in the course of this discussion. One in particular is relevant for what is to follow: the (in)appropriateness of identifying specific philosophical principles as rational principles. If rationality arises through dialogue and public discussion, or through self-reflexive thinking, then it seems we must recognize that rationality can only characterize systems of thought, not specific doctrines or philosophical principles. At the same time, of course, pluralism in philosophical systems or paradigms, (which is, I believe, a consequence of the idea of structure which I argue for here), undermines such a rationality, the rationality of systems, for it implies that no system is fully rational (in terms of its content), for pluralism evades adjudication; there are no rational means for choosing one system over another, if we are to acknowledge that philosophical pluralism, of one form or another, is an inescapable reality¹². These conclusions do not, however, imply that the means such systems may take to establish themselves are not rational, any more than the plaintiff's and defendant's arguments in a legal case could be presumed to be irrational because of their opposition. Only one side can be, at the end of the legal process, judged to be correct, but both sides may yet be rational by the means used to establish their arguments.

We will see below that one strain of thought has postulated rationality as one source of the unity of early modern philosophy. No doubt modern thinkers' attempts to free themselves from the tradition of Aristotle and the

¹¹ For such an interpretation, see Taborsky (2010), Chap. 3, "Stability, Growth and Decline".

¹² Any claim of pluralism in philosophy must eventually deal with the not lightly to be dismissed problem of relativism. I cannot address this problem here. An attempt at one particular resolution has been sketched in Taborsky (2010), chap. 1, though this solution is admitted highly bound to the specific analysis of philosophical paradigms presented therein.

authority of the medieval church were genuine contributions to the rationality of philosophical discourse, but, given what has just been said, it would appear that the extent to which it can be claimed that any one particular principle, such as the Principle of Sufficient Reason (to be discussed in connection with causality in section 3.6 below), or the alleged mathematization of Descartes' physics (section 3.3.2) can be correctly understood as motivated or inspired purely on grounds of rationality, is problematic. If rationality is a property of systems of thought, not of individual principles (except by transference; it might be argued that a rationally defended principle must be rational itself, in some way or another), then rationality cannot be embodied by any one principle; for any single principle can, after all, be held (or opposed) dogmatically¹³.

To move from methodological observations to the discussion itself, I would like to outline a number of characteristics, previously identified by others as characteristic of the philosophical nature of modernity, that are consistent with the approach outlined above; i.e. after dismissing explanations that are based on mentalities or world intuitions, the following remain:

- The development of a univocal concept of being and an objective sense of being, the latter grounding the development of ontology, as distinct from metaphysics.
- Changes in the concept of substance (for example, from an Aristotelian hylomorphic conception to a mereological conception, or to a Cartesian conception of substance as that which can exist independently).
- The alleged subjective character of modern thought, most characteristically symbolized by the Cartesian cogito argument, and its alleged universalizing subjectivity grounded in mathematics.
- Representationalist theories of perception.
- Various versions of a causal "dissimilarity principle".
- Changes in concepts of causality (most characteristically, a focus on efficient causality).
- Changes in the concepts of temporality and motion.

¹³ There are several distinct senses of "rational" in philosophy, briefly discussed in section 3.6 below. The point of the present discussion will be served if we remember that a philosophy can easily be rational in one sense, but not in another; the process of rationalization in philosophy (in particular that associated with Heideggerian interpretations) is thus probably better described in other, more specific ways.

In the first part of the following chapter I shall examine these approaches in sequence. I believe that only some of these can adequately characterize early modern thought, and no one of these suffices in its entirety. In the final chapter, I shall try to propose a perspective on the options that remain.

Part of my inspiration for this perspective derives from a reading of early modern thought proposed by Foucault. At the same time, I think that Foucault's interpretation must be modified in certain ways. In particular, I think that it is to causality, not representation or signification, that we must turn to in the interpretation of early modern thought.

In the *Order of Things*, Michel Foucault characterized classical thought (*l'âge classique* in French historiography corresponds roughly to the early modern period in English) as rejecting resemblance as a feature of the organization of knowledge, replacing it with a principle of "order". According to Foucault, the philosophical epoch preceding that of early modern philosophy organized knowledge by means of a principle of resemblance. For example, according to Foucault (1969, 70)

At that time [the era immediately preceding the early modern period], the theory of the sign implied three quite distinct elements: that which was marked, that which did the marking, and that which made it possible to see in the first the mark of the second; and this last element was, of course, resemblance: the sign provided a mark in so far as it was 'almost the same thing' as that which designated it.

This three-fold scheme of organization was, in the "classical" or early modern era, replaced with a binary or dyadic system. The element that drops out of the triadic system is precisely the factor of resemblance. In its stead is a dyadic relationship between sign and signified, no longer governed by similarity. We are left with a brute relationship between the two termini. This relationship itself comes to govern the linkage between the relata; instead of likeness, there is the mere fact of the possibility of representation, or as Foucault puts it, "From the Classical age, the sign is the *representativity* of the representation in so far as it is *representable*" (72, italics original). Similarity gives way to representability itself, to the mere fact of being able to be placed in a representation relationship with another element, or, in other words, to the only element left in the relationship once resemblance is subtracted: order, the ordering relationship of the sign-signified relation itself.

There are a number of interesting features of Foucault's analysis that I wish to retain. For Foucault, for instance, it is important to note that order in early modern philosophy is not a principle of rationalization; rather it is

merely one kind of organizing principle among many. Resemblance, for instance, is for Foucault the organizing principle of the Renaissance—it is neither more nor less indicative of rationality than the early modern orientation towards order. And clearly, it does appear to be legitimate to conclude that neither order nor resemblance is more or less rational than the other.

Yet it must be noted that "order" remained an ambiguous term for Foucault. As we will see below (3.4), Foucault used the concept in a number of non-equivalent ways, and was never quite successful in working out this ambiguity, and more particularly a general sense in which he clearly wished to use the term, that is, a sense that governs all historically significant sign-signified relationships, and not merely the reduced schema of the classical age. If the sign-signified relationship is to be explained by order, and if similarity or resemblance is one specific form of this relationship, in what way can it be explained in terms of order, not simply bare order, but order in a general sense? What order does similarity exemplify? Foucault appears not to have been able to fully answer this question.

As mentioned, and in agreement with Foucault, I would claim that the gradual tendency towards rationalization that has sometimes been proposed as characteristic of early modern thought (sections 3.1, 3.3.2, 3.6) must be rejected; in its place, I provide an alternative interpretation of the facts that this hypothesis proposes to explain (sections 3.6 and chapter four). Foucault's ambiguous conception of order, however, tended to undermine his re-evaluation of the rationality of early modern thought; I hope to provide an unambiguous conception here.

Ultimately, it would seem that for Foucault (at least in *The Order of Things*), resemblance and order are semiotic relationships; that is, they are principles that regulate representation. Foucault's notion of order in early modern thought follows his understanding of the features of early modern theories of representation. For, Foucault, then, as we shall note below, early modern systems of *mathesis*, "taxonomy" (by which Foucault means an ordering of concepts) and representational theories form a tight synthesis. The leading element in this nexus, however, would appear to be representational theories. In this, as noted by (Han 2002, 56), Foucault largely follows Heidegger, in particular, the Heidegger of "The Age of the World Picture". Here we may read that, "The fact that the world becomes a picture at all is what distinguishes the essence of the modern age." (Heidegger 1977b, 130). Indeed, Foucault's discussion of "classical" thought in *The Order of Things* begins with an analysis of a picture, of a space of representation. It is here that I wish to depart from Foucault's

interpretation¹⁴. The reasons for this departure will be discussed in section 3.4 below, and in the first section of the concluding chapter.

¹⁴ Although I do believe that the structures by which I intend to characterize early modern thought may be mirrored in representational models, just as, as will be seen in chapter four, they can be mirrored in language, I claim (in chapter four) that they do not do so necessarily and naturally (without the need for a further level of interpretation), and can ultimately be fully understood only within a causal model.

CHAPTER THREE

PREVIOUS APPROACHES

3.1 Developments originating in late medieval thought: Systems of ontology

The idea that early modern thinking in general, and Cartesianism in particular, owed much to developments in later scholasticism began with the work of Duhem, in the sciences, and Gilson, in philosophy¹.

In *Suarez et la système de la métaphysique* Jean-Francois Courtine, mentioned above, traces the origin of the modern concept of ontology (in the terminology of the eighteenth century philosopher, Christian Wolff, general metaphysics) to the sixteenth century Jesuit philosopher, Francisco Suarez. According to Courtine, Suarez was the first to rigorously develop a system of ontology or general metaphysics, (in Suarez's case a study of the kinds of objective being, being as the objective correlate of intentional thought) as distinct or independent from special metaphysics that is, a metaphysics that (in Heidegger's terminology) might be called an onto-theological metaphysics, a metaphysics focused on or subordinated to a primary being (God).

Suarez's ontology, in Courtine's interpretation, replaces the vertical onto-theology of being dependent upon or subordinate to God, with a horizontal (unsubordinated) taxonomy of beings. The traditionally ambiguous and sometimes problematic status of theology's relationship to the science of metaphysics (both have a claim to be the most fundamental level of philosophy or speculative knowledge)—in Aquinas' interpretation, for instance, God, the first cause of being, has a determinate relationship with metaphysics, without being part of it or subject to it—is resolved in favour of the so-called *scientia transcendentalis* (ontology), to which even divine being is at least conceptually subordinated.

Even earlier, some had already pointed out the pervasive influence of Duns Scotus in modern thought, or rather in the scholastic climate which

¹ See Robertson (2007) for a brief summary of this history.

formed the immediate background to many of the first early modern thinkers, such as Descartes. According to Ariew, it was Dalbiez, in his critique of Gilson's *Index scolastico-cartésien*, who was among the first to point out the wide influence of Scotism in the late scholastic thinkers who would have been in a position to influence Descartes thought² (Gilson's research was primarily focused on the influence of Aquinas). There is now widespread recognition of the extent of this influence; as Ariew points out, "it can be shown that the philosophical climate in France from the early 1600s (with the major exception of Jesuit philosophy in the first half of the seventeenth century) was predominantly Scotist and not Thomist" (1999, 45). What is more, it has been alleged that this climate was crucial for the development of modern trends in philosophy. According to Dumont (1997, 193–4), summarizing the work of Boulnois and Honnefelder,

Duns Scotus's doctrine of the univocity of the concept of being ranks as one of the most original results of the scholastic period [...] univocity changed the concept of philosophy because it transformed metaphysics from the Aristotelian concept of theology or divine science, concerned principally with immaterial being, to a true ontology. As such, Scotus's univocity marks the 'second beginning of metaphysics' as a transcendental science that would ultimately culminate in Kant [...] it is thus to say that univocity marks the 'turning point' and 'second beginning of metaphysics', which is to say, its beginning in the modern sense.

Recent research has also focused on the alleged modernity of Scotus' ideas of modal concepts and its relation to modern possible worlds semantics³. The modernity in question here, though, is strictly a contemporary one, the reference being to twentieth-century modal semantics, not early modern modal theories. In concert with this, it has been pointed out that the modal systems of early modern figures such as Descartes and Leibniz may not match the conceptions of Scotus, despite apparent similarities in conception and terminology⁴. This issue hints at an ambiguity in Scotus' relationship with early modernity; I shall have some brief comments on this ambiguous inheritance, in so far as it relates to the context of my main argument concerning the characterization of modernity, in the final section

² In Dalbiez, (1929) "Les sources scolastiques de la théorie cartésienne de l'être objectif (à propos du Descartes de M. Gilson)", *Revue d'Histoire de la Philosophie*, 3, 464-472.

³ See e.g. Knuuttila (1981).

⁴ See Alanen & Knuuttila (1988) and Park (2000), for the cases of Descartes and Leibniz, respectively.

of this monograph.

To sum up: In both cases (Scotus and Suarez), the analogy of being (a hierarchical taxonomy of beings with a supreme being, God, at its apex) is displaced from its primary role in metaphysics, replaced by concept of being with a single (univocal) sense, on the one hand, or a horizontal (i.e. non-hierarchical) systematic ontology or *scientia transcendentalis* (i.e. a system of the so-called transcendental concepts that can be universally predicated, such as thing, being, finite or infinite, etc.) based on a very general concept of objective or intentional being which includes not only existent, but also possible objects⁵.

It is perhaps less easy to see how this concept of being operates outside of the medieval idioms of transcendentals and varieties of *esse* (being), given that most early modern thinkers dispensed with such scholastic vocabulary and its systemizations. Courtine claims that the Cartesian idea of *mathesis*, as expounded in the *Regulae*⁶, is the inheritor of this tradition. For Courtine, the ultimate mark of *mathesis* is its concern with systemization and order, in particular the concept of a universal order, for example as in Descartes' employment of algebraic symbolism (building on the earlier work of Viète) in his *Geometrie*, for both numerical and geometrical quantities—a specific and literal example of a *mathesis universalis* that included both algebra and geometry. For Courtine, as for Heidegger before him, *mathesis* is the ultimate mark of the modern—except Courtine eschews Heidegger's negative evaluation of *mathesis*.

Does *mathesis* really shed light on the rest of Descartes' work? It would seem to depend on what one takes from *mathesis*. Can the *Geometrie*, and the particular concept of *mathesis* therein, be taken as a model of Descartes work, or merely a particular specialized instance of it? It is difficult to see, for example, how the Cartesian conception of the divine creation of eternal truths, which many see as a key feature of his philosophy⁷, has much to do with *mathesis*. Likewise, Gueroult (1954) reminds us that Cartesian physics, although mathematical, is not reducible to the rationality of mathematics nor a pure mechanical materialism, as, dependent upon God's continual recreation of entities and conservation of motion, it is grounded in the divine will. Gaukroger (1980) points out that while it is possible to call Cartesian physics mathematical in one sense, in

⁵ See e.g. Courtine (1990, 248 ff).

⁶ *Regulae ad directionem ingeni* (*Rules for Direction of the Mind*), AT X, pp. 359–469.

⁷ E.g. Marion (1980). This issue will be examined in detail in sections 3.3 and 3.6 below.

another, and perhaps the most important sense, in terms of providing solutions to physical problems, it is not mathematical at all, instead retaining much of the medieval linguistically inspired logic of modes, predication, and substance. Descartes' physics is thus unable to provide solutions to physical problems in the manner familiar from Newton onwards, that is, a physics subject to mathematical laws and axioms that enables one to calculate solutions to physical problems, using mathematical laws alone.

Furthermore, there is little doubt that the Cartesian theory of sense perception, as well as Cartesian physics, both governed by systematic laws but bereft of the hierarchical complexity of substance-oriented theories, have something to do with order, but whether this kind of order has much to do with the *mathesis* of the *Regulae*, remains to be seen⁸. For Heidegger, *mathesis* (which begins with Descartes) brings not only systematization, which he finds in Suarez, but also another element, that of mathematization, which for Heidegger includes intentionality, that is, the tendency of objects to be grounded in directed consciousness. In other words, for Heidegger, modernity is grounded in subjectivity.

Likewise, Courtine points out that the later 17th and 18th century *Schulmetaphysik*, the metaphysics developed in Protestant Europe (Germany and the low countries) in the centuries following Suarez and apparently heavily indebted to his thought, as a science of objective being, developed a "constante inflexion *gnoséologique*" (536), which was to turn ontology into something more resembling a tinology⁹, that is, a science of objects, not of beings as such; objects understood as *esse objective*, that is, of objects insofar as they are presented to consciousness. Baumgarten's *Metaphysics*, (published in the 1750s), for instance, begins (§6) with a demarcation of the science of ontology as the science of the most general *predicates* of being, not properties of being. This at once gives Baumgarten's metaphysics a second order or logical orientation. The first term defined (§7) is "nothing" (*nihil*); the first predicate of being discussed is "something" (*aliquid*), which is defined as "not nothing" and which is representable (Baumgarten 2014, 100–101). Courtine sums this up,

⁸ Schuster (1980) develops a sophisticated interpretation of Descartes' conception of *mathesis universalis* (in the *Regulae*) as a systematic attempt to fuse the mechanics of perception, physical theory, and the algebraic symbolism of geometric construction into a coherent theory that endeavors to achieve such a unification of method and natural science, but he notes that Descartes ultimately abandoned this approach in his mature works.

⁹ From the Greek "τι": "something", "particular".

Nous trouvons déjà formulée ici en toute clarté la thèse centrale de l'ontologie post-suarézienne, qui retiendra : est quelque chose (*aliquid*) ce qui n'est pas rien (*non est nihil*) et qui par là même est, ou plus précisément peut être (251).

[We find, here already formulated in complete clarity, the central idea of post-Suarezian ontology, which maintains: that which is *not nothing* (*non est nihil*), is something (*aliquid*), and in this way also is, or more precisely, could be.]

In the post-Suarezian tradition, then, metaphysics becomes less a study of reality than of the counter-domain of the non-existent, that is, of a logically defined second-order aspect of reality, of possible (and representable) being. As Rolf Darge (94) explains,

[In the interpretation of Courtine, Boulnois, and others] Suárezian metaphysics turns out to be a theory of the 'super-transcendental' objectivity, concerning that which is logically possible (*possibile logicum*), thinkable without contradiction (*cogitabile*), or the ontologically undetermined anything at all (*aliquid*, τ). The guiding interest of this interpretation is directed towards the confirmation of a specific scheme of the development of metaphysics from the late middle ages to modernity. According to this scheme—inspired by Heidegger, but outlined first by Gilson in his famous study of the history of the question of being—a line of development of metaphysical thought may be drawn from Scotus to Suárez, then from Suárez to the seventeenth-century school of metaphysics, and from this to Leibniz, Wolff, and finally, to Kant. This development may be characterized as a way of rationalization, subjectivication, and epistemological reorientation of metaphysical thought.

Modernity, thus, according to this line of interpretation, not only sees the unambiguous maturation of pure ontology as such (as opposed to a theologically-inspired metaphysics)¹⁰, but also of the subjective grounding of thought, as well as a tendency to schematization and rationalization, including some form or another of mathematization.

Although I must leave aside the adequacy of this interpretation of Suarezian (and "post-Suariezian") thought, as we have seen, there are serious grounds for doubting the adequacy of the claim that Cartesian philosophy is in any deep sense mathematical, without qualification. Does

¹⁰ The word itself dates from the 17th century, see e.g. Courtine (*op. cit.*, 410 *et seq.*)

this then leave us with a paradox in Cartesian physics, as Gaukroger claims, in that Cartesian physics both attempts to break from Aristotelian qualitative physics by means of mathematics, yet makes mathematical formulation and solutions of physical problems beyond reach? Or perhaps one might claim that mathematics is not the operative notion underlying the changes introduced by Descartes, and that perhaps one might better see Cartesian physics and Cartesian mathematics (Descartes also introduced historically influential and important changes in mathematics) as developing in some sense in parallel. Although I shall not cover Descartes' innovations in mathematics in any detail, I hope to show that neither mathematization, nor subjectivity, nor rationalization, can adequately characterize the innovations in either Cartesian philosophy or early modern philosophy as a whole.

The claim of a turn to subjectivity in at least one major stream of post-Suariezian thinking, Cartesianism, will be examined section 3.3 below. I will have something further to say on the subject of rationalization in section 3.6, and in the concluding chapter four.

3.2 Changes in the concept of substance

A more recent attempt to ground modern thinking in late medieval developments is outlined in the work of Lagerlund et al. (2011). Instead of to the Cartesian conception of *mathesis*, order, or to Suarezian *esse objective*, Lagerlund et al. look to a particular conception of substance, which they claim can be traced to the work of medieval nominalists such as Ockham and Buridan. Contesting the view that the roots of modernity can be found in developments in modern physics (a view to be examined below), they claim that this idea, (whose modern incarnation dates from the explorations of Husserl and Koyré in the early twentieth century), has the relationship exactly backwards. Lagerlund et al. claim that

Standard histories of the development of modern science and philosophy have it that the mechanical philosophy was driven by changes in physics that then required a reconceptualization of the metaphysics of substance.¹¹

¹¹ For a recent and sophisticated defense of a variant of this standard picture, see Gaukroger (2006). Gaukroger, in company with Duhem and Gilson, sees continuity, not discontinuity, between the medieval and early modern periods, and like Weber, Gaukroger sees scientific rationality as originating from a close relationship between certain forms of religiosity and rationality (and not to mention as a peculiarly western cultural phenomenon as well).

They go onto argue, however, that these changes are, at root, based on ontological foundations. Their points are worth quoting at length:

We contest that this view is backwards. The revisions of the metaphysics of substance occurred in the 14th century and it underlined the well-known changes in physics in the 15th and 16th centuries, which gave rise to mechanical philosophy in the 17th century.

The Aristotelian framework developed by Aquinas was severely criticized and rejected in the early 14th century by William Ockham (1288-1348) and John Buridan (1300-1362). Their criticism pushed in two directions. First was the rejection of any forms, essences, or natures really distinct from the individual substances themselves. Second was the replacing of the Aristotelian/holistic view of substance with a mereological view.

On this new view substantial forms had parts and were divisible [...]

In the commentary tradition on Aristotle's *Physics* after Buridan, thinkers applied this new conception of substance to the problems of identity and continuity through change. A number of concepts in physics had to be restructured in the light of the new concept of substance. Quantity is elevated from an accident to a quasi-substance, and without substantial forms to account for the essence or nature final causality disappears and is replaced with law like regularities between things or parts of things. Powers are reduced to the interactions of the parts of the substance. The disappearance and reappearance of things are explained by laws of nature.

The culmination of these trends were twofold. First the recognition by Descartes that body is comprised of extension and if theological commitments like the immortality of the soul were to be possible, humans and their rational soul had better be fundamentally distinct from bodily substances, and second the recognition by Locke that primary substances—whether bodily or mental—were simply collections of powers or qualities inhering in and united by a some-thing-we-know-not-what. For what else could substance be once the concept was ontologically reduced to nothing but quantity and powers standing in regular, law-like relationships.

In conclusion: It is our contention that the conceptual shifts in the ontology of substance not only pre-dated the rapid developments in physics

Although I differ with Lagerlund et al. in the identification of the source of the root of the conceptions that are central to modernity, my account here is much more in agreement with theirs as compared to that of Gaukroger's, in that I believe that it is to key philosophical concepts, rather than broader cognitive values or practices, that we must turn to in the evaluation of philosophically significant periodizations of thought, a point I have emphasized above. For a wide-ranging critique of the kind of approach that Gaukroger's work arguably has an affinity with, see Lloyd (1990).

and mechanics in the 17th century, but were moreover necessary for those developments that are commonly termed 'The Scientific Revolution' and 'The Rise of the Mechanical Philosophy.' Descartes and Locke were not casting about for a new ontology of substance that the developments in science and physics needed, but rather were synthesizing changes that had already been made and were antecedently necessary for the development of science and physics.

According to this view, then, changes in the concepts of substance, first advanced in the philosophy of 14th century thinkers such as Buridan and Ockham, persisted into the early modern period and eventually led to the mechanical philosophy and to the changes in physics mentioned above¹².

Wilson (2007), (2008) and Pasnau (2011) make a similar claim in their discussions concerning the relationship between modern philosophy and corpuscularianism. Pasnau (chap. 5) identifies corpuscularianism as one of three *philosophiae perennae* (along with Aristotelianism and Platonism). Corpuscularianism, according to Pasnau, is any philosophy that divides substances into integral parts, as opposed to what he calls "metaphysical parts"¹³. Integral parts correspond to parts in the common sense understanding of parts, that is, the material parts of an object. Examples of metaphysical parts are form, matter, and quality; metaphysical parts differ from integral parts in that they are abstract, and usually require metaphysical arguments to support their identification (Pasnau 2011, 7). Corpuscularianism begins, after its first florescence in classical Greek thought, with Ockham (although Pasnau characterizes Ockham not as a corpuscularian as such, but as someone who employs "corpuscularian strategies") and becomes "practically definitive of seventeenth century thought, at least in its main current", and includes the thought of "Locke, Newton, and Leibniz—among many others." ¹⁴(10).

C. Wilson (2008, 28) likewise suggests that "early modern philosophy might be described as a reformulation of Epicurean natural philosophy within the constraints and aspirations of Christian providentialism and anti-materialism".

Corpuscularianism does not seem at first to be quite equivalent to the mereological point of view mentioned by Lagerlund—if a substantial form can be divided, are its parts necessarily integral parts? The answer,

¹² See also Normore (2006) for a similar argument.

¹³ The term seems to have originated with Twardowski in the 1890s. See e.g. (Poli 2013, 8)

¹⁴ Later in the book, however, Pasnau implies that Leibniz' system is perhaps best viewed as an equivalent to Aristotelianism.

however, would appear to be yes; for a metaphysical part differs from an integral part in that a metaphysical part has a different character from the whole of which it is a part. Yet to divide anything means to cut it up into parts which are roughly of the same ontological status. Substance can be thought of as made up of matter and form, but one cannot realistically divide substance into two separate parts, a matter part and a form part. When Lagerlund et al. claim that for Ockham and Buridan substantial forms had parts, they cannot mean metaphysical parts—although these parts, being parts of form or formal parts, would not be material integral parts (for example. in the case of a person, hands, or other bodily parts), but the formal correspondent to such material parts.

Pasnau claims that while Ockham was not a corpuscularian as such, he did use "corpuscularian strategies". This can only mean the rigorous elimination of metaphysical parts from his ontology, while perhaps eschewing a strict physical corpuscularism (Ockham always claimed to be merely interpreting Aristotle). Ockham, for instance, denies that there is anything (distinct) such as the doubleness or halfness of a thing, or that the relation of efficient causality is distinct from its relata (*Quod.* 6, 10; 12). Doubleness, halfness, and the relation of efficient causality, were they to be entities really distinct from their subjects, would be said to be in them, as a part is in a whole or as an accident is in a subject. On a realist reading (which is not Ockham's), they could be seen as metaphysical parts (although none of the scholastics used this term as Pasnau notes). Integral parts are usually taken to be *pars extra partes* (parts outside of parts) in that they cannot occupy more than one place at the same time; they are also integral in the sense that their destruction would also destroy the subject. Metaphysical parts do not always have these properties. A tree could lose half of itself and still be the same tree (by losing some of its matter, i.e. material, over time). The same tree could lose half of its branches—and so suffer a loss of quantity—yet remain the same tree. Losing an integral part, however, such as roots or leaves, could possibly result in the demise of the tree.

These three authors then, identify modernity with the break-up of the unity of the traditional Aristotelian conception of substance, and its replacement by a different kind of unity, a mereological unity. This position, and the viewpoint of the previous section, show how one kind of unity eventually replaced another kind. In both cases, it is claimed that late medieval thinkers replaced the hierarchical structures of analogy, on the one hand, or the substantial unity of the matter/form complex (the hylomorphic conception of substance) on the other, with, respectively, the linear structures of univocity and *esse objective*, or the mereological

conception of substance and linear law-like relationships.

That being said, the exact analytical relationship between this analysis and the analysis of the previous section is not easy to determine. Does a mereological conception of substance imply an intentional system of "objectivity without objects" (Courtine 1990, 5, 162), and vice-versa? Lagerlund has tied the mereological developments to the development of laws of nature, as we have seen. Yet law-like regularities by themselves do not yield the kind of subjectivity that Heidegger discerns in this phenomenon, not to speak of the terminological change made by the modern inversion of the traditional designations of subjective and objective being.¹⁵ Exactly where the laws of nature come from, what guarantees their functioning, is a dilemma, but it is not a given that this involves intentionality or the positing (Heidegger) of transcendental selfhood. Without further assumptions, it would appear that the two developments are unconnected. Some thinkers (Descartes, Desgabets, Boyle) turn to God, to God's divine concurrence with natural events in order to explain law-like phenomena, yet as has been noted (e.g. Henry 2004, 108–9), once introduced, such divine justifications were easily dispensed with by succeeding generations of thinkers, once the concept of causally effective law-like generalizations had become a conceptually acceptable substitute for scholastic substance-oriented explanations. We shall see, in the next section, that something similar occurred to Cartesian subjectivity and the cogito argument; Descartes' successors, such as Malebranche, Desgabets, and Régis (not to speak of Spinoza and Leibniz), either minimized the importance of this apparently crucial facet of Cartesianism, or dispensed with it altogether.

Another question: Is the mereological/corpuscularian analysis sufficient to explain the entire extent of early modern thinking? Pasnau's comprehensive treatment of late medieval and early modern thought, which he treats as unity (though a varied and complex unity, to be sure) ends with the first draft of Locke's *Essay*, in 1671. It stops before what he calls the second generation of post-scholastic thought, among which is the phenomenology of Berkeley, Hume, and Kant, not to mention what one might call the logico-idealistic approach of thinkers such as Malebranche, Spinoza and Leibniz. The phenomenology of the eighteenth century seems not so much dependent upon a reformulation of the idea of substance, as an attempt to avoid the question of substance altogether, and to focus on other concerns, such as those of perception and causality. This latter trend ultimately culminates in Kant's phenomenalization of the idea of

¹⁵ E.g. Heidegger (1977, 303–4). Courtine (1990, 170).

substance, and the Second Antimony, wherein the question of whether substances are made up of parts, that is, whether they are composite or simple entities, leads only to paradox.

It is difficult to fit these developments into the reformed mereological picture offered by Lagerlund and the other authors mentioned above. Likewise, Courtine develops his picture of post-Suarezian ontology entirely independently of the mereological developments discussed above.

Let us turn to another attempt to isolate the essential characteristics of the modern conception of substance, in Ong Van Cung (1997), who identifies a set of features which appear at first glance to be logically independent of the mereological conception. This, as in the previous case, raises the interesting question of their relationship.

Ong-Van-Cung (1997) has advanced an interesting hypothesis concerning the modern conception of substance, a conception that she finds underlying the views of Suarez, Descartes, and Leibniz.

According to this conception, substance has the following properties:

1. It is centered around the notion of immediate activity. The classical, Aristotelian notion also involves activity, but Ong-Van-Cung claims that the actuality of the modern conception of substance is not grounded in any prior transcendental notion of actuality; transcendent, that is, to a conjoined potentiality. The actuality of substance is, in the modern case, immediate (218), and active in itself.
2. Second, substance is characterized by completeness (223). For Descartes, an incomplete substance is a contradiction in terms; if a substance is that which can exist by itself¹⁶, an incomplete substance, which has a relation of dependency with another substance (for example, the material and formal substances of the human person, which enter into composition to constitute a complete human substance; or the secondary substance of the *Categories*, i.e. substance as a universal) is by definition not a substance at all. Gueroult (1968, 228–9), makes a similar point with regard to the human soul and body; for both Descartes and Spinoza,

¹⁶ E.g. *Princip.* I, 51. The conventional definition of substance, which derives from Aristotle's *Categories*, characterizes substance negatively, as that which is neither "in", nor predicated of, another entity. This definition would seem not to preclude other possible relations of dependency.

these are complete substances in themselves, and are in no need of each other for completion, in contrast to the medieval hylomorphic conception.

3. The problem of universals is avoided in the new conception:

Descartes dispose déjà d'un concept nouveau de substance, qui rend caduc le rapport entre substance première et substance seconde. C'est manifeste dans la manière dont Suarez cerne, entre l'unité formelle et l'unité numérique, une simple distinction de raison (224).

[Descartes has a new concept of substance already available to him, which renders the connection between primary and secondary substance obsolete. This is apparent in the way that Suarez discerns a simple distinction of reason between formal and numerical unity.]

If incomplete substance cannot be substance, the concept of secondary substance makes little sense, and consequently the concept of a universal is rendered problematic. For Suarez, substance was individuated by itself as a totality (*entitas tota*), not by any part of itself, such as designated matter (Aquinas), nor by an individuating unity which is formally distinct from the entity itself (Scotus)¹⁷. For Suarez, an entity and its individual nature are one and the same.

Ong-Van-Cung sums up the modern conception of substance as follows,

Pourtant la 'modernité' consisterait peut-être, par le biais de la question médiévale de l'individuation, à transformer le sens de *per se* et à poser ainsi une puissance propre ou positive de la singularisation, puissance au sens où, par exemple, Descartes définit la substance comme ce qui 'existe en telle façon qu'elle n'a besoin que de soi-même pour exister', ou au sens où Leibniz parlera de force ou de dynamique en modifiant profondément les formes substantielles de la scolastique [...] cela et manifeste dans l'invention terminologique et conceptuelle de la notion de cause de soi. (222)

[However, perhaps modernity consists, from the point of view of the medieval problem of individuation, in transforming the sense of *per se*, by postulating a self-power or positive power of singularization, a power in the sense by which, for example, Descartes defines substance as that which

¹⁷ See e.g. *De Principio Individuationis* 166, (Wolter 2005, 81).

'exists in such a way that it needs only itself to exist', or in the sense where Leibniz will speak of force or potentiality, in profoundly changing the substantial forms of the scholastics [...] this is apparent in the terminological and conceptual novelty of the notion of self-causation.]

For Ong-Van-Cung there is no surprise that the idea of a self-caused being or *causa sui* (which will be explored in more detail below) appeared to originate in the modern era. This idea is perfectly in concordance with the new, modern conception of substance, which finds its origin or cause within itself, within its own singularity.

Although Ong-Van-Cung's discussion is centred around, broadly, the dynamic properties of the modern conception (characterized by activity that is immediate, complete, and self-individuated), whereas the mereological and corpuscular pictures emphasize issues related to the static category of substance, I think there is common ground to be found between the two. Both accounts present a simplified metaphysical picture by abjuring many distinctions that can serve as the basis of metaphysical parts. Suarez, for instance, replaces Scotus' formal distinction with a modal distinction (Ong-Van-Cung 1997, 217); the latter has anti-symmetrical properties, as compared with the formal distinction: a substance can exist without its modes, but not vice-versa; not so for things that are formally, but not actually, distinct, such as a being's essence and its specific individuality (haecceity). Both the formal and modal distinctions have a basis in reality as they are made *ex naturae rei* and hence make more than a conceptual distinction or a distinction of reason. Yet the modal distinction has the familiar structure of the substance-accident or subject-property relationships, in that it is anti-symmetrical, and can be tied to causality. Indeed, for Descartes, mode, quality, and property were virtually synonyms. This choice of Suarez was to have implications for the development of modern thought. Ong-Van-Cung (218) reports that "Il semble que la distinction modale ait ainsi triomphé de la distinction formelle dont elle a à présent acquis toutes les caractéristiques. Dans l'usage cartésien du vocabulaire formel et univociste de Duns Scot, se dissimulerait donc un accord avec Suarez contre Duns Scot¹⁸". Thus Descartes (and much of early modern philosophy) was to adopt the Suarezian language of modes in place of not only Duns Scotus' formal

¹⁸ "It would seem that the modal distinction has triumphed over the formal distinction, of which it has acquired all the characteristics. An agreement with Suarez, *contra* Duns Scotus, hides behind the Cartesian use of the Scotist vocabulary of formality and univocity."

distinction, but much of the Aristotelian quality/property language. This appears to be a move in the direction towards the reduction of the role of metaphysical parts.

One further point merits attention: Ong-Van-Cung emphasizes the difference between the early modern conception of substance and the doctrines of Duns Scotus; in the previous section we have seen that some thinkers have on the contrary located the origin of many characteristically modern doctrines precisely in Scotus' work¹⁹. At the same time, I noted that the relation between Scotus' metaphysics and modern doctrines is an ambiguous one. What are we to make of this ambiguous inheritance? I shall say something further about this issue, insofar as it relates to my main topic, towards the end of this monograph.

The problem of the relationship between law-like behaviour and subjectivity has been raised. Let us now turn to this latter of these two, which has also been claimed to be central to modern thinking.

3.3 Subjectivity

We have seen that Heidegger has claimed that subjectivity is central to modern philosophy, by means of the grounding of *mathesis* in mathematization and the positing of the transcendental ego. In the *Lectures on the History of Philosophy*, Hegel makes a similar claim (without the emphasis on mathematization—likely a reaction, on Heidegger's part, to Marburg NeoKantianism),

Descartes made a fresh start in every respect. Thinking and philosophizing, the thought and the formation of reason in modern times, begins with him. The principle in this new era is thinking, the thinking which proceeds from itself. We have exhibited this inwardness above all with respect to Christianity; it is pre-eminently the Protestant principle. The universal principle now is to hold fast to inwardness as such, to set dead externality and sheer authority aside and to look upon it as something not to be allowed. In accordance with this principle of inwardness, the inmost core of inwardness—thinking is what now establishes itself on its own account. (Hegel 1990, 131–2.)

In fact, subjectivity—the grounding of philosophizing in thinking, by means of the complete conformity of objects to thought—is part of a

¹⁹ For a detailed examination of the possible Scotist influences on Descartes' work, see Arieu (1999), chap. 2. For another avenue of disagreement between Scotism and Descartes, see Des Chene (1996, 84).

larger nexus of problematics, such as the problem of representationalism, the problem of skepticism, and the so-called epistemological turn of modern philosophy. Yet if modern philosophy is neither essentially subjective nor representational, there is probably no meaningful way in which it could be claimed to be uniquely epistemological²⁰. For since Plato philosophy has always been concerned with epistemology one way or the other, as it has been with ontology. I note the term itself is a nineteenth century invention, and was unknown to the early moderns. This does not mean that it wasn't a modern concern; ontology likely did not wait for its seventeenth century coinage, either. But it was not a uniquely modern concern.

Subjectivity is, furthermore, connected with an even broader range of issues, (as we can see from Hegel's ruminations above) such as those of personal autonomy or individualism; the centering of the cosmos around man, or humanism; the centrality of the self in the imagination, the priority of personal experience, and other ideas taken from political and aesthetic spheres; however, from the point of view of the present essay these are properly thought of as expressed by mentalities, and so fall outside the scope of the present discussion.

Instead, I would like to focus on two particular issues: the role of the cogito argument in Cartesianism after Descartes, and Heidegger's mathematization argument. For if subjectivity concerns the grounding of objects in thought (which makes it a form of idealism), this latter issue concerns the inverse relationship, that is, the relation of thought to objects, in this case in terms of the object-orientation of thinking.

3.3.1 *Cartesianism and the cogito*

Not only did Hegel claim that modern philosophy begins with Descartes' "metaphysics of the understanding", in the *Encyclopedia of the Philosophical Sciences*, he explicitly singled out Descartes' cogito argument as modern philosophy's point of departure.

Although the importance of this argument for Descartes philosophy was recognized in Descartes' own time, it is curious that many of the succeeding developments in Cartesian philosophy, such as those by Descartes' self-styled successors such as Malebranche, Roger Desgabets,

²⁰ Heidegger reminds us that Descartes' principle work was entitled *Mediationes de prima philosophia*, ("Meditations on first philosophy", i.e. metaphysics). The 1647 French translation by D'Albert was entitled *Les meditations metaphysiques*. See also the following note.

and Pierre-Sylvain Régis, make little use of this aspect of Descartes' philosophical system²¹. This often overlooked fact merits further attention.

Let us begin with probably the most prominent Cartesian after Descartes, Nicholas Malebranche. For Malebranche, although appearing at times to reproduce arguments that familiarly mirror Descartes' own explorations in skeptical doubt and its resolution in the cogito argument, it is a fact that, as Martial Gueroult observes, the argument loses much of its importance in his work: "Fait remarquable", observes Gueroult, "de toutes ces ouvres, une seule commence par le Cogito"²² (Gueroult 1955, 22). In a chapter of his *Malebranche* entitled *Déchéance du Cogito* ("Decline of the Cogito"), Gueroult explains that, for Malebranche, the cogito argument loses many of its crucial functions, in particular, its foundational function as the producer of the first clear and distinct ideas, the guarantors of veracity. As Gueroult explains,

Pour Malebranche toutes les vérités fondamentales sont originellement indépendantes du Cogito. Elles ont une évidence propre aussi immédiate que la sienne. De plus, leur valeur objective n'a pas à être établie, car elle n'a jamais été mise en doute. (43).

[For Malebranche, all the fundamental truths are, at bottom, independent of the Cogito. They have their own evidence, more immediate than that of the Cogito. Furthermore, their objective validity does not need to be established, since they are never in doubt.]

Though the cogito argument does occur in Malebranche's work, it does not play the foundational role it does in Descartes; it is secondary and less immediate than other fundamental truths. What takes its place? Malebranche, we find out, substitutes the vision of God for the Cogito argument. For Malebranche, it is the vision of ideas in God in all their clarity that act as the guarantor of the veracity of science and of our grasp of essences, not the clarity and distinctness of the cogito.

And in fact, for Malebranche, the cogito has little to do with clarity and distinctness. For the self is not a subject of clear and distinct perception, but of obscure and confused. The self does not possess that transparency

²¹ Ariew (1999, 188–9), notes that "That image of Descartes [as centred around the cogito argument] does not mesh very well with the reality of the reception of his philosophy in the seventeenth century [...] one can read whole books critical of Descartes' philosophy, written in the seventeenth century, without running into any discussion of the cogito or any other aspect of Descartes' epistemology".

²² "Remarkable fact: in all of his works, only one begins with the Cogito."

and clarity that it does in Descartes; it is subject to emotions and passions, which are never perceived as clearly as that other realm of comprehension, intelligible extension—not to mention other ideas (which for Malebranche are in, or are perceived in, to speak more accurately, God, and not the self). The self is not a reliable source of knowledge, nor is it a reliable subject of knowledge. All the cogito can do, for Malebranche, is to acquaint one with the existence of the self, not its essence. It merely reveals to us the existence of mental reality, and that this mental reality is easier to understand than the body. As Gueroult explains, the cogito is transformed from an experience of veracity and rationality, in Descartes, to an ordinary lived experience, in Malebranche (48). It becomes, for Malebranche, merely a preliminary starting point for what for him was a more crucial experience, the vision of all things in (or through) God. And unlike our (eventual) knowledge of extension, which, when seen (understood) through God, as intelligible extension, is perfectly clear and distinct, we never come to know the soul in this way. We never know the soul through its idea, only through consciousness or sensation, which is always inexact. This is due to the fact that, although our knowledge of the soul is imperfect, it is not false or deceptive, unlike our unrefined knowledge, through sensation, of the body. Knowledge of the soul may be inadequate, but it does not need to be corrected through the ideas, unlike our knowledge of extension. Hence, the soul is never really the subject of radical doubt, as it is in Descartes. (*R.d.V.* III.2.7).

Another consequence of the difference between the two approaches is mentioned by Gueroult, (56-59) and that is the differences in the principles that underlie the different versions of the cogito arguments, and thus in their respective inferential forms.

For Descartes, the cogito, when expressed in its full logical form²³, takes the form of a modal syllogism: *If something thinks, it must exist. There is thinking, therefore there is an existing thing.* Undergirding the necessity of the cogito is the principle: *In order to think, existence is necessary.* Gueroult calls this principle "hypothetical", for it does not presume the existence of thinking things. For Descartes, the cogito is founded on a principle, not an experience, although it may be intuited or understood through an experience. Furthermore, this principle "does not exceed the sphere of my thinking" (59), as it is most properly expressed as

²³ The cogito argument is probably best seen as an intuition, not a fully expressed logical argument, in both Descartes (for which see Gaukroger (1989), and Malebranche. For the purposes of analysis we can consider their logical equivalents.

a conditional statement linking thinking things with existence, not making a categorical assertion about something pre-existing. This principle is a hypothetical assertion about something which we come to experience later, through the actual experience of the cogito argument itself.

For Malebranche, however, the argumentative situation is very different. According to Gueroult, for Malebranche the principle underlying the cogito is the very different *Nothingness has no properties (nihilum nullas esse affectiones sive qualitates)*. Although accepted by Descartes as well, Gueroult points out that this principle is never used by Descartes in the context of the cogito. It is, for Descartes, merely an "empty formality" (58), "something well known by the natural light" in Descartes' words (*Princip. I, 11; AT VIII A, 8–9*), used by Descartes but once²⁴, to show that the soul is better known than the body. But for Malebranche, this principle is something else. It is a principle that is revelatory of existence, that has a categorical form; that is, that says something about reality considered in general ("nothingness" is not something existing, of course; the statement is likely best understood in its positive form: *Properties indicate the existence of something*). For Malebranche, therefore, the full inference runs: *Properties indicate the existence of something; thinking is a property; therefore, something exists*. The cogito is then just one particular instance of this principle, whose field of application is being in general, and which is known via God, not found innate in the soul, as Descartes' principle is.

We can conclude that the cogito argument, although used by Malebranche, has a very different function, a very different form, and a very different place in Malebranche's argumentation than in Descartes'. In particular, it is not intimately connected with the ultimate sign of veracity and deductive probity, that is, clear and distinct ideas. It is not connected with the soul in any essential way, for it reveals nothing of the actual essence of thinking substance, only its existence. And it is in fact merely one particular instance of a more general axiom, an axiom has as its field of application existence in general, not just that of the soul. It would appear that, for Malebranche at least, the cogito has little to do with subjectivity, that is, subjectivity understood as a vehicle of truth. It merely reveals to us the existence of something which is never perceived but confusedly and obscurely (the soul), and is at most a step on the way to a greater vision, what would appear to be a theologically oriented vision, not a subjective one. As Gueroult puts it, for Malebranche the point of

²⁴ As pointed out by Schmaltz (2002, 60), this principle also supports Descartes' claim that purely empty space or void is impossible.

departure for philosophy ("science") is neither being, nor doubt, nor the cogito, but the vision of infinite being. For Malebranche the cogito is but a second order truth, empirical, obscure, and confused. (61).

Malebranche kept a place for the cogito argument, although in a weakened form. Yet Descartes' followers Roger Desgabets and Pierre-Sylvain Régis openly criticized it. As Schmaltz (2002, 1) reports, Desgabets, a Benedictine monk who in his own time was taken to be a committed Cartesian in the eyes of his contemporaries, advanced a form of Cartesianism which "given the preoccupation in twentieth-century discussions of Descartes with the epistemological and metaphysical implications of his cogito argument" appears to deviate markedly from the standard picture of Descartes' thought. Desgabets advanced a kind of physicalist²⁵ version of Cartesianism, in which knowledge of (and *a fortiori* the foundational aspects of) the soul took second place to extension. In this, his thinking shares certain tendencies with that of Malebranche, but whereas for Malebranche certain truth, in the form of clear and distinct ideas, is guaranteed by the intuition of ideas in God, for Desgabets, as for his follower Régis, it is the centrality of material substance or extension, which takes its place. For Desgabets, matter is foundational: once created, it cannot be destroyed. Matter is identical with extension, and the idea that extension, once created, could cease to exist is to be rejected. Matter is completely contained by "imaginable space", which, once imagined, cannot be so-to-speak unimagined. Matter thus becomes "indefectible" (98). This doctrine has a number of consequences, one of which is to challenge the conceptualism usually associated with Cartesianism. Schmaltz reports that,

Desgabets and Régis attempted to address this problem [conceptualism undermining our understanding of supposedly immutable eternal truths] by grounding this immutability in something distinct from our mutable perceptions. This solution reveals that they were committed at a deep level to a realism that places the ground of the immutable truths we perceive in a world external to our perception [...] from the fact that there is this sort of relation to our perception, they drew the further epistemological conclusion that we can know the existence of extended substance simply by reflecting on the nature of that perception. Here they set themselves in opposition to

²⁵ Although, needless to say, Desgabets was hardly a physicalist in the current sense of the term, as for him mental events most certainly don't reduce to physical ones. They are, however, and apparently unlike for Descartes, always connected or coordinated with physical occurrences. See Cook (2008) for some helpful discussion.

Descartes, who claimed in the *Meditations* that experience can afford no immediate knowledge of the existence of an extra-mental world. (128–9)

It is from the standpoint of this doctrine, the doctrine of the indefectibility of matter, that Desgabets came to criticize the cogito argument. If matter can ground a kind of realism, then it is clear that an epistemology that grounds veracity in perception of the soul would come to take second place. Indeed, Desgabets asserts that the cogito had "neither solidity nor use" (73). It is undermined by our more certain knowledge of material substance. At the same time, the hyperbolic doubt that clears the way for the cogito loses its functionality. Desgabets maintains that an intentionality principle, that supposes that consciousness is inherently directed towards objects, is a necessary feature of thinking. Hyperbolic doubt that dispenses with this feature of thought would thus be of no use.

Moreover, Desgabets and Régis both maintained that temporal succession is inherently tied to material substance. For Descartes, there is always a psychological dimension to temporal succession. Even though, strictly speaking, there is no time without change and motion (in agreement with the classical formulation of Aristotle), Descartes did appear to believe that it made sense to speak of a psychical sense of duration that took place in minds that could not be understood to be in motion²⁶. However, these two followers of Descartes took the fact that there appears to be a regular succession of mental phenomena as proof of the contention that the soul is essentially united to the body. For, on the strict interpretation of the Aristotelian definition of time, if time is inherently connected to motion, and if the soul cannot be said to move (for it does not occupy a place; motion requires change of place), then the experience of succession in mental phenomenon cannot originate in the soul, and can only be a sign of bodily influence. Once again, the cogito argument, which purports to establish veracity on the grounds of thinking alone, loses its importance, for it appears to be an answer to a question that needn't be asked. For Desgabets, a true understanding of the nature of human thinking must involve the body, to which it appears to be inseparably connected by virtue of its temporally successive nature.

Mind-body dualism was adhered to by practically all followers of Descartes, the above two thinkers included. As Schmaltz has pointed out, in our time²⁷ it has been virtually taken for granted that Descartes' primary

²⁶ See further *infra*. section 3.7 for Descartes' understanding of temporality and duration.

²⁷ In fact, as we have seen, this tendency to interpret Descartes' thought as an

concerns centered around the theory of knowledge, and hence were aligned towards one particular pole of his dualistic ontology, the mental. The work of Malebranche, Desgabets and Régis has shown, in various ways, that Cartesianism can be (and in some versions had been) coherently centered around the other pole of the mind-body pair.

3.3.2 Mathesis and subjectivity²⁸

Is early modern thinking inherently subjective? We have seen that what is often today taken to be the *leitmotiv* of Cartesian philosophy, and the basis of its supposed subjectivity, the cogito argument, weakened or abandoned by some of Descartes' immediate followers, who saw themselves as no less Cartesian in spite of this. But, outside of the cogito argument itself, can Cartesian thought, or more generally early modern thought, be said to be part of a subjective moment in the history of philosophy? For Hegel, Cartesian thought, by which modern philosophy begins, identifies being with thinking, that is, objects are understood by their conformity to the intellect (in contradistinction to the medieval formula that thought adequates itself to being). This is supposedly the significance of the cogito argument itself; Hegel emphasizes Descartes' reluctance to concede that it is in fact an argument at all. Hegel takes this reluctance as Descartes' concession that the cogito functions as a kind of a priori assumption, an assumption of the equivalence of thinking and being. For Hegel, thinking that has postulated such an equivalence has a very specific function within his (Hegel's) philosophy. As Floy Andrews (2000) explains,

One could go on, but it is now sufficiently manifest that Hegel's treatment of Descartes in the Lectures on the History of Philosophy has concretely as its paradigm the self-development of the Idea in the Logic. What simply appears in Descartes or is 'innate', presupposed, asserted, is inadequate to the full self-determination of the absolute Idea. Yet it is a moment in that life of God in himself 'The eternal life of God is to find himself, become aware of himself, coincide with himself. In this ascent there is an alienation, a disunion, but it is the nature of the spirit, of the Idea, to

exploration of the consequences of the cogito argument goes back at least to Hegel.²⁸ This subsection is a largely a critique of the mathematization thesis associated with Heidegger, Husserl, Koyré, and Burtt, insofar as it applies to what might be called the philosophical standpoint of Descartes and other early modern thinkers; for a criticism of this idea as an interpretation of Cartesian and Galilean *physics* (especially in the case of the physics of free fall), see Arthur (2016), and Damerow et al. (1992).

alienate itself in order to find itself again.’

For Hegel, Cartesian thinking (and by extension, early modern thinking, prior to Kant) is pure, abstract conceptual thinking, which subordinates the objects of thought to the rules of thinking itself, which corresponds to the unmediated idea or concept, and to unmediated understanding (*Verstanden*), which functions by means of "picture thinking" or presentational thought (*Vorstellen*).

In a similar vein, we have seen that for Heidegger modern thinking is *mathesis*, which for Heidegger constitutes the mathematization of nature, that is, the attempt to subject the entirety of nature to that which is decided or known in advance, to impose the unlimited universalizing of thought on objects. This mathematization is grounded, according to Heidegger, in the postulations of the Cartesian ego, which by placing itself at the foundation of clear and distinct ideas grounds the mathematization of thought²⁹.

Thus for both of these thinkers, Cartesianism begins to resemble something very similar to the kind of transcendental subjectivity conventionally associated with Kant; but an uncritical, rather than a critical subjectivity, that is. Hegel notes that Kant was the first to distinguish between understanding (*Verstand*) and reasoning (*Vernunft*)³⁰. The former is (according to Hegel) unreflexive and uncritical, while the latter is essentially dialectical, and so self-reflexive and critical. Thus, for Hegel and Heidegger, thinking in Cartesianism functions somewhat in the manner that the perception of space and time do for Kant in the Transcendental Aesthetic, for here thinking imposes an uncritical universalizing on the objects of thought in the manner of that space and time function as unreflexive intuitive spaces within which temporal and spatial perception take place. Thinking is, in this interpretation, unbounded and infinitary, in that it has no internal manner of limitation.

But is Cartesian thought really infinitary in this way? Jean-Luc Marion and Vincent Carraud have thrown doubt on this characterization of

²⁹ It should be noted that there were other contemporary accounts of the mathematization of early modern thought that did not approach the problem through subjectivization or the cogito argument, but by means of other grounds. Husserl, in the *Crisis of the European Sciences*, approaches the issue through the distinction between primary and secondary qualities and the postulation of a universal causal tie between the two that will enable qualitative sensations to be mathematized. On Husserl's account, mathematization could then be seen as another instance of the universalization of causality, to be treated in section 3.6, below.

³⁰ Hegel (1991, 88) (§45, *Zusatz*).

Cartesianism. According to Marion, Cartesianism is, in important respects, not a philosophy of unlimited, unbounded subjectivity, but a philosophy of finitude,

The certitude of science (and this we owe to Descartes alone) is deployed perfectly in the finitude of its foundation and implies no infinite knowledge. In fact, only finitude as conceived by Descartes, and which opposes him in advance to all metaphysical pretensions to absolute knowledge (from Spinoza to Hegel) permits one to describe the ontical and epistemic situation in which we find ourselves today [...] Descartes thus posed, more clearly than most metaphysicians, the principle that there is no subjectivity other than the finite. Because, even more essential to the *res cogitans* than its ontical status, than its cogitative performance or its rational qualification, is the finitude in it. Before and yet like Kant and Heidegger, Descartes thought the ego that we ourselves are, whatever the case may be, as finite. (Marion 2007)

So, for Marion, Cartesian subjectivity is in fact comparable to the subjectivity posited by Kant and Heidegger (critical, reflexive, limited), not the supposed unlimited, unbounded subjectivity that the Hegelian and Heideggerian picture of rationalism attributes to it, and thus, according to the definition of subjectivity at the beginning of this section, not really subjectivity at all.

In *Sur la théologie blanche de Descartes*, Marion explores the extent to which Descartes' doctrines concerning the divine creation of eternal truths, (eternal truths such as those of mathematics or basic physical laws of motion, knowledge of which is at the same time innate in us), primarily expressed in a number of letters written to Mersenne in the 1630s, are able to form a coherent doctrine. What does it mean to claim that eternal, apparently necessary truths, are at the same time subject to the free will of God, in that they are purely God's free creation? And in what sense can they be said at the same time to be innate? How to make sense of the claim that eternal truths can be created? (Marion 1981, 267–8). Without too much expostulation, it can be said that this doctrine (which, for Marion, "nothing less than the place of Descartes in the history of being is implicated." [Des Chene 2002]), is not only coherent and meaningful, but marks an essential break not only with the middle ages, but with another widespread tendency in modern thought, the tendency towards the univocity of reason and the grounding of necessary truths in some sort of formal principle or condition, whether external to the divine nature or not, but all the same, uncreated, not subject to divine creation (as for example God's own nature is uncreated). So these laws are at once necessary, and at the same time, arbitrary, much as, to use one of Descartes' own

metaphors, the decrees of a king are, once instituted, mandatory. There is no necessity of reason to these decrees, for the king needn't furnish any justification for his laws, but once promulgated, these laws in a sense become reason, in that they define what must be legally adhered to. Thus there is a certain here and now to them, a certain situatedness or finiteness to them, despite the fact that they are at the same time both necessary and innate (Descartes asks us to imagine that the king has somehow impressed these laws in our own minds).

But there is another aspect of finitude in Descartes. As Marion puts it elsewhere, "And so the first two meditations deal at least indirectly with finitude, first by repeating the incomprehensibility of that which bypasses the science of objectivity [the divine nature], and then by temporalizing the *cogitatio*." (Marion 2007). The science of objectivity is the method of the *Regulae, mathesis*. Descartes, as we have seen, maintains that the truths of *mathesis* are created by God, and depend on God's creation for their truth (although not as such in the *Meditations*—here he only mentions the incomprehensibility of the divine nature, to which Marion is referring).

But Marion also emphasizes that the thinking of the cogito begins with doubt, is originally doubting (*verum etiam est te, qui dubitas, esse [...] si non essem, non possem dubitare*). Doubting is finite thinking, because it is aware of its limitations, of its imperfections. And this cogito is only true of the moment, because, it is a conditional truth, contingent upon the self-awareness of the doubting self. The cogito argument can only proceed when doubt exists, and so is grounded in temporality, in finitude. For Descartes, it is, as Gueroult has pointed out (as we noted earlier), a hypothetical, not categorical, expression. The cogito is not a logical truth, or what in Descartes' time would be called a common notion such as "equals subtracted from equals leave equals", but a contingent truth dependent on the existence of the self.

Vincent Carraud has also pointed out another singularity of Descartes' position within early modern metaphysics, in this case, concerning the relationship between cause and reason (*ratio*), and in the associated development and emergence of what was to become the principle of sufficient reason as it is found in Leibniz' metaphysics. As Carraud's thesis is concerned with causation, I shall leave a more detailed examination of these ideas to section 3.6 below, but here I wish to note that Carraud shows us that Descartes was likely the first thinker³¹ to

³¹ There have been some suggestions that the idea of *causa sui* also appears Plotinus (e.g. Narbonne 1993), but this is outside the scope of the present study.

propose that the divine nature could be subject to rules of causation, by placing God under causal rules³², under which God is considered to be a self-caused (*causa sui*) being. For most medieval thinkers, causal rules applied only to created beings, not God. At one point, Descartes claims that no being, created or uncreated, should be exempt from causal laws; it is legitimate, he claims, to inquire about the cause or reason for any being's existence. Descartes, however, appears not to fully endorse this claim³³, for at another place he claims that the idea of self-causation is part of our thinking or interpretation of the divine nature's unlimited power, not part of the divine nature itself, for various traditional reasons pointed out by his objectors (in the *Objections and Replies* to the *Mediations*). Descartes, in fact, usually expresses this causation principle as a disjunction—God's power is the "cause or reason" of his existence. Carraud points out that this expression is not a junction of synonyms, but appears to be an exclusive disjunction³⁴; God's existence is "from a cause or from itself *as a cause*", as Descartes puts it in his reply to Caterus in the first replies (my emphasis). "Appears" is the operative word here. As Carraud explains, Descartes seems to be equivocal about the matter of the meaning of "or" (*sive*) in the expression, leaving it uncertain as to whether we are to understand the expression *causa sive ratio* as postulating an equivalence between causes and reasons, or a division of things into those that are caused and those which, though uncaused, can nevertheless be supplied with reasons for their origins.

Thus, far from subjecting God to a universal principle of reason, which an unequivocal interpretation of the *causa sive ratio* expression would furnish, Descartes appears to hedge his bets, so-to-speak, as he "provided instruments [that helped build this principle, which Carraud claims was eventually to evolve into the principle of sufficient reason as it appears in Leibniz] and at the same time opposed himself against it", by leaving its meaning open to interpretation. (Carraud 2007).

Likewise, Carraud (2002, 15) has remarked on the peculiarity of the

For possible roots of the idea in both Scotus and Suarez, see Lee (2006).

³² "What does seem to me self-evident is that whatever exists either derives its existence from a cause or derives its existence from itself as from a cause." (*Resp.* I; AT VII, 112)

³³ The first unequivocal endorsement of the idea of God as *causa sui* is in Spinoza (*Ethics*, I, def. 1).

³⁴ Malebranche takes it purely as an exclusive disjunction. For Leibniz, it is an equivalence. Descartes is equivocal about the matter. See Carraud (2007, 93; 100); Carraud (2002, 263) and especially p. 502 *et seq.*

equation of causality with reason in the Cartesian causal context, that is, of causality as efficient causation. For surely (and traditionally), efficient causality is the cause least connected with or expressive of reason; traditionally, formal and final causes have been connected with explanation of reasons in a metaphysical context. The efficient cause is (conventionally) no more than the moving cause or initiator of motion or change, at most an explanation of physical events, not a *ratio essentiae*. The relationship of efficient causality to the principle of sufficient reason is thus problematic,

Autrement dit, se pose la question de savoir si la primauté de l'efficience est la condition de la possibilité de l'accès de la raison suffisante à la principalité, ou son dernier empêchement. A-t-on affaire à deux réponses contradictoires à la même question du fondement, la cause ou la raison, ou à deux réponses successives, la cause puis la raison, l'efficience étant alors un moment nécessaire à l'incubation du principe de raison suffisante ? [...] en excluant radicalement les sens de la cause qui seuls pouvaient traditionnellement être identifiés avec la raison—la cause formelle et la cause finale—Descartes rompait définitivement avec une équivalence ancienne et établie, moment initial de l'incubation du principe de raison suffisante : en dépit des apparences, la formule cartésienne *causa sive ratio* ne répèterait pas alors l'*αἰτία και λόγος* pseudo-aristotélécien, elle l'écartèlerait. (14–15).

[To put it another way, the question arises as to whether the primacy of efficient causality is the condition for the possibility of the principle of sufficient reason becoming fundamental, or is instead, its last hindrance. Does one have a situation of two contradictory responses to the same question concerning foundations, cause or reason, or two successive responses, cause and then reason, efficient causality then being a necessary stage in the birth of the principle of sufficient reason? [...] in radically excluding the sense of causality which alone could have been traditionally identified with reason—formal and final causality—Descartes broke categorically with an ancient and established equivalence, the first moment in the birth of the principle of sufficient reason: despite appearances, the Cartesian formula *causa sive ratio* would not repeat the pseudo-Aristotelian *αἰτία και λόγος*; it would distance itself from it.]

The "hegemony of efficient causality" (15) would seem to be the least suitable to a universalization and mathematization of reality; motion or change has little relation to the mathematical as such, traditionally the science of quantity; even less so to *ratio* or reason.

Is then the Cartesian universalization of efficient causation an initiator, an ancestor, or a peculiar deviation from the principle of sufficient reason

which eventually flourished in Leibniz' thought? Can the principle of sufficient reason be called a Cartesian principle? If not, what does the Cartesian "principle" (formula) of *causa sive ratio* amount to, from the point of view of sufficient reason?

An answer to this question must be postponed for the moment. But we can at least conclude the following: If the Cartesian *mathesis* is finite, limited, or equivocal in the manner just discussed, it cannot be subjective in the sense mentioned here, for subjectivity in this sense is necessarily a foundation for a universalizing, unlimited, and rationally transparent perspective³⁵. What then can be said about the relation of Cartesian finitude to the rest of early modern thinking, to which it is often in conflict, as we have seen from both Marion and Carraud? For Marion and Carraud, Descartes appears as almost something of a paradox, instigator of a tradition to which he only partially belonged: "Modern metaphysics constructed itself in opposition to that [Descartes' thinking] which made it possible." (Carraud 2007). For Marion and Carraud, Descartes still remains a singular thinker within early modern philosophy, although not in the way usually understood; not so much the first modern thinker, but a kind of singularity within the "linear and homogenous movement which leads the history of causality from Suarez to Leibniz" (Carraud *op. cit.*, 98). This singularity can be difficult to understand; is it a hesitation before, or simply a variation of, modernity? Is it part of a path towards modern thinking, or merely an alternative branch? Is Descartes' thinking fully modern, or partially something else? I hope to provide some answers to this dilemma in the last part (chapter four) of this study.

3.4 Representationalism

Another important doctrine often associated with early modern philosophy is representationalism, or the idea that direct cognitive access to external objects (whether by sense perception or through some other means such as some form of intellectual perception, the latter which operates by means of the senses, but has as its object a non-sensual content such as form) is not possible. Representationalism asserts that cognition is mediated by an intermediary, such as, for example, an idea. Ideas, as mediators, are—from the representationalist point of view—the direct objects of our perceptual faculties, which are then taken to represent or stand for objects in the external world.

³⁵ For another argument against Heidegger's claim, see section 3.7, note 77, below.

It is usually understood that the perceptual theories of scholastic Aristotelianism largely support a form of direct realism; in scholastic direct realism, the mind grasps the form or intellectual structure of external objects by means of the "active intellect", transferring this form to the receptive or passive faculty of the mind, which in turn structures our perception. Early modern philosophers, dispensing with the Aristotelian mechanisms and faculties of perception (the so-called active and passive intellects, substantial form, and formal presence of forms in the intellect) dispensed with direct realism as well—or so goes the standard interpretation of early modern perceptual and cognitive theories.

Representationalism is indeed a plausible reading of many early modern perceptual theories. Yet it cannot be said that there is complete consensus for this reading, even in the case of the iconic figure of Descartes, for in fact there are a number of issues involved in interpreting Descartes in this way that do not admit of a straightforward resolution. For instance, as noted by Clemenson (2007, 3), Descartes appears to be strangely untroubled by many of the standard skeptical problems that often accompany representational theories, such as the problem of coordinating or verifying that our representations do in fact correctly refer to the external world.³⁶ This, and other difficulties, such as Descartes' language in some passages in the *Meditations* where he appears to claim that certain objects, such as the sun, or God, are directly present to the mind, have led some to argue that Descartes is likely better understood as a direct realist of some kind.

It has, in fact, been recognized for some time that the representationalist reading finds difficulties in accounting for the perceptual theories of Descartes' Jansenist follower Antoine Arnauld³⁷. Some, such as Yolton (1984), have rejected the representationalist reading for the entire early modern period, arguing that early modern perceptual theories are best seen as advocating a kind of semiotic realism, a version of direct realism that somehow functions without the Aristotelian apparatus of the active and passive intellects.

I think it can be claimed with at least minimal confidence that the debate is not yet closed and that a direct realist reading, of some kind or another, of at least some aspects of early modern perceptual theories is at least defensible. The consequence, then, is that representationalism cannot be a necessary condition for early modern thought. In fact, I shall leave the

³⁶ Clemenson notes that this skeptical problem is separate from Descartes' method of universal doubt, which undermines direct realism no less than representationalism.

³⁷ See e.g. Nadler (1989).

representative reading of early modern thought as an open question; what appears to me to be more important here are the consequences that some thinkers have drawn from the supposition that it is so; in other words, certain thinkers have posited this reading as an explanation of features that they take to hold of early modern philosophy. Rorty (1979) is known for one such interpretation. Foucault, as I have mentioned in the second chapter, is known for another, and it is Foucault's reading I shall address here.

For Foucault, (in *The Order of Things*) the early modern *episteme* or paradigm is constituted by a specific relation between language and being, that is, between words and things in the world; indeed, all of the knowledge structures that Foucault examines there are constituted by some sort of particular arrangement of this relationship. It is representationalism that makes early modern thought different from the thought of the preceding and succeeding epochs, and gives it unity. This theory also purports to explain certain absences, such as the absence of a developed semantic theory or theory of language, which Foucault believes to be characteristic of early modern thought, and which, according to Foucault, was a necessary consequence of the "transparent" role of signifiers (language) required by early modern representationalism, which envisioned language as tool or medium of knowledge, and not as a possible object of knowledge itself.

As a consequence of his analysis, for Foucault, a non-representationalist reading of the epistemological theories of an early modern thinker is not simply something improbable, but literally impossible—early modern thought *is* representationalism, it is the very system that removes "similitude" from the Renaissance knowledge system and replaces it with the random interrelationships of dyadic relations, thereby allowing itself to be governed by a representationalist theory of signification.

Yet this interpretation of early modern thought is problematic in a number of ways. The various relationships between words and things (reality and language) that govern or parse the knowledge structures discussed by Foucault would seem to trespass on possible theories within those structures. In terms of the discussion in chapter two above, this is to display a confusion between the languages of outlooks and paradigms; for surely the relationship between language and entities is a fundamental axis of philosophical exploration or philosophical themes (topics) that can only exist within the context of a debate. Any philosophical answer to the problems this relationship poses is unlikely to structure the entire thought of an historical era, for it can only exist within the context of a debate in which both sides participate, if the language/being debate or discussion

truly belongs among the perennial topics of outlooks. But Foucault's position, or perhaps more adequately, interpretation (of the early modern use of ordering relations) would preclude even the possibility of such a conscious or open debate, a debate which we have reason to believe took place, perhaps not quite in contemporary terms, but which took place nonetheless.

While the scholastic and early modern thinkers did not phrase the issue in terms equivalent to present usage—in particular, they did not, as far as I am aware, have labels for epistemological positions equivalent to our direct realism or representationalism, they were certainly aware of the issues involved in the debate and the debate itself, which tended to center around elements of the various theories, rather than in terms of thematization of the theories themselves.

For it is in fact possible to recognize the modern debate between direct realism and representationalism in some specific late medieval and early modern contexts, for example in discussions concerning the distinction between formal and objective concepts and the question of their possible identity, and whether it is necessary to postulate a "third thing" (*tertium quid*) between the concept in the mind and the thing in the external world³⁸. At least one medieval philosopher, the thirteenth century theologian Durand de St. Pourçain, is known to have defended this postulate, and has often in consequence taken to have advocated a representationalist theory of concepts. Durand's view was defended in the sixteenth century by Gabriel Vasquez, and contested by Vasquez's fellow Jesuit, Suarez. The debate was later taken up, in the next century, by a number of thinkers known to have had some influence on Descartes' thought, Albert de Raconis and Eustachius a Sancto Paulo, both who appeared to have defended a version of Durand's position.

It is, furthermore, possible to see an echo of this debate in Caterus' criticism of Cartesian ideas in the *First Objections* of the objections and replies to the *Meditations*, where Caterus takes issue with Descartes' treatment of ideas, in particular with the claim that ideas are subject to causality, that they need causes in order to exist (AT VIII, 91–94). The claim that ideas have real (as opposed to modal or formal) being, would seem to be one part of the platform of concepts that support representationalism, for there must be some sort of entity (the sign; in this case, ideas) that does the representing, that stands for its objects, and so must have some measure of reality independent of the objects that its represents.

Finally, the debate between Arnauld, previously mentioned, and

³⁸ The summary here draws on Ariew (1999, 42 *et seq.*)

Malebranche, over the status of ideas in perception, appears to be an explicit debate concerning this very issue of the representative (or not) status of ideas³⁹.

Thus, representationalism is not only a theory about the early modern structuring of knowledge, it is also, troublingly, a doctrine within it, as it can be claimed that various thinkers did or did not adhere to some version of a representationalist theory of knowledge, as we have seen, despite the lack of explicit terminology for these positions. The claim, then, that early modern thought is governed by representationalism would seem to entrap itself in a serious confusion of levels.

I believe we are forced to acknowledge that a theory that is used to organize systems of knowledge cannot at the same time be a theory within that system, or part of the system's object language. Foucault appears to be aware of a dimension of this problem when he revises his methodology and abandons the semiotic perspective in *The Archaeology of Knowledge* (Foucault 1972), replacing it with "discourse analysis", so-called enunciative functions, and the "archive", (54) which move the analysis to a different level, involving "a task which consists of not—no longer— treating discourses as groups of signs [...] but as practices." Interestingly enough, however, in the English preface to *The Order of Things*, written in 1970, a year after the publication of the French edition of *The Archaeology of Knowledge*, Foucault claims just this as a part of the methodology of the project he had articulated in the earlier book, that is, a project to "reveal a *positive unconscious* of knowledge: a level that eludes the consciousness of the scientist [...] [which can be called] rules of formation, which were never formulated in their own right, but are to be found in widely differing theories." (italics original).

Now, perhaps one might object that Foucault directs his attention to semantic theories, that is, relationships between words, meanings, and objects, and not perceptual theories, and that it is far less clear that the early modern philosophers were consciously aware of the issue of representationalism insofar as it involved grammatical theories (as indeed Foucault claims). In other words, while the representationalist / direct realist debate might be plausibly claimed to be a real issue for the early moderns as far as perceptual theories are concerned (and which is where the debate usually is placed), Foucault was not concerned so much with this sort of representationalism (as were Rorty and Thomas Reid), but with its semantic analogue, which has its classical counterpart in Aristotle's *De Interpretatione*, not in the *De Anima* or the *Parva Naturalia*.

³⁹ See e.g. Wahl (1988).

Indeed, Foucault (1969, 62) claims that the transparency of language and words in the early modern period, a consequence of representationalism, goes beyond Cartesianism and its immediate issues,

The written word ceases to be included among the signs and forms of truth; language is no longer one of the figurations of the world, or a signature stamped upon things since the beginning of time. The manifestation and sign of truth are to be found in evident and distinct perception. It is the task of words to translate that truth if they can; but they no longer have the right to be considered a mark of it. Language has withdrawn from the midst of beings themselves and has entered a period of transparency and neutrality.

This is a general phenomenon in seventeenth-century culture—a more general one than the particular fortunes of Cartesianism.

We have certainly seen above that Foucault focused on much more than a theory of perception in his analysis of the early modern period, and unlike both Rorty and Reid, he finds seventeenth-century perceptual representationalism to be simply another manifestation of a more general phenomenon, and not the root of the issue as do Rorty and Reid. For Foucault, this general phenomenon operates not through perception and ideas or, that is, through an explicit epistemological doctrine (for as we have seen, for Foucault, the knowledge that characterizes an *episteme* must exist as a kind of positive unconscious), but through another sort of representationalism, not the representationalism of idea and object but of sign and signified, which deal with "complex" objects (algebra and *mathesis* deal with simple objects), and which "span the whole domain of empirical representation" (81). In fact, Foucault goes so far as to say that "Classical [sc. early modern] philosophy, from Malebranche to Ideology⁴⁰, was through and through a philosophy of the sign." (73).

So we must admit that Foucault was concerned with representationalism in this more general, semantic sense, which may undermine the criticisms levelled at it above. But in order to fully make an evaluation in this regard, we must examine some of the consequences of this more general theory.

One consequence of this semantic representationalism is that the mediating function disappears. As perceptual representationalism eliminates impressed species and forms and replaces them with passive ideas, for Foucault, semantic representationalism replaces active signs (words, language) with passive counterparts, thus removing them from the field of knowledge.

⁴⁰ The term refers to Destutt de Tracy's *Éléments d'Idéologie* (1801–15).

In other words, just as one might observe that the early modern period generally lacked a "philosophy of mind" (in the Aristotelian and NeoAristotelian sense), having jettisoned the Aristotelian active intellect and replaced it with an essentially passive mental substance whose only function is to combine and divide ideas, Foucault claimed that it must also lack a philosophy of signification, or a hermeneutics, as "the universal extension of the sign within the field of representation precludes even the possibility of a theory of signification." (72). More specifically, signification and hermeneutics are replaced by theories of general grammar, whose only function is to mimic or picture the order of the world through the order of the sentence. Foucault thus predicts that for early modern thinkers there can be no theory of meaning other than a naive direct word-object correlation theory, and the categories of words should mirror the categories of things in the world, or of beings.

Certainly the accuracy of Foucault's theses about the function of language in the early modern era and beyond have been questioned, e.g. (Pécharman 1995), (Hacking 1988).

But without wishing to adjudicate this debate, it is still fair to question whether Foucault's semantic interpretation genuinely avoids the problem of interpretation discussed above, and whether it may in fact be little more than a translation of early modern knowledge structures into Foucault's (and post 1960s French philosophy's) peculiar concerns. Was the early modern era genuinely an era of the "philosophy of the sign", a designation all the more questionable in that Foucault appeared to later abandon this particular avenue of interpretation? Even in *The Order of Things* itself, Foucault appears to vacillate: there are plenty of passages⁴¹ where Foucault characterizes early modernism not as representational, but as instead centered around the notion of order, not the sign.

But order is a problematic idea, because as noted by Han, "order" for Foucault is a polysemic conception, which he also attempts to use (in the preface to *The Order of Things*) in a methodological primary way, to characterize all knowledge systems, not just the early modern. Order belongs to a "middle level", which gives structure to all paradigmatic knowledge systems, including, but not limited to, the early modern. Yet, despite this assertion of Foucault's in the methodological sketch in the preface, order drops out of the picture at the end of the early modern era, to be replaced by "History", which seemingly has nothing to do with any

⁴¹ See especially I, 3, II ("Order"), and I, 3, VI ("Mathesis and 'Taxinoma'") throughout.

sort of order.⁴²

One may conjecture that Foucault opted for a semantic interpretation in *The Order of Things* because he was unable to generalize the concept of order to include the "pre-classical" era, and the following late modern era, which were rather governed by "Resemblance", and a somewhat amorphous group of notions (which include "Finitude", "History", "Man"), respectively. It seems that Foucault was ultimately inclined to identify order with one particular kind of order, the "order" of early modernism; perhaps this is a vestige of the rationalization thesis which I have mentioned above, a thesis from which Foucault was not quite able to distance himself.

Returning to my earlier point, it should be noted that Arnauld explicitly discussed perceptual representationalism in *Des vraies et des fausses idées*, or rather at least there referred to certain "*êtres représtantatifs*" (representative beings), denying that our mind needs these particular kind of ideas, or "representative beings", distinct from perceptions, in order to perceive—language which was admittedly somewhat scarce in Descartes and elsewhere (Descartes often speaks of ideas as that by which we conceive of or present objects to our minds, although he does occasionally use words cognate with the English "represent". Locke refers to ideas as "objects of thinking" (*Essay*, II, 1,1), although in one place (*Essay*, IV, 21, 4) he does call them representations).

Yet finally, the crucial point is this: one wonders if semantic and epistemological or perceptual representationalism are as distinct to early modern thinkers as they might be to us, used to the idea that "semiotics" or "semiology" has come to constitute a distinct discipline, different from traditional fields of epistemology or linguistics. Let us not forget that a part of Arnauld and Nicolas's logic textbook *Logique, ou l'Art de Penser* (the *Port Royal Logic*) included a chapter on grammar, and that the *Port Royal Logic* itself begins with a discussion and definition of, not words or terms, as was the case with traditional medieval logical works, but (following the Ramist tendency) ideas. Locke (*Essay*, IV, 21, 4) calls the traditional third division of science (or philosophy) "The Doctrine of Signs", a kind of extended logic⁴³ that includes both words (the domain of logic) and ideas. I conclude that the early modern era may indeed have

⁴² (Han 2002, 59): "The rest of *The Order of Things* contradicts the idea, central to the preface, that archaeology should have order as its sole object: indeed the beginning of chapter 7, "The Age of History", describes a "mutation from Order into History"."

⁴³ The traditional three divisions of philosophy (since the Stoics) were physics, ethics, and logic.

been an era of signs, not in the sense of any kind of semiotic foundationalism, a placing of signs at the centre of knowledge, (as might be seen in a later thinker such as Peirce or Saussure), but in the sense that logic, grammar, epistemology and the theory of signs were not as compartmentalized or differentiated as they are today (and were as well in the earlier scholastic era), but were equally important, with no one of them predominating. Thus it may be incorrect to separate the two forms of representationalism, perceptual and semiotic, in early modern thought.

Representationalism, if it is to truly belong to the level of analysis that Foucault calls archaeological, and claims for his own, cannot expressly belong to ideas or theories made by the thinkers in question themselves⁴⁴. While it might be arguable that this could be the case for the linguists, economists, biologists, and other practitioners of the "human sciences" that Foucault largely directs his attention to in Foucault (1970), I believe I have shown, however briefly, that this was not the case for the philosophers and philosopher-theologians of the era. If this (and the above) are correct, then representationalist is an inadequate label for the time period, both as a characterization of the period's epistemological theories, or—and this is the crucial aspect here—as an analysis of the era's "rules of formation" or knowledge structures, for they belonged, in violation of Foucault's express methodological rules, to the level of conscious thought.

3.5 The causal dissimilarity principle

Larry Laudan (1981) has advanced an interesting alternative view of the influence and relationship between the sciences and early modern thinking. Rather than focusing on the "Copernican-Galilean revolution" and its alleged mathematization of method, as Heidegger⁴⁵ does, Laudan insists that it is early modern explorations of matter and material substance that are crucial for the development of early modern methodology. According to Laudan, what made these latter explorations different from

⁴⁴ As Han (2002, 43) interprets Foucault, "the conditions of the possibility of knowledge are not homogenous with the objects that they determine."

⁴⁵ Laudan mentions, not Heidegger, but Koyré and Cassirer, among others, as advocates of this approach (*idem*, 25 n. 1). The idea that modernism is somehow rooted in the specifically *mathematical* idealizations of early modern thought appears to have been developed roughly contemporaneously by a number of thinkers, including Heidegger, Husserl, Koyré, and Jacob Klein, as well as E.A. Burtt and E. J. Dijksterhuis. See e.g. Moran (2012), chap. 3, and Ariew (2016).

their medieval precursors was the postulation of unobservables in the makeup of material entities. These developments occurred in the philosophies of Gassendi, Descartes, and Hobbes, among others, and not in the more phenomenologically oriented approaches of Galileo and Newton, which, according to Laudan, remained closer to everyday experience, and hence, further away from the revolutionary developments of the emerging sciences of the sixteenth and seventeenth centuries.

This postulation led, according to Laudan, to two important methodological developments. Because the objects studied by the new mechanistic science lay so far beyond ordinary experience, it became necessary to develop a postulational-hypothetical approach to scientific reasoning, instead of a more strictly inductive model. At the same time, the distance between ordinary and scientific experience necessitated an experimental approach to nature. That is, experiments had to be deliberately constructed in order to go beyond the phenomenal experience of nature, the latter which is available to ordinary, non-experimental experience. Later, with the development of the microscope, (and the opening of previously unseen microstructure to observation) such postulational-hypothetical methodology disappeared, not to be revived until the nineteenth century when similar problems in the sciences re-occurred⁴⁶.

I think Laudan's observations are very apt (albeit I believe that 17th century postulationalism and the more recent Popperian variety are importantly different), but I wonder where the foundations lie. Whence the need to postulate unobservable entities? Laudan offers no clear answer. Certainly the sciences which Laudan identifies as postulating "micro-entities"—optics, magnetism, theories of chemical change—existed before the early modern era and the changes that Laudan is concerned with. Perhaps one might conjecture that these sciences had run out of plausible explanations for phenomena that were wholly restricted to the "macro" realm, that is, the realm of ordinary experience, by the time of the early modern period. Some such explanation would appear to be at least consistent with Laudan's theory, although he does not explicitly make it.

However, perhaps we can speculate that the very postulation of micro-entities (and the two methodological changes mentioned above) may have themselves been motivated by another possible feature of early modern thinking. We have seen in chapter 2 and 3.4 above that Foucault based his interpretation of early modern thought on its supposed rejection of the principle of resemblance. This theory, however, as we noted above, is a semantic theory, dealing with mechanisms of signification and

⁴⁶ Laudan, *op. cit.*, chaps. 3, 4.

representation. Some scholars of early modern thought have pointed to a role for a rejection of similarity in a different domain, that is, the causal domain. With this, it is possible to explore a realist version of the semantic principle postulated by Foucault.

First, let us turn to the causal "dissimilarity principle", cited by Schmalz⁴⁷ as playing an important role in the thought of Régis and Spinoza, and, to a certain extent, in Descartes. According to this principle, causes are, in certain important ways, unlike their effects. In Spinoza the principle appears in the scholium to *Ethics* I, proposition 17, where he states that an effect differs from its cause in terms of what it receives from the cause; in proposition 17 this principle is used by Spinoza to prove that God's intellect and will, if God could in fact be said to possess either, would have to be radically different from human intellect and will. Likewise, the case of the reproduction of entities, or the production of one entity from a similar entity, such as a man producing a man, is for Spinoza not a case of like producing like. For one particular man is the only the cause of the other man's existence, not of his essence, and it is precisely in the former that the two instances differ.

Schmalz points out that this principle appears to play a role in Descartes' thinking as well, despite his apparently contrary advocacy of a similarity principle in causation, as well as a similar claim that asserts that every cause must contain its effect formally or eminently. As Schmalz notes, however, (*op. cit.*, 90) the similarity principle appears to be restricted by Descartes to causes that are total causes of being, and hence to the divine production or creation of being only. But even in this case, there are a number of Cartesian doctrines that would appear to undermine similarity. Descartes' belief in the arbitrary creation of eternal truths, mentioned above, surely undermines similarity, as any kind of similarity restriction entailed by the similarity principle would act as a restriction on God's free creation of beings.

There are a number of other areas of Descartes' philosophy where something like the dissimilarity principle appears to have influence. Perler (1997) and Marion (*op. cit.*) both emphasize what might be called the anti-realism of Descartes' theory of sense perception, in that Descartes' dispenses with the medieval tradition of understanding sensory perception by means of resemblance factors such as impressed species. According to Descartes, it is not necessary that sensory images be transmitted by means of likenesses, as the doctrine of impressed species implies. There is no need for resemblance between what is in our perceptual field and the

⁴⁷ Schmalz (2000, 86–87). The term is also due to Schmalz.

external object; all that is required is some method of causation. The colour we see in objects, for example, need not be literally present in the objects themselves, as long as some sort of quality in the external object can be correlated to the perceptual phenomena. As external objects of our perception are, according to the principles of Cartesian physics, ultimately nothing but parts of extension, there can be no colour as such (or any other sensory quality not directly constituted by extension) in the object. This is not to say that colour or other sensorial qualities are pure idealizations—they are "in" the physical object, not only in our minds. But they do not resemble the physical factors that exist in the objects to which they are correlated.

There is another argument against perceptual similarity: the theory of internal images (that is, images present in the mind or in the organs of sense), to which the doctrine of impressed species is committed, introduces an additional stage to the perceptual process—the perception of the internal image itself, in addition to the perception of the external image which lies in the perceived object. The operation of this internal image on the organs of sense perception must now be accounted for, in addition to the operation of external causes or impressed species. As Perler recounts (146), there would seem to be two possible versions of this internal stage, both dismissed by Descartes. Either one must bring in another image, in addition to the impressed species, to explain its action upon the sense organs (much as the internal species itself was introduced to explain the transmission of the external image), or one might postulate a kind of internal eye (in the case of sight), within the eye itself. Both cases appear to be implausible. The first would eventually involve one in an infinite regress of additional images (much like the "third man" argument); the second postulates an internal faculty of perception for which there is in fact little direct evidence (other than this argument itself).

These two arguments against perceptual similarity, one "empirical" (dependent on the Cartesian theory of extension and the constitution of material entities), the other purely "theoretical" (Perler's terminology), are interestingly independent of each other. One need not be committed to the principles of Cartesian physics to accept the theoretical argument. The theoretical argument, and the "homunculus fallacy" it appears to imply (*idem.*, 147), has seemingly nothing to do with Cartesian dualism, which Descartes argues for on quite independent grounds. Could there be a common root, not to the two arguments (for plenty of philosophers have rejected the idea of the homunculus to account for perception, without thereby being committed to mind-body dualism; indeed, Perler specifically mentions Ockham in this regard), but to their placement in Descartes'

philosophy?

Both arguments seem to trade on the idea of dissimilarity: the empirical argument directly, by postulating a causal, rather than resemblance based theory of perception⁴⁸; the theoretical argument via a critique of the necessity for mediation and mediating entities such as an internal eye or a homunculus (we will explore in more detail in section three below the relationship between similarity and mediation). Perler notes the common commitment of Descartes and Ockham to the critique of the theory of impressed species, although there is no evidence of direct influence. Most of Descartes' intellectual influences appeared to have come from the scholastic authors he would have studied at the Jesuit college at La Flèche, who would have been little disposed to support a nominalist theory of perception such as Ockham's. If there is no indication of direct influence, what could account for this shared commitment between approaches as distinct as Cartesianism and 14th century nominalism?

We have seen above, in section 3.2 (and will see in the next section as well) that apparently distinct theories (such as, for example, corpuscularianism and the mereological theories of substance of Buridan and Ockham) may have common, or at least compatible, metaphysical grounds, without being identical. For example, both Buridan and Ockham attempted to defend a version of an Aristotelian substance ontology along with a severe reduction in the number of metaphysical parts within it, yet retaining enough metaphysical structure (in particular, the form / matter distinction) for their versions to remain distinct from corpuscularianism, which adopted a different theory of material composition. Something similar can be said concerning the distinct, yet comparable, philosophies of Malebranche and Descartes. Malebranche's philosophy might be thought of as a peculiar mixture of Cartesianism and Platonism. According to Gueroult, it is the tension between these two points of view that is responsible for most of the aporia in Malebranche's doctrines:

On pourrait sans doute là [this conflict] découvrir dans la fusion que Malebranche croit pouvoir établir entre la physique cartésienne comme

⁴⁸ And it should be noted that causal theories of perception in early modernity were not limited to Cartesian philosophers. Gassendi, who argued that extension was a merely a mode, rather than the essence, of matter, nevertheless supported a kind of causal theory of qualities, seeing qualities as characterized or individuated by their effects. Thus, Gassendi could claim that atoms of heat were in fact not hot; presumably as they only caused heat, but were not hot themselves. See Lolordo (2007, 224).

science d'idées claires et distincts [...] avec la conception platonicienne exemplariste d'un monde d'Idées intelligibles radicalement récusé par Descartes. (Gueroult 1955, 249)

[One could, no doubt, find this in the fusion which Malebranche believed he could establish between Cartesian physics as a science of clear and distinct ideas [...] and the Platonic exemplarist notion of a world of intelligible ideas radically rejected by Descartes.]

Yet we note that many of these Malebranchian aporia are mirrored by similar aporia in Descartes' own philosophy, which is apparently free from this particular conflict (between a Platonism of ideas and a mechanistic physics). Much of the tension found in the conflict between the infinite and the finite in Malebranche (another way of parsing this disagreement) merely reproduces the familiar tension in Descartes between mental and extended substance, a tension which is reduced in Malebranche's thinking, due to the essentially secondary function that mental substance assumes in Malebranche. One might conjecture that since such a conflict, the conflict between the two kinds of substance as sources of clear and distinct ideas, is not available to Malebranche (as perception of the soul is merely confused), it becomes manifest in a different dimension. This raises the possibility that this tension, the tension between extension and mind in Descartes, and the finite and infinite in Malebranche, is less a problem to be solved than it is an essential part of their respective philosophies. For both tensions are a concrete manifestation of dissimilarity, and the idea that completely dissimilar realities can nevertheless be causally interactive: In Descartes, mind and extension, and in Malebranche, the infinite (the idea of intelligible extension, for example) and the finite (individual extended things).

If it is possible to find different manifestations of the same conflict in different thinkers, it might be conjectured that something similar can take place within the doctrines of a single philosophical system of thought—distinct arguments or ideas might yet be the vehicle for a single doctrine. If this is granted, it might be possible to see the two different kinds of argument that Descartes employs to argue against the perceptual employment of impressed species, and the function of resemblance in perception, as different manifestations of a single principle, independent though these arguments are. There is certainly no reason or requirement that the theoretical, anti-homunculus argument be conjoined with the empirical argument, the latter based on Cartesian dualistic physics, as we have seen. Yet clearly these doctrines reinforce each other.

That principle, I would claim, is the principle of causal dissimilarity:

that causality functions, not via resemblance or similarity, (and hence not, in the case of perception, by impressed species), but regardless of the similarity or dissimilarity of cause and effect. Both the empirical and theoretical arguments for perceptual dissimilarity, above, trade on this principle, and I would argue that their concurrence in Descartes perceptual theories, as completely independent arguments, can only be explained by the motivation of some such principle. Schmaltz (2000) traces this disappearance of analogy, which he finds not only in Descartes, but in Régis and Spinoza, to the influence of Descartes position on the arbitrariness of the divinely created eternal truths; yet we have seen that Gassendi also employs a dissimilarity principle in his account of the individuation of qualities. Gassendi, however, was outside of the line of direct influence of this particular Cartesian doctrine, unlike Régis and Spinoza, who were, at least at times, Descartes' explicit followers.

Now, it is true that Gassendi was likely a voluntarist when it came to the question of eternal truths, and thus would have supported the Cartesian doctrine. Yet it has been argued that, in contrast to Descartes, Gassendi's philosophy was likely not strongly influenced by such theological considerations, or indeed any particular set of theological concerns at all. Lorldo (2007) has argued that the relationship between Gassendi's theological motivations and his philosophical positions is far from clear⁴⁹. Indeed, quoting Wilson (1997), Lorldo makes the point that it is difficult to determine the precise relationship between a thinker's theological and philosophical concerns; theology (especially if postulated as holding a "subterranean" influence, that is, as part of a thinker's set of unexpressed commitments) can ground philosophical concerns, but what is to prevent such philosophical commitments from playing an equally subterranean role?

If this is correct, we have grounds for discerning an independent, non-Cartesian, and possibly non-voluntarist origin for the principle of dissimilarity in early modern thought. However, the issue that arose concerning the apparent coincidental agreement in outcomes of the empirical and theoretical arguments for perceptual dissimilarity, that we examined above, reasserts itself. What could link Gassendi's Epicurean arguments for dissimilarity in sense qualities with the Cartesian arguments, the latter grounded, apparently, in the perceived unbridgeable gap between the infinite divine nature and finite beings?

⁴⁹ As evidence, Lorldo cites, among others, Gassendi's general epistemological pessimism, which she takes to have purely philosophical motivations, and the lack of explicit attention to conflicts between faith and reason in Gassendi's work.

We have seen in the previous section that Foucault accounted for such occurrences of dissimilarity by means of a representational theory of significance that he attributed to the early modern paradigm or *episteme*, though he did not give detailed attention to perceptual theories as such. We have also had reason to doubt this semantic explanation and its exclusive explanation in terms of the theory of the "transparency of the signifier".

Is another approach possible? I hope to answer this question in the final chapter of this essay.

3.6 Causality

A familiar picture of the development of modern philosophy is the account that traces the early modern reduction of the four Aristotelian causes to the single causal category of efficient causation. Carraud (2002), however, sees efficient causality as a "pretender" to a formula which he sees as the true expression of modern causality: *causa sive ratio* (cause, or reason): In other words, the gradual genesis of the principle of sufficient reason, and its equation with causality, which finds its culmination in Leibniz' philosophy. For Carraud the two (causality and sufficient reason) are linked in the development of modern philosophy⁵⁰, for it is, in Carraud's account, precisely causality which confers intelligibility in modern philosophy. Causes become reasons, or, better put, it is causality which becomes the ultimate explanatory factor in giving an account of beings; beyond limited grounds as an explanatory concept in physics, causality becomes a metaphysical principle of universal extension. From Carraud's perspective, the history of causality becomes the history of metaphysics in modernity, in its reformulation or re-foundation in modern thought,

Nous aurions à interroger les modalités de cette fondation, ou refondation, en évaluant ce que l'histoire de la métaphysique elle-même doit à l'émergence de la nouvelle *ratio causae* qui autorise que la *causa efficiens* vaille comme ratio, puis au passage de la *causa sive ratio* au principe de raison. Autrement dit : en quel sens l'histoire de la causalité est-elle l'histoire de la métaphysique elle-même en son époque moderne? (19).

[We would have to investigate the modalities of this foundation, or refoundation, in evaluating that which the history of metaphysics itself

⁵⁰ More precisely, continental rationalism (Descartes, Spinoza, Malebranche, Leibniz).

owes to the emergence of the new *ratio causae*, which authorizes the efficient cause to count as a reason, and, next, towards the transition to the *causa sive ratio* as a rational principle. In other words, in what sense is the history of causality the history of metaphysics itself in its modern existence?]

The expression *causa sive ratio*, which we have encountered above, becomes, for Carraud, a convenient symbolization of this transformation: Cause and reason are synonymous expressions in this picture—the Latin *sive* is an inclusive disjunction that links synonyms—not alternate explanations belonging to different orders of knowledge, as is the case in the Greek roots of these two expressions (αἰτία, λόγος).

Although the equivalence of the two notions of cause and reason is asserted in many places in early modern thought, amounting at times to a "banality" (21) as Carraud remarks, the explicit formulation of the disjunction itself is something of a rarity. In Descartes it occurs in the responses to the objections dealing with the proofs of God's existence, (most explicitly, in the first axiom of the synthetic exposition of Cartesian principles in the second reply) and in particular along with another key idea that only appears explicitly in the responses, that of the idea of God as a self-caused being or *causa sui*, an idea which we have encountered above. Thereafter the expression appears only sporadically in early modern thought, ultimately replaced by its Kantian category of pure understanding: causality.

As mentioned above, however, for Descartes causation is essentially efficient causation; this reduction of causation to the single dimension of efficient causality bodes problems for the equation of causation and reason. Although efficient causality has been mentioned by many as a peculiar mark of modern thought, it remains difficult to discern exactly what role it might play in early modern metaphysics, beyond serving as a foundation for a mechanistic physics. Taking efficient causality as doctrine belonging to and motivated by the development of mechanistic physics, any further foundational role it would have would have to be mediated by doctrines in natural philosophy. But we have already seen that this proposal—that early modern thinking is grounded in changes in early modern science—is problematic. This is not enough to dismiss the problem, but it would leave us with at least two sources of change in the transition from medieval to early modern thought, one grounded in early modern physics (the primacy of efficient causation), and one not (the equivalence of cause and reason), without any clear means of relating the two.

Nevertheless, Carraud sees the relationship between the two principles

as puzzling, The role of efficient causation in the genesis of the principle of sufficient reason, and similarly Descartes' position in this genesis, retains a certain singularity (as we have remarked above in connection with Descartes' understanding of the relationship between God and eternal truths), but would seem to have been nonetheless central to its genesis.

Carraud's diagnosis of modernity has much in common with Heidegger's, (and with Courtine's thought, examined above). Both see early modern thinking as characterized by gradual emergence and eventual dominance of some form or another of rationality or rationalization, although their respective views of its development may differ.

We need to step back for a moment, and attempt to ascertain what exactly it means for a philosophy to be rational. For it can be said that rationality characterizes any system of philosophy, for all systems of philosophy are, in contrast to mentalities, reflexive systems of thinking possessive of a certain measure of rationality. In this sense there is no such thing as a naïve or non-rational philosophical system, although a philosophical system may well be concerned with or centered around various naïve positions such as so-called naïve realism. Yet such a system will have internalized responses to other, competing systems, so in this manner will have to incorporate a certain amount of reflective, and hence rational, thought⁵¹.

In light of this, it is difficult to claim that early modern thought is more rational than the thought systems it has succeeded. For there was surely a tradition of discussion and debate in medieval scholasticism, even if not all doctrines (in particular, certain theological doctrines) were open to questioning or revision.

Another use of rational can indicate opposition to philosophical positions that deny a priori knowledge, or knowledge not derived from experience. Yet another indicates opposition to intuitive sources of knowledge. There is a sense in which the thought of the continental rationalists merits these uses of the word, yet we have seen even in the

⁵¹ By rational thought I have something in mind such as the following (Bronkhorst 1999): "The presence of a tradition of rational inquiry [...] expresses itself [...] in its tradition of rational debate and in the result thereof, the attempts made by many thinkers to improve their own system, and the refinements and developments that this entailed [...] in a tradition of rational inquiry there are no areas of reality which are fundamentally beyond the realm of critical examination, no areas which should exclusively be left to tradition, revelation, or insight." As noted by Bronkhorst, this characterization of rationality is not far from that of K. Popper.

case of Descartes there are key elements of his thinking (the doctrine of eternal truths) which cannot be said to be rational under either description. In what sense, then, is early modern thought exclusively or specifically rational, in a way that other systems of thinking are not? Both Courtine and Carraud see early modern thought as culminating in a form of rational expression, as having gone through a process of rationalization culminating in a system of pure ontology and a systematic classification of transcendental predicates on the one hand, or the principle of sufficient reason on the other. It would seem that we must identify this form of rational expression as concerning the first of the above three meanings of rational. Yet as we have seen it is difficult to label a specific doctrine or principle, such as efficient causality (or even the principle of sufficient reason itself) as rational, given that rationality is best thought of as characterizing a system of thought and its relations and reactions to other systems of thought, not specific doctrines or elements of these systems. In what sense, then, can efficient causality, or any interpretation of causality centered on it, be called rational?

Perhaps, however, the key to the specifically metaphysical or philosophical interpretation of causality lies in a different direction. Instead of attempting to link the *ratio causae* to the genesis of the principle of sufficient reason, there is another way we can interpret the *ratio* of the cause under the "hegemony" of efficient causation. For in this section I am not so much concerned with the principle of sufficient reason, which after all has a long history that precedes early modern philosophy, but with the connection or grounding of it in causality that we allegedly see in the early modern era, and in particular its use as an explanation of the growing predominance of efficient causality, that is, with the kind of explanation that we see in Carraud: efficient causality (or the exclusive focus on efficient causality as a kind of causal explanation) as a precursor or initial manifestation of the principle in modern thought.

I would argue, however, that efficient causality, in modern thought, is not a precursor of the principle of sufficient reason, and that therefore we cannot look to this principle as an explanation for the undoubted importance that efficient causality played in modern thinking.

Thus far, I have tried to show that neither subjectivity, nor mathematization, nor changes in the concepts of substance, or the development of modern physics were solely responsible for the early modern standpoint, and *a fortiori* for the centrality of efficient causation. If the principle of sufficient reason is to be taken solely as a metaphysical principle (without a specific phenomenological or experiential manifestation), but efficient causality as a physical principle, then neither can we look to

the former as a ground. Whence, then, efficient causality? To put it another way, if the *ratio causae efficiens* is not grounded in subjectivity, mathematization, *physis*, or reason, what could be its ground?

Before we can answer this question (which shall be done in the concluding chapter), let us note some changes that have occurred in the concept of causation from antiquity to the modern era. The notion of causality as a relation linking two relata, cause and effect, familiar to us today, is not part of the traditional language of causality as it existed before the modern era: In antiquity, causality was not understood as a dyadic relation, but as a triplet, composed of an agent, a "patient" (the place or locus of the occurrence of causality), and the actualization of the causal potential, which lies in the patient⁵². For example, in the case of perception, the external object, or more precisely the form of the external object, acts as an agent on a particular sense faculty, and initiates (not causes!⁵³) the actualization or the potentiality that already existed in the sense faculty of the patient, resulting in the existence of the sense form in the different (different to the object) material of the perceiver. Thus, in the classical conception, what goes on between the agent and the patient is not so much a relation between a cause and an effect, but, as Des Chene notes (46), a kind of manifestation of a power, a power which occurs in and is in some sense of the patient, but is also of the actualizer of agent, just as sense perception can be thought of as the manifestation of the object as well as, somewhat unfamiliarly to modern ears, the power or potential of the sense organs.

Effects (in the modern sense), however, are not manifestations; they are not unfoldings or the coming-into-existence of an agent or cause. In fact, in Greek, a separate word for effect (*ἀποτέλεσμα*), only came into use from the first century AD, well after the classical period of Greek philosophy (Duhot, 23, 266)⁵⁴. Nor was causality a relation that necessarily occurred in sequential time (as appears to be the case from

⁵² A similar transformation in the semantics of relations was noted above in chapter one.

⁵³ "Our use of causal terms seems to be strongly coloured by the notion that in causation there is something which in some sense does something or other so as to produce or bring about an effect [...] our difficulty with Aristotelian causes is due to the fact that they cannot even be conceived of in this way". (Frede, *op. cit.*, pp. 125–126.)

⁵⁴ For a detailed discussion of some of these changes, and their likely origination in Stoic philosophy, see Frede, *op. cit.* But Stoic causality is not equivalent to modern causality, as it is still a three-term causality (Frede, *op. cit.*, 137), and *supra*.

Hume onwards)⁵⁵. In other words, as noted by Fox (2006, 100), the causal and temporal orders were (for pre-modern thinkers) distinct; simultaneous causation was not only conceptually possible but was commonly assumed to take place in a number of typical situations, such as angelic actions and divine illumination (*Idem*, 107 *et seq.*).

Des Chene (44) makes an additional observation on a related matter, a contrast between the structure of classical and modern analyses of action and motion. In scholastic analysis, motion (as a species of causality) occurs in the recipient or patient alone (motion in classical analysis usually involves three entities, just as causality does: a mover or agent and a moved or patient, and an actualization or motion that takes place within the patient); the relationship is anti-symmetrical⁵⁶. In Cartesianism and early modern physics, however, action is always symmetrical—every mover is moved in its turn. Thus in early modern physics, the basis for the classical distinction between agent and patient disappears. A three-fold anti-symmetrical relation (between mover, moved, and motion) is reduced to a symmetrical⁵⁷ dyadic one (mover and moved, action and reaction)—Newton's third law.

Indeed, and as mentioned above, (chapter one), it is worth noting that the modern concept of relation itself is quite different from the medieval and classical notion. In antiquity and the middle ages, the category concerned the termini (the relationals) themselves, and not the connection between them. A relational is a directed object, or an object whose name indicates that it points to or connotes another entity; thus father, not fatherhood (the relation itself, in modern terms). Causality (the name for the relationship of cause and effect, conceived of as a regulating principle) itself appears to be a modern word⁵⁸.

⁵⁵ For some traditional medieval views on the relationship between time and causality, including the differences between causal and temporal ordering, see Fox (2006), chap. 3. These traditional views persisted quite late into early modernity; for Descartes, causation was also likely instantaneous. For this see *infra*, section 3.7.

⁵⁶ It should be noted that in this respect that scholastic Aristotelianism differs from Aristotle himself, who was open to the idea of symmetric causation, at least in some circumstances. See e.g. Russell (1976, 27).

⁵⁷ The symmetry (of motion and action) arises from a compounding of anti-symmetrical causal relations: the underlying causality is still anti-symmetrical, but the symmetry of the compound shows that causes and effects occupy the same ontological level and are capable of reversing roles as a consequence, different from the medieval Aristotelian causal model.

⁵⁸ See the discussion in Carraud, *op. cit.*, 91ff.

Could this transformation in the languages of causality and motion throw some light on the modern situation? We have seen that one of the key points in the Cartesian rationalization of causation, such as it is, is the extension of causal explanation to the whole of phenomena, including God. One of the characteristics of rationalization, as we have seen above, is universalism, that is, its tendency to explain a wide range of phenomena in a uniform manner. It is worth asking whether rationalization is the only kind of mechanism that employs this kind of universalizing, or domain broadening. We will see in section three that there are philosophical structures, connected with the various kinds of two-part or dyadic relations that developed in modern thought, that entail the very kind of universalizing characteristic of rationalization, yet are distinct from any sort of process of rationalization, in any of the three senses of rationality discussed above—for in what sense are two-part relations more rational than three-part relations, or more rational than directed relata? If this latter explanation (of efficient causality as a paradigm of the two-part cause and effect relation) is to be used as explanation of its link with rationality, and from thence to its status as a precursor of the principle of sufficient reason, then we have in my opinion a very weak explanation.⁵⁹

Now, Carraud does not make this argument; in fact, he is quite prepared to make the opposite point, and in fact does find a strain of irrationality in the modern development of study, which takes into account efficient causation.

In the first section of his study, which takes into account various historical formulations of a number of axiomatic-like causal principles, he discusses the genesis of efficient causality itself, the change from the ancient *causa movens* (moving cause), as the Latin renditions of Aristotle have it, to the early modern *causa efficiens*. Carraud views this development (which he traces initially through the Stoic active cause, and later through Avicenna) less as a development in language than a change in language motivated through the development of a concept. Carraud's interpretation of the development of efficient causality shows the influence of Gilson, who traces the modern sense of efficient causality through its theological interpretation in Avicenna, that is, efficient causality as cause of existence, separate from a different sense of efficient causality, which treats of motion.

⁵⁹ It might be claimed that these structural changes, to be examined in more detail in the last chapter of this essay, are themselves symptomatic of some underlying rationalization. But this claim would need evidence independent of such changes themselves. I believe my arguments in this and in section 3.3 above show that there is no such evidence.

In particular, Carraud follows this change via the idea of the efficient cause as a sufficient condition of existence, encapsulated in the formula *remota causa, removetur effectus*, (remove the cause, and the effect is removed, hereafter the RCRE principle) a principle which he finds, initially, in Aquinas, summarizing an argument of Avicenna, and thereafter in other writers such as Hobbes and Hume.

This principle (according to Carraud) acts as a kind of negative version of the old formula *nihil est sine causa* (nothing is uncaused) (Carraud, 2002, 78), which can be read as the conditional "if there is an effect, its cause exists". *Remota causa, removetur effectus*, on the other hand, reads as the seemingly logically equivalent "if there is no cause, there is no effect", a kind of *modus tollens* to the *modus ponens* of *nihil est sine causa*. Yet, as Carraud notes, there is a subtle difference, in that the second formula would appear to imply that the cause is a sufficient condition of the existence of the effect (following the causal implications of the *remota ... removetur* / if ... then formulation, language which linearly mirrors the causal action of the cause-effect relationship, but this time in terms of absences), while no such connotations accompany the first axiom (which would seem to exemplify a sign - signified relationship, that is, an effect functions simply as the sign of its cause, so there could be other causal factors at play).

There are two points to note here. One, which Carraud traces through the influence of Avicenna, is the change in focus from movement to existence; that is, the RCRE principle (which accompanies the newer sense of efficient causality) works as a condition of existence, of the existence of the effect, not simply of alteration or movement in the affected substance, as the older language of *causa movens* or original source of change, to literally paraphrase the Greek, does. The efficient cause becomes a kind of existential principle, in contrast to the older *causa movens*, which is a principle of alteration or change. The second point, related to the first, is to note that in this new, existential formulation, the cause becomes a condition of the effect *sine qua non* (79), that is, something without which the effect would not appear. This negative formulation he finds especially in Ockham, Hobbes, and Hume.

The RCRE principle, in Hobbes ("every effect produc'd hath had a sufficient cause (else it had not bene produc'd)") (*Short Tract on First Principles*, I, 12), and Hume ("[...] an object, followed by another, [...] where, if the first object had not been, the second never had existed") (*Enquiry Concerning Human Understanding*, VII, 2), is largely (according to Carraud) an "Anglo-Saxon" development, (appearing primarily in the work of Ockham, Hobbes, Hume), and at most a cousin, perhaps, of

continental occasionalism. The *sine qua non* formulation of the RCRE principle, the analysis of causality as a negative condition, that if something is not present, something else does not follow, aligns it, so Carraud emphasizes, with the direction that efficient causality took in the early modern era in its evolution and distinction from the moving cause, towards causality as a ground of facticity. In this sense, both developments run counter to the story Carraud wishes to tell (which Carraud acknowledges), in that they separate casual explanations from rational explanations, from reasons. As a *sine qua non* condition, the RCRE principle leaves the causality of the cause unaccounted for.

Thus, concludes Carraud, neither efficient causality, nor the Anglo-saxon nominalist development of causality as a negative condition connecting two absences, are at the heart of the modern development of causality, the equation of causes with reasons, which begins in Suarez, and culminates in Leibniz.

Yet, perhaps there is something in the RCRE principle that makes it relevant to this development, regardless. I have in mind the second feature, that a cause becomes a sufficient condition for an effect to take place. What this principle implies about the workings of (efficient) causality is not simply its facticity, as noted by Carraud, but it is important to see that it also shows that such causality can be entirely summarized by a two-fold causal relationship between cause and effect, instead of the traditional three-fold relation between agent, actualization, and patient, which traditionally holds even in the case of efficient causality as it was usually formulated in scholastic Aristotelianism. We have seen this two-fold relation elsewhere in early modern thinking, indeed outside of the Anglo-Saxon tradition, in the language of action, reaction, and motion used by many early modern authors⁶⁰, including, to some extent, Descartes.

We will also see, in chapter four, that the language, or rather, structure, of causes other than efficient causes transformed as well in early modern thought; formal causality, for Spinoza, becomes something akin to logical consequence, a relation between a set of premises and a conclusion. Post-Leibnizian analyses of *influxus physicus*, one of the three causal mechanisms identified by Leibniz, use arguments that resemble those intended to support conservation laws (e.g. conservation of momentum, energy), i.e., logical, largely apriori arguments, leading to an almost interactionless version of interaction, without the necessity of positing a medium or mechanism whereby such influx (of motion or momentum) would take place.

⁶⁰ For more details, see Russell, *op. cit.*

To return to occasionalism: Carraud interprets occasionalism along the lines of the RCRE principle, as already mentioned; not however, as establishing a causal connection with the implicative force of a *modus tollens* argument, but as a kind of solution to the problem of the facticity of efficient causality, as it appears in Descartes. For Carraud, occasionalism, above all, is a theory of causality of two terms that are absolutely exclusive (372), separated and distinct from each other; linked by the voluntary action of God. Ultimately no longer an adequate vehicle for reasons, the pure facticity of efficient causality is replaced, in Carraud's interpretation of Malebranche, by the "*efficacité*" (power) of God. Causes become separated from reasons: *causa aut ratio* (either cause or reason): the disjunction is exclusive, separating the realm of reasons from the realm of causes, but they run in parallel: with each causal occasion is an exercise of divine efficacy or power that is the reason for the effect. But this is no longer efficient causality; it has been replaced by causal occasionalism which sets up a one-to-one parallel correspondence between the cause and the intelligible.

But there appears to be no such room for rationality or intelligibility as regards the RCRE principle (which doesn't accompany a replacement of efficient causality with something else). Thus the PSR and the RCRE principle must be two parallel but distinct developments, because a cause that acts for a reason, or that answers a question about reasons (which even the occasionalist approach to causality does) must be very different from a cause that merely underlies existence or facticity.

Yet are occasionalism and the RCRE principle really different paths in the modern transformation of causality? One, a path away from the rationalization of causation, and the other, by means of finding a replacement for efficient causality, not? I do not mean to suggest that the formula *causa sive ratio* exhausts the principle of sufficient reason, or that there is nothing more to the latter than the former. The rationalization of causation may only be one part of the PSR, which is much more than a theory of causation. But the confusion over how exactly occasionalism—a "cousin" of the RCRE principle—and pre-established harmony differ as theories of causal mechanisms⁶¹, and the near exact contemporaneity of

⁶¹ "Since its conception, the theory of preestablished harmony has confronted the charge that it is at bottom indistinguishable from the doctrine of occasionalism." (Rutherford, 136). For example, Arnauld (letter to Leibniz, March 4, 1687): "Il me semble que c'est [the doctrine of preestablished harmony] dire la même chose en d'autres termes que disent ceux que prétendent que ma volonté est la cause occasionnelle du mouvement de mon bras, et que Dieu en est la cause réelle." [It

their development in early modern philosophy, should alert us to the possibility that the reconceptualizations introduced by the "rationalization of causation", and the emergence of the RCRE principle, may have more to do with one other than might be apparent. Perhaps, *pace* Carraud, with occasionalism we are not "déjà au plus loin de Leibniz" (372), but closer to him than we might realize—not because of any means of drawing the divine voluntarism of Malebranche nearer to sufficient reason (which remain distinct, but distinct on the level of mentalities), and, as I have said, because the motivations of PSR surely are not limited to causality, but because of the way that "legality" (used by Carraud as an explanation or perhaps metaphor of the function of occasional causes) approaches rationality in a way that we have already seen in Descartes' treatment of eternal truths; that is, both are approaches to generality, a generality that is universal, but distinct from rationality, a generality that is embodied, as I have tried to explain, in two-term or dyadic relations.

It is possible to see occasional causality as the purest form of relation, purer even than the factual link of efficient causality, in that it abstracts even from the factual link of efficient causality and the connotations of movement and influx thereby. Carraud seems to acknowledge this somewhat, in the way that he finds an element of occasional causality (the idea of causes as pure occasions for causal relations) as a factor distinct from both the facticity or existential aspect of efficient causality (which the occasions take the place of), and from the uses of causes as reasons (which the occasionalist places instead in God, not in the causal relationship). Perhaps the RCRE principle (a cousin of occasional causation) is more part of the modern story than suggested by Carraud, if the other developments mentioned here (the reinterpretations of final causality and physical influx), are as crucial to modern causality as they would appear to be, as crucial as the rationalization that Carraud claims to be central. For they would seem to have set aside the relationship between causes and facticity as well, and it is perhaps this, rather than the relationship (positive or not) between causality and rationality, that is of key importance for the making of modern causality, if we are to have the fullest and broadest picture of it, and if we are to have a true understanding of the role that reasons and rationality can play (or not play) in any philosophy.

seems to me that this says the same thing, but in different words, that is said by those who imagine that my will is the occasional cause of the movement of my arm, and that God is the real cause.]

3.7 Temporality and dynamism

We have seen that Heidegger interpreted Descartes' methodological rules as leading to the creation of a kind of universal reasoning space, one that was mathematical in character, which, in Heidegger's particular use of this term, consists of the setting out or determination of that which is already known. Mathematical things also possess or are amenable to measurement, that is, they possess a metric. We have seen that there is reason to doubt the universality and subjectivity of the Cartesian *mathesis*. However, Descartes did in fact postulate another kind of space within which all entities must appear in a uniform manner, and that is the dimension of time. Jean-Luc Solere points out that,

... cette subsistance de l'ego, que Descartes pose au fondement de son ontologie, il la conçoit de plus, en guise de rupture supplémentaire avec la métaphysique scolastique, comme présence successive, d'une durée s'écoulant selon l'antérieur et le postérieur. De là le temps, comme 'modus cogitandi' humain, mise en rapport de durées coexistants, devient la forme universelle selon laquelle nous nous représentons toute chose (Solere 1997, 348).

[This subsistence of the self, which Descartes places at the foundation of his ontology, is also seen by him to be (in the guise of another break with scholastic metaphysics) a successive presence, with a duration that extends itself in terms of before and after. Time, in this way, as a "modus cogitandi", connects coexistent durations, becoming the universal form according to which we represent all things to ourselves.]

Solere notes that Descartes posited a universal temporality (as a "mode of thinking") in which all things were to be represented. Even God and the angels, which are exempt from substantial change, could in this way said to be in time. For Descartes, the duration⁶² of things in motion was no different from those not in motion,

Je ne conçois pas autrement la durée successive des choses qui sont mues, ou même celle de leur mouvement, que je fais la durée des choses non

⁶² For the various meanings of the Latin *duratio*, and its difference from *tempus* (time) see Fox (2006, 35–39) as well as Gorham (2007, 34–5). As Gorham notes, *duratio* principally indicates "persistence in being" without implying succession, in contrast to *tempus*. In this way it possible to speak of the *duratio* of apparently timeless entities such as God, without assuming (or necessarily precluding) that they are in time in the more familiar sense.

mues ; car le devant et l'après de toutes les durées, quelles qu'elles soient, me paraît par le devant et par l'après de la durée successive que je découvre en ma pensée, avec laquelle les autres choses sont coexistantes.⁶³

[I do not conceive of the successive duration of moving things, or of their movement, in any way different than that of non-moving things; because the before and after of all durations, whatever they would be, appear to me in terms of the successive duration of the before and after that I discover in my thoughts, with which other things are coexistent.]

So it might be said that, for Descartes, although God and the angels, as unmoving things, did not exist in time, they nevertheless could be said to show themselves in time, as they could be said to co-exist with the temporal succession that Descartes was able to perceive in his thoughts. In this sense, all things could be said to inhabit the same temporal dimension, or more accurately, the duration of all things could "coexist", and so be comparable in some way.

In postulating a single universal temporal space⁶⁴ in this manner, a space which is rather familiar to our contemporary everyday understanding of time, Descartes was clearly breaking with scholastic tradition. One account of this scholastic tradition explains the difference as follows:

It should immediately be clear that even in its broadest sense the medieval account of what it is to exist in time is much narrower than many contemporary philosophical accounts [...] many contemporary philosophers would claim to be able to make sense of time in the absence of succession or decay, and so for them an unchanging immutable particular could well count as existing in time, even though for medieval thinkers such a particular would be *not* in time. (Fox 2006, 235–6).

Medieval thinkers, moreover, distinguished three distinct durations: the a temporal durations of eternity, of the *aevum* (or angelic time, which is, for most thinkers, non-successive, but created, and amenable to beings that could undergo certain restricted kinds of change), and the more familiar temporality of finite beings⁶⁵.

⁶³ (Letter to Arnauld, July 29, 1648. AT V. 223)

⁶⁴ I use the term "space" without any assumption of ontological commitment; Descartes' ontology had no room for empty space or void in either spatial or temporal senses. See e.g. Gorham, *op. cit.*, p. 52.

⁶⁵ Fox (2006, 233).

Descartes' sense of time is clearly closer to the modern sense. For Descartes there is a universal sense of time, rather than three distinct times, or, more properly, durations. In this way, Descartes would appear to break with the classical Aristotelian definition that bases time on motion. For if God and the angels, who do not move or change (although it is admitted that the latter can exercise choice, and so can change their will), can be said to somehow yet be subject to time in the sense that they can be imagined to be in time, or to show themselves in time, then time becomes realizable independently of change⁶⁶. Descartes, then, would appear to have no trouble admitting the temporality of an unchanging particular, much as contemporary thinkers do.

But time is not yet connected with causality in Descartes, as it would be for later thinkers, such as Hume. Many passages in Descartes' works show that he did not conceive of causal actions as taking time, but rather as occurring instantaneously⁶⁷. Moreover, for Descartes, no one moment in time could be said to have any form of dependency upon another, as is made clear by the second axiom of the second set of responses to the objections to the *Meditations*, which Descartes needs to support his thesis of divine concurrence (the idea that the causal efficacy of objects needs the cooperation or concurrence of God at every moment): "Les temps présent ne dépend point de celui qui l'a immédiatement précédé, c'est pourquoi il n'est pas besoin d'une moindre cause pour conserver une chose, que la produire la premier fois." (*Resp. II*, AT VII, 165).⁶⁸

So it could be said that Descartes does postulate a kind of universal space within which objects make an appearance, the universal space of temporal succession. However, this temporal space is not directly connected with causality or activity (as it would be for Leibniz and Hume much later), for causation in Descartes is not something that takes time⁶⁹,

⁶⁶ See also Gorham (2007, 44), "unlike Aquinas and Suarez, Descartes does not admit various species of duration—eternity, aeveternity and time—for various things according to the degree of their involvement in change and succession. Rather all things that exist, whether movable or not, created or not, material or thinking, endure successively".

⁶⁷ E.g. Letter to Beckmann (?), July 29th, 1648, AT I, 308. *Resp. I*, AT VII, 108. *Optics*, AT VI, 84.

⁶⁸ "The present does not in any way depend on that which has immediately preceded it, which is why it takes no less of a cause to conserve something than to create it for the first time."

⁶⁹ See e.g. *Resp. IV* AT VII, 108, where Descartes claims that cause and effect do not necessarily follow in time. See also Secada (1990, 49 ff). As Secada notes, the doctrine of causal simultaneity was widely accepted in scholastic thought, and

whereas clearly the temporal succession of events in this temporal space does take up time. Leaving aside the question of whether, for Descartes, time was continuous or discrete, it is still nevertheless clear that, continuous or discrete, the successive nature of time precludes there being two simultaneous moments; causality, therefore, expressed through the simultaneous presence of cause and effect, cannot be uniformly mapped onto the successive nature of time.

Solere claims that this temporal dimension is grounded in the self, for Descartes, and this certainly appears to be a reasonable conclusion to draw, given the argumentation in Descartes' letter to Arnauld presented above⁷⁰. But what of Descartes' followers? We have already pointed out how some of Descartes' successors diverged from him in important ways concerning the status of the cogito argument and of perception of the self.

Does Malebranche have a similar understanding of time? The answer would appear to be that he does not, for Malebranche has a different understanding of duration.

Malebranche's understanding of temporal perception is shaped by his belief that perception of mental phenomena is not clear and distinct. The result is that our temporal perception is subject to variation and ambiguity, dependent upon our experiences⁷¹. Descartes does in fact make similar use of some of the examples that Malebranche mentions (the effect of emotions on our psychological sense of the passage of time; the variability of attention), but Malebranche does not, unlike Descartes, have recourse to clear and distinct perception of the soul, wherein the perception of duration takes place. Thus it would appear that for Malebranche, no equivalent of Descartes single, unique, and non-arbitrary measure of temporal perception could exist. Indeed, for Malebranche, the even stronger conclusion, that there is no certain knowledge of the measure of a duration, follows from his assumptions concerning our knowledge of the soul.

However, it is interesting that there does appear to be a parallel space in Malebranche's philosophical system, parallel to Descartes' postulation of a universal field of temporal perception. Yet this phenomenon is not grounded in the self, for Malebranche, but in the divine will.

In Malebranche, motion becomes independent from matter. However,

ultimately derives from Aristotle. For examples, see Solere (1998, 84 n. 43).

⁷⁰ But see Gorham (2008) for a defense of the stronger idea that for Descartes, God can be said to exist within time, not simply the weaker idea that God's duration can coexist with the temporal succession of our ideas.

⁷¹ E.g. *RdV*. I, 8. (Lennon, 38–9).

for Descartes, it appears that matter and motion are created simultaneously. As Gueroult explains,

A cette divergence fondamentale [the divergence between Descartes' and Malebranche's conceptions of extended substance, in particular with reference to Malebranche's distinction between intelligible extension or the idea of extension, and material existence, which were not distinguished in Descartes' physics] s'en rattache une autre, de grande importance pour la physique.

En situant dans l'incr  ,   titre d'intelligibles, l' tendue g om trique et le mouvement d fini g om triquement comme id e de la variation possible des rapports de distance (mouvement intelligible), en les soustrayant par l    l'acte de la volont  cr atrice d'o  d pendent l'existence des choses mat rielles, leur repos, la force qui meut, Malebranche, tout en persistant   r duire la physique   la g om trie, tend   les s parer m taphysiquement, alors que m taphysiquement Descartes les avait rapproch es autant que faire peut.

Si, en effet, chez Descartes, les forces qui expriment directement la volont  de Dieu ont dans leur d pendance les modes de la substance  tendue qui en sont les effets, l'essence de cette substance est elle-m me aussi l'effet de la volont  cr atrice, alors que chez Malebranche, elle en est ind pendante. Du coup, le math matique et le dynamique se trouvent situ s sur des plans h t rog nes et rattach es   des sources tout   fait distinctes.

Dans ces conditions, il  tait naturel que la physique e t tendance   glisser au dynamisme, vers lequel semblait vouloir s'orienter la science de l' poque. (Gueroult 1954, 125–6)

[This fundamental divergence is connected with another, of fundamental importance for physics.

Malebranche, by placing geometric extension and the movement defined geometrically as the idea of possible variations of relations of distance (intelligible movement), in the uncreated, under the rubric of intelligibles, and in this way subtracting the rest and motive force of material things from the actions of the creative will on which their existence depends, tends to metaphysically separate physics and geometry, by reducing the one to the other; Descartes, on the other hand, attempted to harmonize them to the extent that he was able to.

If, for Descartes, the forces which divine volition directly expresses are responsible for the modes of an extended substance which are among its effects, the essence of this substance is itself also an effect of the creative will. But for Malebranche, it is independent from them. All at once, mathematics and dynamics find themselves situated according to different schema and attached to totally different sources.

In these conditions, it is natural that physics would have a tendency towards dynamism, to which the science of the times would seem to wish to orient itself.]

Malebranche postulates an idea of extension, intelligible extension, essentially the essence of extension as perceived via God. As Gueroult notes, this has the effect of reducing physics entirely to geometry for Malebranche, as intelligible extension has no modes, unlike physical extension⁷². There is no geometrical definition of rest or motion; indeed, there is no geometrical way to distinguish between the two. For Malebranche, matter is "indifferent to motion and rest".⁷³ Consequently, for Malebranche rest becomes something very different from movement—it is not something in itself, capable of resisting change or impact, but merely the absence of motion⁷⁴. Consequently, there is no force of resistance in resting objects in Malebranche's physics, unlike in Descartes. Once again (notes Gueroult) we see an application of the axiom "nothingness has no properties", which as we have seen has foundational importance for Malebranche. By separating the geometrical and material aspects of extension, Malebranche effectively separates the static and dynamic aspects of extension,

The idea of matter in motion certainly includes two powers or efficacies to which it is related, to wit, what created it, and further, what activated it. But the idea of matter at rest includes only the idea of the power that created it, without the necessity of another power to put it at rest, since if we simply conceive of matter without considering any power, we will necessarily conceive of it at rest. (*RdV*, VI, 2.9. Lennon, 515.)

Thus there are two acts in creation of the physical universe—an initial creation of matter, and an initial impression of movement that sets this matter in motion. Along with this impression are created laws of motion, which could not have existed without this second act⁷⁵.

⁷² This strict geometrical view of physics is often imputed to Descartes, but, as Garber (1992, 175) notes, "Descartes' claim that all accidents of body must be "referred to" the principle attribute, extension, are, in the strictest sense, false. The Cartesian world is a world of geometrical objects made real. But as he construes them, the objects of geometry, even as they exist objectively in the mind, are taken to be enduring things and are thus at least capable of objective motion in objective time. And so, the world of bodies, the objects of geometry existing formally outside of our conception, can have real duration and motion as well".

⁷³ *RdV* VI, 2.9, (Lennon, 514).

⁷⁴ *Ibid.* p. 515.

⁷⁵ Gueroult (1954, 127). *Entr. Meta.* VII, 12: "Si Dieu n'a point encore établi de lois des communications des mouvements, la nature des corps, leur impénétrabilité l'obligera à en faire de telles qu'il jugera à propos." ["If God had not already

As Gueroult notes, this understanding of extension has the effect of placing the essence of matter in movement, and not in spatial or geometrical properties. This conception, furthermore, was much more in agreement with the later physics of Hobbes, Leibniz, and Newton, and thus with the tendencies of the trends of development in modern dynamics. It is important to remember, however, that despite the postulation of an independent foundation of motion, Malebranche's dynamics still remained fundamentally Cartesian, as the initiation and regulation of motion remained grounded in the divine will, not in physical entities themselves, i.e. in so called secondary causes. As Gueroult notes⁷⁶, it was not until the rejection of the idea of instantaneous causality (principally by means of the rejection of the idea of the instantaneous transmission of light) that physics was able to fully advance into its modern form, the dynamic form that we find in Newton and Leibniz. So Malebranche's dynamics was at most a kind of quasi-dynamics, for motion in Malebranche's conception was not the result of the interior dynamics of matter, but merely a distinction based on two acts of divine will.

Thus, like Descartes' universal *tempus*, Malebranche's independent foundation of motion in a separate act of divine will could be said to have created a single law-like foundation for a wide range of physical phenomena. In both cases, these changes appear to be foundational for modern thought, as both mark developments which were to be continued in later developments of modern philosophy.

However, in Malebranche's case, this space is not grounded in the self. It is not a consequence of subjectivity. Yet it does have foundational grounding, in that it is founded in a second act of creation, the act of creation of movement, which is a distinct act from the creation of matter, much as Descartes' sense of temporality is grounded in the clear and distinct perception of temporal succession in the soul.

The Cartesian postulation of this single temporal space, and Malebranche's quasi-dynamic conception of matter-in-motion (and, likewise, Heidegger's interpretation of Cartesian *mathesis*), could be said to create a kind of fundamental linear metric space. In Descartes' case, this space is universal, as all real entities, even non-temporal entities, can

created the laws of motion, the nature of material bodies and their impenetrability would have obligated him to create such laws as he would have judged appropriate." This would appear to imply that the laws of movement are created according to the properties of matter, and hence separately from them.

⁷⁶ Gueroult (1954, 132). See also Hill et al. (2012).

appear within it; though as a mode of thought, it is not quite independent. Malebranche's space of motion is likely best conceived of as a regulatory space, a space of laws of motion. As it is only applicable to material things, it does not have the universal extent that Descartes' temporal principles do. Yet, as grounded solely in the will of God, independently from the act of will that created matter, and hence not a mode of matter or *a fortiori* of anything else, it possesses an independence that is lacking in Descartes' temporal measure. However, both these spaces serve as foundations for the perception of and understanding of all physical phenomena, and are both subject to a linear measure, as both temporal and motive space are measured in terms of the linear measure of before and after⁷⁷.

This is in contradistinction to the medieval view, which not only postulated a multiplicity of incommensurable durations, but, so long as it remained a metaphysics of substance (and not an ontology of being, as Courtine alleges is the case for Suarez), could not but be a study of an open ended plurality. For Aristotle's science of "being as being", the project of the *Metaphysics*, remained a notoriously open-ended and inconclusive project, in the eyes of many interpreters. Even on the strictest unified reading, the unity of being could at most be analogical.

Once again we must ask what these transformations in perspective have in common with the other results mentioned here. It seems difficult to connect these transformations in temporal and dynamic concepts with the changes brought about by the introduction of the mereological picture,

⁷⁷ J.R. Armogathe (1983) has pointed out that the Cartesian *duratio* is not quite a measurable space, as measure requires uniformity, not simply succession. The psychological time of Cartesian *tempus* was a continuous space (at least according to Armogathe), and therefore had no un-arbitrary means of measure; it could not be consistently divided into instants (and hence uniform intervals) that measurement requires. It took the concept of successive but discontinuous time, according to Armogathe, to make the scientific advancements of the seventeenth century possible; this kind of time is exemplified by the angelic *aevum*., which consisted of (in Bonaventure's interpretation) the successive but disconnected acts of angelic will. It is also exemplified in the instantaneous movements of corporeal matter, which, unlike mental acts, do not take time. These discrete moments, once coordinated to a uniform measure such as the cycloidal pendulum, could provide a measure for duration. Thus, the continuous psychological time of the mind was not enough for the emerging science of dynamics; the discrete time of the *aevum* and of extension was needed as well. Armogathe's hypothesis, I believe, further undermines Heidegger's contention that the mathematical is grounded in the subjectivity of the ego (see section 3.3 above).

for instance, or with other developments such as the principle of sufficient reason or with a system of ontology in a Suarezian sense. It seems no less clear the Malebranchean picture, at least, is in no way a consequence of any form of subjectivity. It is clear, however, that the development of these independent spaces was in concomitance with the emerging trends in modern physics that were later to achieve fruition in Leibniz and Newton, and in this sense at least has an equal claim to the modern perspective as do the developments mentioned by Lagerlund, Courtine, or others.

CHAPTER FOUR

CAUSALITY AND ANTI-SYMMETRIC DYADIC RELATIONS

As has been said, the proximate matter and the form are merely two aspects of the identical reality, the one with respect to a thing's capacities, the other with respect to its actual operation. Therefore, to seek a reason for their unity is like explaining how one is one.

—Aristotle, *Metaphysics*, H6, 1045b 17–20.

The soul is united to all the parts of the body conjointly.

—Descartes, *The Passions of the Soul*, 1.30

The order and connection of ideas is the same as the order and connection of things.

—Spinoza, *Ethics*, II.P7

4.1 Relations, causality, and comparative philosophy

Let us step back and summarize:

I have tried to show that early modern thinking is not necessarily connected to subjectivism or representational thinking. No doubt certain modern philosophers did employ arguments and ways of thinking that are reflective of either or both of these paths, but they cannot be claimed to adequately represent early modern philosophy as a whole, or even the more restricted part I have examined here.

Instead, in examining the work of others, I have discerned several developments that can be reasonably said to hold of much modern philosophy:

- A structural or systematic approach to being (ontology) as opposed to a metaphysics of a primary being.
- The development of a mereological conception of substance, or, alternatively, a reworking of the concept of actuality.
- A "principle of dissimilarity" that governs certain aspects of causal

interaction and perception.

- The "rationalization" (i.e. domain broadening) of causation.
- Changes in the language of several kinds and principles or means of causality: (efficient, formal; physical influx; the RCRC principle).
- The development of several versions of a universal linear metric "space" (i.e. a mathematical, not necessarily physical space).

I wish to emphasize that none of these results are original to my analysis (although some of the interpretations of them are).

But I do claim that no one of these changes is able to account for all of the metamorphoses of modern thinking. It is, however, possible to see these developments as varying instantiations of a single principle.

To motivate this claim, let us look at an earlier work of Jean-Luc Marion, whose work we have discussed in section 3.3 above,

In Marion (1975), Marion claims that Cartesian *mathesis*, in the *Regulae*, can be understood as an attempt at sketch of an ontology, a revision of the Aristotelian ontology of the *Categories*. According to Marion, Descartes revises Aristotle's ontology by placing relations, not substance or primary being (*ousia*), at the centre of ontology,

Donc, si Descartes établit *absoluta* et *respectiva* au sein d'une relation entre termes à connaître, quand même il reprend la terminologie d'Aristote, il l'inverse, en y lisant une nouvelle relation—celle même par quoi « nous les comparons entre elles » (381, 20)—, au lieu d'une opposition. L'essence (comme *ousia*) perd donc la rang du terme essentiel, dans le mouvement même, où la relation à la *Mathesis* comprend l'absolu comme relatif à elle, donc respectif. (81)

[Thus, if Descartes established *absoluta* and *respectiva* at the heart of a relation between terms to be known, all the same he renews the Aristotelian terminology, he inverts it, by here reading a new relation—that by which "we compare them with each other"—in place of an opposition. Essence (as *ousia*) loses its status as an essential term, in the same way that the relation to *Mathesis* includes the absolute as relative to itself, and therefore respective to it.]

Marion's thesis is that Descartes, by placing *mathesis* at the centre of his philosophical approach, by starting *mathesis* with the cognition of simple terms, "not in so far as they can be referred to some ontological genus (such as the categories into which philosophers divide things), but in so far as some things can be known on the basis of others." (*Regulae*, VI; AT X, 381; Descartes 1984, 1985, 21). Descartes has relativized the categories of

the absolute and relative themselves, by turning both into terms of a single relation. As Descartes explains, continuing the previous remark,

We should note first that everything, with regard to its possible usefulness to our project, may be termed either 'absolute' or 'relative'—our project being, not to inspect the isolated natures of things, but to compare them with each other so that some may be known on the basis of others. (*Ibid*).

Thus, "absolute" and "relative" become terms of art, so-to-speak, that is, relative terms themselves. As Marion points out, this relativity functions in a number of ways:

1. By means of *mathesis* and our understanding in the first place, that is, "with regard to the possible usefulness to our project."
2. Between individual categories, that is, to the extent that the relative and the absolute are categories that are defined in terms of each other (this is the sense introduced in the immediate references above). In this way, "absolute" itself becomes a relative term; further, the particular things which fall under these categories are known on the basis of each other: "what we are contemplating here is the series of things to be discovered, and not the nature of each of them" (*Ibid*, 383). In this way, for example, Descartes says that he classifies "cause" and "equal" as absolute terms, and not as relatives, although "their nature really is relative", for they serve as initial terms in the series of inquiry.
3. In the strict or traditional sense, wherein one can find the traditional kinds of relatives, such as "effect", "many", "particular", etc.

Which of these senses is the most fundamental? After a number of considerations (including aspects of Descartes methodology in the *Geometrie*), Marion settles on the following,

Ce qui se substitue à la *ousia*, paraît être aussi moins la relation 3 (à laquelle l'*ousia* se réduit), que la *séries* même (qui opère cette réduction) [...] la *séries* achève la disposition de l'ordre en posant l'ordre lui même comme absolu, en sorte de disposer les *res* en tant que connues —relatives à l'ordre (Marion 1975, 95).

[That which takes the place of *ousia* (substance) might not so much be relation 3 (to which *ousia* is reduced), but the series itself (which carries out this reduction) [...] the series acquires the capacities of order in postulating order itself as absolute, by means of presenting entities to the extent that they are known—relative to order.]

That is to say, for Marion it would appear that it is not the relative itself ("relation"), as it appears in Descartes categorization (sense 3 above) that is the most fundamental, but the ordering, the serialization created by relatives, as for example when one places the category of "cause", which is really a relation (sense 3), at the head of a series in order to stress its importance for ordering philosophical inquiry. In other words, in Marion's consideration, it appears that it is the second sense in the above list that is key, that is, the sense involved in ordering the various series of entities involved in *mathesis*, which doesn't appear to fall under the traditional concepts of relation covered in sense 3. At the same time, Marion stresses that this ordering would not be possible without the "shift in the centre of gravity" (99) accomplished in Descartes' thinking by the cogito, and so sense 2 is dependent in a certain manner on sense 1; or, more properly speaking (since the cogito argument doesn't appear in the *Regulae*) to this "silent" shift ("une décision originelle que taisent les *Regulae*"¹) of which sense 1 is a manifestation or "flowering" of.

Whatever one makes of Marion's difficult argument, I think Marion is quite correct in discerning that there are fundamental ontological implications of Descartes' method in the *Regulae*, or perhaps better put, that the adoption of the particular methodology of the *Regulae* reflects a revisionary ontology, an ontology that puts the category of relation (in one sense of or another) at its centre. It is interesting as well that this category appears on several different levels in the *Regulae*: in the category of traditionally understood relational terms (sense 3), as the ground of each categorical term, by means of the claim that even absolute terms are in some sense relative terms (sense 2), and by means of the relationship of the whole procedure to the project of *mathesis*, and by this way, to the self (sense 1).

Fundamentally, then, Marion sees the Cartesian "inversion" of Aristotle's categories as grounded in the centering of the self in Cartesian ontology. For various reasons discussed above (section 3.3), I do not believe this to be a tenable assertion, that is, if we take into consideration the broader picture of Cartesianism developed by Descartes' immediate followers.

Yet, we have seen that according to Marion, relations function on at least two important levels in Cartesian *mathesis* (sense 1 and sense 2, aside from the conventional sense 3). I would like to propose that a similar stratification of relations appears throughout early modern philosophy, in many of the conceptual structures that have been explored in this essay.

¹ "An original decision which the *Regulae* is silent about."

What I would claim is that I believe that the positive characterizations of early modern philosophy that I have surveyed above can be seen as employing instances of a particular kind of relational structure.

More precisely, I claim that this structure has the following entailments:

1. It is an ordered or anti-symmetrical² dyadic relation, that is, a relation with only two terms, in which the influence flows only in one direction.
2. As such, it precludes mediated relations; for mediated relations can be rephrased as multi-term (three or more) relations, by converting the mediating function itself into a term³. No purely dyadic relation can be mediated, for it then ceases to be a dyadic relation. Some examples of mediated relations are: relations based on similarity or likeness; the three-fold structure of the pre-modern version of causality (agent, patient, and actualization); the three-fold structure of substantial change (form, matter and privation).
3. The absence of mediation in dyadic relations has as a consequence that such relations often apply across broader domains than mediated relations, for the mediation often serves as a basis for a classification of the relation. In brief, the mediation may tell us what kind of relation the relation falls under. Mediation, for instance, is at the basis of the complicated classifications of the so-called dialectical topics of medieval argumentation schemes, such as arguments from "greater", the "lesser", and so on. The contrary opposite of a mediated relationship is the purely arbitrary relationship, for it is only the purely arbitrary relationship that cannot be classified under any kind (any kind smaller than the domain in which it operates). There may in fact be no relationship that is completely arbitrary or purely unmediated (outside of, perhaps, arbitrary functions over an infinite domain such as the relations induced by choice functions in set theory), but at least I hope to have shown that the mediation and domain / range of a relation are in an inverse relationship.

² Anti-symmetry or directionality (implicit when the two termini are explicitly distinguished, as in cause and effect) is important, for it precludes mutual interaction and influence, which as Kant notes is the principle difference between the categories of causality and community (*Critique of Pure Reason*, B112)

³ This may very well be behind the "third man" objection to Platonic forms.

Now, no single instance of this kind of relation predominates in early modern philosophy. But I claim that the prevalence of these kinds of relations reflects a significant feature of early modern thought. This raises the following line of inquiry:

In what sense is it permitted to examine structural patterns in philosophical thinking? It is one thing to suggest that the fundamental role of such dyadic relations are a principle that organizes early modern thinking, but given the lack of explicit expressions or consciousness of such relations in the works of the philosophers under examination, it can be difficult to see how this claim might be justified. Yet a number of thinkers have proposed just this sort of approach, in some rather difficult interpretive contexts. I would like to briefly mention three of these.

In his *Philosophie d'algebre*, Jules Vuillemin argues for a link between developments in mathematics and philosophy in Descartes, Fichte, and others. According to Vuillemin, mathematical entities such as groups and groupoids can share abstract structure with representations of elements of consciousness, such as in the manner of the postulation of the Fichtian self and its environment, the not-self. Vuillemin⁴, for example, has shown how Kant's conception of space and physical actions within this space share patterns with that of a mathematical group⁵. Likewise, although there has been no direct evidence that Fichte was aware of the work of the mathematician J. Lagrange (Fichte's near contemporary), Vuillemin believes that something of the latter's mathematical methods used for finding solutions of algebraic equations have much in common with the dialectical structure of consciousness explored by Fichte⁶.

Another example: In his explorations in Sino-Hellenic comparative philosophy, Jean-Paul Reding claims that the relation between language and thought, or between language and philosophy, is not one of a particular directed influence from one to the other, or even one of mutual interaction, but rather an almost compensatory relationship, grounded in a prior relation with consciousness; that is, structures in both language and thought can themselves be expressions of an underlying cognitive structure. At times a structure may manifest itself in language, at other times (or places), a similar structure may show up in conscious, explicit

⁴ Vuillemin, *op. cit.*, pp. 431 ff.

⁵ A group, in mathematical terms, is an abstract algebra closed under a single operation (\bullet), to which there exists an inverse operation, and which has an identity element (i.e. an e such that $e \bullet a = a$ for any element of the group a), and which is usually associative (i.e. $a \bullet (b \bullet c) = (a \bullet b) \bullet c$).

⁶ *Idem*, p. 112 ff.

thought such as in philosophical doctrine.

Thus,

The frontiers between both domains [language and philosophy] are shifting, which means that one and the same cognitive insight may turn up as a philosophical theory in one culture and as a grammatical rule or a semantic structure in another. (Reding 2004)

Reding shows how atomism manifests itself in different ways in classical Chinese and Greek thought; in grammatical and linguistic structures in one, and in physical doctrines in another. Moreover, development in one area precluded development in another. The reason for the lack of an explicit physical version of atomism in China, in contrast to ancient Greece and India, Reding attributes to certain features of the Chinese conceptual apparatus, manifested in its language: in Chinese, words for change always signify change from one thing into another, rather than change *ex nihilo*, which the Greek language suggests. But it was commonly acknowledged, in both ancient Greece and China, that *ex nihilo nihil fit* (nothing comes from nothing). Thus, in order to account for continuity in things, obscured by the Greek language, the ancient Greeks had to postulate unchanging atoms behind shifting appearances. The Chinese had no such need, for continuity in change was already presupposed by ordinary ways of speaking.

None of the Chinese words for change has concomitant representations similar to the Greek idea that a thing grows out of nothing or vanishes into nothing. Most of the Chinese terms, on the contrary, describe change as a rearrangement of pre-existing elements, and none of them suggests that a thing vanishes into nothing or comes out of nothing. Even the most radical type of change (substantial change, *hua*) holds fast to the basic 'ontological' unity of the transforming object. None of the concomitant representations violates the logical postulate *ex nihilo nihil*. The philosophical solution found by the Greek Atomists, Empedocles and Anaxagoras lies *in nuce* in the Chinese language. (Reding 2004, 124–5)

Reding concludes, "What is philosophical in one culture may already be lexicalized in another, and what is lexicalized in one culture may turn up as a philosophical theory in another".

Thirdly, the Sanskritist Johannes Bronkhorst, in a number of his works, has argued for the prevalence of what he calls the "correspondence principle", in a certain period of classical Indian philosophy. According to this principle (which was never explicitly articulated by any school) real situations correspond exactly to their linguistic expression, so that, for

example, to the expression "the potter is crafting a pot", there must exist a set of real entities to which each part of the expression corresponds, including the apparently not yet existing pot. Various solutions were given for this dilemma, and Bronkhorst contends that this principle acts as a kind of unarticulated guiding thought or unstated assumption for nearly all the rival philosophical schools of the era⁷.

I think something similar can be claimed for the philosophies of the early modern era, which after all were, like the rival schools of classical Indian philosophy, in a closer relationship with one another than either early modern mathematics and philosophy were, not to mention the philosophers of ancient Greece and China.

For I think that only an explanation of this sort can give unity to the early modern era, for it strikes me that none of the explanations given by the other sources mentioned above (Lagerlund et al., Carraud, Courtine, etc.) are able to furnish a comprehensive explanation for an internal source of unity for early modern thinking. If the question "What is modernity?" (or in fact the more limited question explored here, concerning a fairly focused aspect of early modern philosophy) is to have answer, then I think that we must look to the work of Vuillemin, Reding and Bronkhorst cited above for clues to the methodology we are to use.

Unlike Reding, though, (who after all was investigating philosophical developments over entire cultures), but like Bronkhorst and Vuillemin, I would like to concentrate on the investigation of the manifestations of one particular kind of cognitive structure in the philosophies under discussion, that is, in this case, the dyadic relations discussed above. Vuillemin, in his investigation of the development of modern algebra from Lagrange to Lie, found that the theory of groups emerged as a key pattern in this development, in both the mathematical and philosophical thought of the era. I have already mentioned Bronkhorst's correspondence principle.

⁷ From Bronkhorst (1996), "A great number of discussions in early Indian philosophical literature betray a common presupposition, which I will call the correspondence principle. The discussions concerned belong primarily to the first half of the first millennium of the common era, even though there are also later manifestations of the principle. It seems that the principle occupied the minds of practically all Indian philosophers during a certain period of time, and that subsequently it only survived in some schools [...] a so far incomplete search has brought to light passages to that effect in different schools of Buddhism, in Jainism, and in all the Brahmanical schools: Samkhya, Nyāya, Vaisesika, Purva-Mimamsa, the grammarian Bhartrhari, and of course Vedānta. The correspondence principle, I believe, allows us to understand these passages, to grasp what problems they are dealing with."

Likewise, I claim that something similar occurs in early modern philosophy—a fundamental and pervasive manifestation of dyadic relations. And although in this study I leave to one side contemporaneous developments in mathematics, it is plausible, I think, to find relevance in at least some of the developments in the mathematics of the era, especially in the development of the idea of a *Mathesis Universalis*, that is (in its early modern version), the development of a mathematics uniting both geometry and algebra, and in the development of an abstract conception of number⁸. For in these innovations we can see the development of a kind of homogenous field or space, within which all kinds of quantity find a purely mathematical expression, no longer linked to the concept of an indivisible mathematical unit or arithmetical monad. This kind of broadening of domain, as I have emphasized, is a key feature of the kind of dyadic relation studied here, for these dyadic relations are universal, in the sense that they apply over the entire universe of discourse, irrespective of kinds and types (to give examples of this domain broadening: From Hume's preamble to his rules of causality in the *Treatise*: "Any thing may produce any thing"⁹, i.e. any one object can potentially enter into a causal relationship with any other object; or in the doctrine of conventionalism in sense perception, any mental impression can potentially serve as the representation of any kind of extra-mental object.)

In a similar vein, although I leave aside developments in contemporary theories of semantics and logic, for reasons discussed in chapter two, in section 3.4, and in this chapter, something should be said here about a development in the interpretation of the syllogism, associated with Kant. Specifically, this involves the appearance in Kant (in *Die falsche Spitzfindigkeit der vier syllogistischen Figuren*, for which see [Vanzo 2014, 15]) of the formula *Nota notae est etiam nota rei ipsium*, (a sign of a sign is a sign of the thing itself), asserted by Kant to be the "fundamental principle of the syllogism", in place of the more traditional *Dictum de omni et nullo* (which asserts that whatever is predicated of a whole is predicated of its parts, and its equivalent negative formulation).¹⁰

⁸ For these developments see in particular the work of Jacob Klein (1968).

⁹ *Treatise*, I.3.15. (Hume 1978, 173).

¹⁰ A version in John of St. Thomas (*Logica*. I.3.10) runs, "*Quidquid universaliter dicitur de aliquo subjecto, dicitur de omni quod sub tali subjecto continetur: quidquid negatur de aliquo subjecto, negatur et de omni contento sub tali subjecto*". ["Whatever is universally predicated of some subject, is predicated of everything that is contained under that subject, and whatever is denied of some subject, is denied of everything that is contained under that subject"].

The *Dictum de omni et nullo* is a class-based interpretation of that feature of certain syllogistic inferences (in particular, the first figure syllogistic mood "Barbara"¹¹) which would now be credited to either the transitivity of predication or of the consequence relation. The *nota* formula, however—interpreting syllogistic entailment in the context of perception or signification—by the language it uses, distinguishes the final element in the chain (which is also given the most reality, "the thing itself") from the first two, identically called *nota* or signs (the Kneales' translation, "What qualifies an attribute qualifies a thing possessing it.",¹² misses this feature), and appears to reduce the three-term, mediated relation of the syllogism to a two term one, of sign to thing. That is, not only does this formula assert that the syllogistic signification relationship is transitive, but, by substituting the same term for the so-called "major" and "middle" terms of the syllogism, and making the "minor" term semantically the most significant, the *nota* formula prioritizes the relation between the major and minor in the conclusion, while minimizing the importance of the middle term, and by doing so, the inference that supports the conclusion¹³: A sign of a "thing itself" would seem to be a more immediate and evident form of signification than that of a sign of another sign, and in this sense Kant's version appears to be rather an analysis of what a logician would call an explanation (of the three place sign-sign-thing relation by means of the dyadic sign-thing relation), rather than of an inference to a conclusion. In contrast, the traditional *Dictum* preserves the distinctions between the three terms, as well as the syllogism's traditional inferential and evidential patterns.

We have already noted a number of explicit reformulations of multi-term relations into dyadic relations: in causality, and in substantial change. It is not too difficult to see how one might interpret the other characterizations of modernity discussed above in terms of dyadic relations. If every substantial description can be rephrased as a relational description, and vice-versa, as I have suggested above, then it can be easily seen that a discussion in terms of whole and part can be rephrased as a discussion in terms of part-whole relations. The mereological

¹¹ "If C is predicated of all of B, and B is predicated of all of A, then C is predicated of all of A"; or, in modern predicate logic formulation: $(x) [B(x) \rightarrow C(x)] \wedge (x) [A(x) \rightarrow B(x)]. \supset. (x) [A(x) \rightarrow C(x)]$.

¹² W. Kneale & M. Kneale (1962, 79).

¹³ Traditionally, the premises of a syllogism should be more evident or apparent than the conclusion, which after all needs to be established by inference. See for example, Aristotle, *Prior Analytics* II.16, 64b33.

revisioning of substance, which eliminated the need for metaphysical parts, becomes, in the relational version, an elimination of the need for the kind of relations that metaphysical parts enter into. These relations, I would argue, are precisely those mediated relations that we have encountered above, e.g. the mediated relations involved in the classical or traditional versions of causality and change. For it is precisely notions such as actualization, or privation, mediating between the initial and final states of causality and change, that are implied in the notion of a metaphysical part. Eliding metaphysical parts thus elides the kinds of relationships that they function by or enter into, and these are relationships which mediate between integral parts (or other metaphysical parts).

Similarly, it is no less clear that dissimilarity can be expressed by a dyadic relation—to state that A and B are dissimilar is to state that there is no basis of comparison, no common term C that can mediate the two other terms, and hence no mediating relation (A is congruent to B in terms of C; $A \equiv_c B$), that could exist between them. Any relation between A and B would have to be unique or brute, not able to be placed into a congruence class of similar relationships.

It can be claimed, as well, that Descartes' extension of causality to God can be explained by the domain broadening of dyadic relations, rather than by an anticipation of the principle of sufficient reason. Under Hume's formulation "anything may cause anything", which implies that any "thing" is within the causal range of any potential cause (in other words, that there is a single causal domain), God may surely be included. Once the barriers erected by exemplar causality are broken down, then the ties that exemplar causality imposes (by largely referring causal explanation to substances and the various predicables associated with substances, such as genera and species) are gradually removed, and even the infinite itself (the divine nature), can become subject to causality. Of course, the infinite still cannot become causally subject to finite things; it must therefore become causally subject to itself. I would claim, then, that the doctrine of *causa sui*, (the principal context in which, after all, Descartes employed the *causa sive ratio* formula) is less the result of rationalization than it is of a particular change in the structure of causal relations, in particular from the exemplar or type-oriented causality of scholastic Aristotelianism, towards the dyadic causality of a relation-centered ontology, which connects entities together by means of criteria very different from a substance-oriented causality.

I have also provided grounds for interpreting the Cartesian and Malebranchian interpretations of time and motion, respectively, as linear spaces, that is, as domains of dyadic relations of before and after.

Is there a ground that underlies all of these? I believe that it is in causality, and the cause-effect relation, that these relations find their most fundamental ground, albeit not necessarily their most explicit expression. So in this sense I would contend that the suggestion, which we have seen made above by Carraud and Schmaltz, that causality is key to the philosophies of the early modern era, is fundamentally correct. However, I suggest that causality functions less as explicit doctrine than as a ground for a number of related doctrines.

For, first of all, no one version or explanation of causality (even of efficient causality) predominates in the early modern era. Debates centered around the plausibility of a number of rival doctrines: the influx model of causality¹⁴, occasional causality, the principle of sufficient reason¹⁵, and the conventionalist version of Hume, not to mention Leibniz's attempted reinstatement of final causality or Spinoza's use of a particular interpretation of formal causality. There have been attempts to draw a unitary picture of causality in this period, by using interpretive models of causality instead of remaining within the casual language of the era. I have examined above Ott's postulation of two causal models (the cognitive and geometrical models), based on two complimentary models of mechanism, as a way of accounting for some of the diversity in the early modern causal picture. Yet I explained there why I do not see these two versions of mechanism, as explained by Ott, as sufficient grounds for either of these two causal models. To recapitulate, Ott's versions of mechanism do not function as a sufficient condition for early modern mechanism, as they can support versions of mechanism (Stoic, and modern varieties such as deterministic chaos theory) that come into philosophical conflict with the presuppositions of early modern mechanism. Thus, I do not believe that mechanism, even when interpreted as a family concept of mechanisms, can provide a unitary account of causation.

However, even though it may be difficult to find an express consensus concerning what might be called the surface or explicit expression of causal doctrines in early modern philosophy, or even if we cannot find unity by postulating interpretive frameworks such as Ott's, there still exists the possibility that we might be able to find a unitary interpretation of causality in the early modern period if we take the approach that causality might play the role of a kind of regulatory principle; that is, that some sort of causal doctrine may lie behind many of the conceptual

¹⁴ For the development of the influx model in Germany prior to Kant, see Watkins (1995)

¹⁵ For these first three see Nadler, ed. (1993).

reformulations of the early modern period, including non-causal doctrines. I think a dyadic interpretation of causality can provide such a unity, if we understand it as playing a conceptually regulatory role.

To see this in the case of explicit causal doctrines first of all, let us take a look at what the principle models of causality in the early modern period have in common, especially as they concern causality in the natural world. If we look carefully, we can see that what occasionalism, pre-established harmony, post-Leibnizian physical influx theory, Humean event causation, and Kant's version of causation all have in common is an absence of mediation, especially when contrasted with scholastic accounts of causation. It has sometimes been claimed that early modern (natural) philosophies are above all philosophies of efficient causality; it might be better claimed that they are philosophies of *unmediated* causality¹⁶, for the conceptions of efficient causality in the early modern period and in antiquity (and in scholasticism, which followed the models of antiquity) differed in the way pointed out in section 3.6 above, in that early modern theories were based on a binary cause-effect model, rather than a three-fold model of agent, patient, and actualization. One might even claim that early modern efficient causality and its classical and medieval ancestors were in fact different kinds of causes, sharing at most a family resemblance.

For Aristotle, efficient causes were mediated causes, conforming to the three-fold pattern. For example, in his discussion of the (efficient) causality of the unmoved mover in the *Physics*, he writes,

For there must be a thing acted upon, an agent, and that whereby the latter acts upon the former; there must be all three of these. The thing moved must be moved, though it need not move anything. The means by which the movement is effected must be both an agent and acted upon, since it changes together with the object moved and had contact and continuity with it; as is plain from a thing which puts another in motion, where the two must have at least some contact. (*Physics*, 8.5, 256b 14–20, tr. [Hope 1961]).

Very different are the models of efficient causality in the early modern period, which rather take the form of a mechanical, or better put, dyadic or

¹⁶ I have pointed out above (in chapter one, concerning formal causality in Spinoza and Descartes) that this is even the case when early modern philosophers invoke causes other than efficient causes; all the more reason to revise the model of the supposed early modern focus on efficient causality.

binary model of causality¹⁷, which strives to minimize if not eliminate the role of the third element of Aristotelian efficient causality, the "means by which the movement is effected" or mediator. We can observe elimination of mediation most strikingly if we take a look at the developments in physical influx theory in Germany after Leibniz, as sketched in Watkins (1995), (1998), and (2005).

What is most striking about these developments is the transformation of physical influx theory from a form of mediated causation via an intermediate element that transfers impetus or motion from one substance to another, to an species of inter-substantial interaction argued for on something like purely logical grounds, argued for from the properties of individual substances alone. We have seen a parallel development in theories of formal causality, discussed above in the first chapter—there we saw that formal causality in Spinoza and Descartes came to take on a logical-implicational pattern¹⁸, rather than the classical Aristotelian pattern, mediated by form. Likewise, later physical influx theories are based on arguments that, as pointed out by Watkins, derive conclusions about inter-substantial causality from the nature of internal or intra-substantial causality alone.

For example¹⁹, the post-Wolffian philosopher Martin Knutzen presents a number of arguments for preferring physical influx as an explanation of physical causality, as opposed to the textbook theory of the time, pre-established harmony. They can be summarized as follows:

1. The argument from *vis motrix* (moving power): If an entity can move itself, it must be able to move other entities as well.

Because two beings cannot occupy the same place at the same time and because beings are surrounded by other beings [as Watkins notes, the argument would seem to depend on the assumption of the continuity of matter, or the absence of a void], any motion involves a motion of others.

¹⁷ See also Tuozzo (2014, 27) for the contrast. As also pointed out in chapter one, other conceptions of causality, such as Stoic, could plausibly be called mechanical, while failing to match the early modern sense, which is why I believe dyadic to be more appropriate.

¹⁸ For this see Huebner (2015), who also claims that such a model serves as a model for Spinoza's understanding of causation in general. See also Gueroult (1968).

¹⁹ The ideas here are drawn from Watkins (2005, 54–66), which summarizes Knutzen's *Systema Causarum Efficientium* of 1745.

Thus, after a force of self-motion is posited, a force of moving others must be posited as well.

2. The argument from impenetrability: As all finite substances are impenetrable, by this very nature of impenetrability, substances exert a repulsive force directed towards other objects.

Thus, the motion of bodies implies the motion of other bodies, lest bodies interpenetrate each other, which is impossible. In other words, bodies naturally resist one another, and this resistance must be interpreted causally.

3. The argument from the simplicity of divine action: God, an absolutely simple being, possesses the capacity of direct action on beings, and therefore so must other simple beings, such as minds, since the properties of minds cannot be understood as limitation or imperfections (which are the only limitations on divine action).

As Watkins notes, what is interesting about this argument is that, since, in Knutzen's view anything attributed to God must be a *perfection simpliciter*, (a common thesis), the capacity of one being to act on another must be understood as a kind of basic capacity, not explainable in terms of anything else. Positing a mediating activity in physical influx theories, i.e. something separate from the cause of the influx and the being affected, in other words something that migrates from one substance to another, would appear to be otiose.

4. The probability argument: physical influx theory is a more probable explanation than pre-established harmony, because it proposes the shortest natural path from cause to effect.

In other words, pre-established harmony (and occasionalism) are complex explanations, as they posit a causal path mediated by divine action, in contrast to the simplicity of physical influx theories.

What is interesting about all four of these arguments is that they argue for a form of physical influx that is logically simple.

We can see causal factors at play in the investigations discussed in this section; upon examining the work of Vuillemin, Reding and Bronkhorst mentioned here, we see that causality plays an important role in the structures they describe. Bronkhorst points out that the dilemmas engendered by the correspondence principle were ultimately solved by the

postulation of various causal principles (in particular, by the competing doctrines of *satkaryavada*—that the effect pre-exists in the cause—and *asatkaryavada*—that the effect does not pre-exist in the cause). The correspondence principle, appearing at first to be rooted in an interpretation of language, was ultimately resolved by postulating various causal principles.

How is it that a problem area that at first appears to have little to do with causality finds a path towards its solution in the causal domain? If our understanding of reality and language are to share a common ground, yet differ, if a principle can be expressed in both a systematic way (in a deliberative philosophical system) and unsystematic or natural thinking (in terms of natural language), then it seems doubtful that such a principle could itself be an expression of a capacity for representation (language), or some feature that represents a relationship between thought (or language) and reality; for the two poles of this latter relationship are precisely the two areas in which that which finds expression—for example, the correspondence principle, or atomism—are realized. What is needed for resolution in these cases is something that can find common, yet individual, expression in both domains, in both language and reality. This requirement would preclude any sort of realization that involves a relationship between the two domains themselves, between words and things.

Thus, if Reding's reflections on the relationship between the principles of atomism in Greek and Chinese philosophy have any bearing on the exploration of philosophical structures undertaken here, then we can see that the basis of these structures would have to preclude the kind of phenomenological or semiotic approaches that have been brought up in similar explorations of this kind.²⁰ For it is not easy to see how such foundations could manifest themselves in both language and in philosophical doctrine, in both the semantic or grammatical features of language, and in purely physical or metaphysical features of reality, in entirely parallel forms. For these kind of foundations presume a fixed relationship between the two domains, something that would seem to be excluded by the very parallelism that is found here, which rather argues for their independence, that is, their independent roles of expression. If a structure can find expression in both language and ontology, as we have seen is the case in atomism, then it is difficult to see how either language or philosophical doctrine could be the foundation of either. It may be very well for Marion to argue for a kind of idealist interpretation of Descartes,

²⁰ E.g. in Foucault (1973), (1970), not to mention Heidegger or Marion (*supra*).

for example, by asserting that the first sense of relation in Descartes is the foundational sense, but this would have to be done in terms of evidence external to these three relations, as in fact Marion, despite his strenuous argumentation to the contrary, finally does: Descartes' phrase "with regard to the usefulness of our project", quoted numerous times by Marion as a justification for the grounding role of *mathesis* (and sense 1) hardly constitutes an argument, much less can it be taken to be equivalent to the cogito arguments, which as we have seen (and as Marion acknowledges) are not part of the *Regulae*. But it is only in light of this anachronistic reading of the cogito argument in the *Regulae* that such a position can be maintained. Even if it is permitted to read back something of the sort into Descartes' earlier work, as Marion tries to do, the argument itself is external to the existence of the three senses of relation. For taking Cartesian *mathesis* as a key to Cartesian ontology is not the same as claiming that it is the ground of this ontology, any more than the correspondence principle would imply that language is the ground of ontology, as we have seen. Thus, I would contend that Marion (and Heidegger before him) are at most entitled to take the Cartesian *mathesis* as a sign or key to Cartesian being or ontology, rather as Bronkhorst and Reding have similarly done with the correspondence principle and atomism, respectively, or Vuillemin has done with mathematical structures. A key, in contrast to a ground, implies at most a parallelism between two or more manifestations of a philosophical structure, whereas a ground implies a foundational relationship between one and the other. To do any more, to turn these keys into grounds, requires something beyond the symbolic or structural analysis employed—and I hope to have at least cast doubt on the plausibility of this conversion in the present context, by arguing that subjectivity and modernity are not co-extensive.

4.2 Modernity, Aristotle, and Duns Scotus

I should take care to note that I am not claiming that the dyadic relations discussed here are an exclusive characteristic of early modernism; quite the contrary, for I believe that there is at least one non-modern example of a such a knowledge system—Aristotle²¹. The dyadic

²¹ But not necessarily any of the later systematic Aristotelianisms that followed the fourth-century B.C. philosopher (such as the scholastic Aristotelianism of the high Middle Ages), although I do not mean to thereby exclude the possibility that particular versions of such systematizations may have reflected this dimension of Aristotle's thought.

element of Aristotelian metaphysics can be seen in the pairing of proximate matter and form in Aristotle's conception of substance, (*Meta.* H6, 1045b 18–21); tr. (Hope 1952, 179–180).

As has been said, the proximate matter and the form are merely two aspects of the identical reality, the one with respect to a thing's capacities, the other with respect to its actual operation. Therefore, to seek a reason for their unity is like explaining how one is one; for each individual is a unity, and its powers and actual functioning are somehow united.

This unity is explained by Keeling (2012, 240), as follows,

I argue that Aristotle's solution [to the problem of unity] is ultimately a deflationary one: once we understand the relationship between matter and form, potentiality and actuality, we need not seek a further cause of the unity of the object. This is because Aristotle takes the matter and form of substances to be reciprocal, correlative entities, each essentially related to its counterpart.

The scholarship on the problem of substantial unity in Aristotle, and on the interpretation of this particular passage, is vast, and I cannot enter into it here. I shall limit myself to a brief comment on Keeling's "deflationary" solution, which I strikes me as the correct one, and on its relevance to the present issue.

To briefly outline the problem: At the end of Book Eta (H) of the *Metaphysics*, after a long discussion spanning the whole of the previous book Zeta (Z), and most of Eta, concerning the nature of "primary being", Aristotle returns to the question of unity, first raised in Z12. What gives various things, such as definition, number, not to speak of human beings, unity? Why aren't human beings two things "by participation": animal and biped, for example, as "human" (*anthropos*) can be defined as "bipedal animal"?

For Aristotle, most entities are composites, made up of matter and form. What gives unity to such beings? The interpretation of the last part of Aristotle's answer, quoted above, has been interpreted in various ways, especially concerning whether Aristotle is attempting to explain the unity of form or of the form-matter composite. Keeling's point is that what Aristotle is attempting to tell us is that the place to look for a solution to this problem is precisely in the form-matter or hylomorphic approach to metaphysics; and here, not just to form, but to form-matter in its entirety. If we have genuinely understood hylomorphism, we can see that it not only addresses questions concerning the nature of being and change (which hylomorphism has been traditionally credited with explaining), but

also the question of unity, which is after all part of the domain of metaphysics just as much as the study of being and change²².

Just as deflationary theories of truth claim that no notion of truth is needed in language, over and above the fact of assertion or predication, Keeling claims that Aristotle here adopts a similarly deflationary theory of unity; nothing external is needed to explain the unity of matter and form (and of form itself), for the (proximate) matter of an entity, and its form are paired entities, linked in a one-to-one relationship. Unity is not, according to Aristotle (1045b 8–12), participation, nor communion or fusion (*sunousia*), nor a compounding or addition (*sunthesis*), nor a conjunction (*sundesmos*), but matter-form itself, as two sides or aspects of the same reality, non-identical, yet linked in a pure correlative relation. As Keeling explains (248, 251, 253, italics original),

[This section will explain] that they [potentiality and actuality] are to be understood correlatively, so that they reciprocally imply one another, and that no Aristotelian cause is needed to account for their unity [...] their natures are not the *same*; they are *correlative* [...] matter and form each have a sort of metaphysical hook that snares the other.

Such deflationary correlativeness of matter and form appears to be remarkably similar to the correlation of relata in dyadic relations that I have brought to attention here. Aristotle's attention to the problem of unity is at least in part motivated by the Platonic problem of the unity of forms, as the example of human beings shows. It thus comprises a key part of his metaphysics, as much as the question of the identity of primary being, the preoccupation of book Zeta. If a correlative pairing of parallel entities (matter and form, potentiality and actuality) stands at the heart of it, as opposed to other kinds of linking, such as one-many (participation), or some kind of fusion (*sunousia*), or compounding (*sunthesis*), or mediated connection or binding (*sundesmos*, a word that also signifies a grammatical conjunction) it may be therefore be not too far off the mark to claim that such dyadic relations, which I contend lie at the heart of the early modern system of thought, also are important for Aristotle. Indeed, I would claim that they must in some manner be central to Aristotelian metaphysics, for the problem of unity was as much a preoccupation of most of the classical systems of metaphysics as problems of motion, causality and perception were for early modern thinkers.

Thus, dyadic relations are not a necessary condition for early

²² Unity is in fact the topic of an entire book of the *Metaphysics*, book Iota.

modernity. There must be other elements at play, and they may very well number among some of the characterizations of modernity that have been discussed above, such as a mereological conception of substance. As I have argued above, however, no one of these positions uniquely characterizes modernism; what does is the occurrence of a particular predominant instantiation of a dyadic relational structure. Modernity (in the historically specific sense) is thus a mixture of core and peripheral elements: the core element is the predominance of a particular structural character; in this case, an instantiation of dyadic relations; the peripheral elements are the particular manifestations of these dyadic relations, the manner in which this is done. As we have seen in Reding's comparative examination of atomism in Greek and Chinese philosophy, manifestations can differ greatly, even bridging such disparate domains as linguistic expression²³ and ontology.

I hope to have shown that a similar structural manifestation is at work across a much more culturally and temporally limited domain. For not only can this kind of analysis help us to unify the various features ascribed to modernity, it can also help to resolve certain aporia, such as the position of the Cartesian principle of causation with regards to the Leibnizian principle of sufficient reason, which we have met with above. If we can see that the universalization of causation involved with Descartes' doctrine of *causa sui* is not a universalization of reason as such, but of the broadening of the domain of causal relations (which we have seen is part of the process of the transformation of triadic structures into dyadic structures), then we no longer are faced with the paradox of Descartes' position, as it is portrayed by Marion and Carraud, of a rationalization of causation that is nevertheless somehow opposed to reason. It then becomes possible to see that Descartes' causal doctrines are not versions *in nuce* of the principle of sufficient reason, but merely different articulations of a relational structure that is also found in the Leibnizian principle. The doctrine of *causa sive ratio* is not a doctrine of rationalization, but of causality expressed by arbitrary dyadic relations, which, as a function of their structure, broaden or universalize their range of application. Descartes' extension of causality to God is in this sense similar to his

²³ We must remember that linguistic structures never strictly determine a philosophical position. Reding shows us that they can even have the opposite effect: the early Greek thinkers were able to develop atomistic doctrines despite the features of the Greek language, whereas the Chinese thinkers neglected to develop atomistic theories precisely because such thinking was already encoded in their language. (Reding, *op. cit.*)

doctrine of the creation of eternal truths, a creation which creates laws that are rational only to the extent of their law-like properties, not because of their content, which depends on nothing external to the divine nature. Their rationality is due to their unmediated imposition, not to a logical principle such as the principle of non-contradiction.

If this sketch is accepted, we can integrate certain other developments in early modern philosophy into the picture that would not be possible if we restrict the relationship of causality to expressions of rationality. As we have seen, the development of a unified temporal space of successive duration and laws of motion independent of matter can also be seen as extending the idea of a domain of dyadic relations to those delineated by the directions of before and after. The ultimate²⁴ culmination of this structural aspect, I would argue, would be the phenomenological picture of a unified casual and temporal order that we find in Hume, where causation is manifested solely by our habitual experience of the linear succession of cause and effect in time²⁵, and where anything (now thought of solely in terms of its spatio-temporal manifestation) may potentially enter into a causal relation with anything else.

We can then conclude that the hallmark of modernity is not rationalization, order, subjectivity, or any of the other developments surveyed here (if we take them to be specifically characteristic of modernity as a whole), but the prevalence of causally grounded anti-symmetrical dyadic relations.

Yet it is also possible to claim that modernity is in a certain sense an accident, that is, an accidental or arbitrary combination of peripheral and essential ontological assumptions²⁶—indeed, if this analysis holds, then likely all such combinations, and so all actual manifestations of what I have called philosophical structure, must retain something accidental. For it is not necessary that an ontology centered around dyadic relations be combined with a mereological conception of substance, for example, or indeed with any of the various features or manifestations of dyadic relations discussed here, at least none specifically, just as atomism, on Reding's account, can be expressed philosophically or linguistically. On the other hand, if we accept the centrality of dyadic ontological relations to modernity and reject the idea that modernity must be likely a non-repeatable accidental collection of ontological positions, then, as noted

²⁴ In the sense of last or most recent in time, not in any evolutionary sense.

²⁵ See the "Rules by which to judge of causes and effects" in Hume (1978), I, 3.15.

²⁶ Assumptions, not doctrines, for these positions are not necessarily part of the explicit language or surface structure (to borrow a conception from Chomsky); see section 3.4 *supra*.

above, it might even be possible to characterize Aristotle as "modern" (in contrast then to the non-dyadic and "non-modern" thought of, for example, Plato, or, as will be explained below, Duns Scotus). This leaves open a number of seemingly counter-intuitive possibilities as well, such as that of an Aristotelian early modernism, a "modernized" Aristotle, which would retain the centrality of dyadic relations along with certain other features of thought compatible with historical early modernism (in particular those compatible with modern scientific developments), while abjuring a number of other, on my account, optional expressions, such as a mereological conception of substance²⁷. The early modern rejection of Aristotelianism must be bracketed in light in these suppositions, I would suggest, and largely depends on which of the above options concerning the interpretation of modernity we choose.

I suggest as well that in this way we emerge with an anthropologically more accurate picture of modern philosophical thought—not as a unique occurrence or stage of development in the history of human thinking, but as a specific, repeatable pattern of causal thinking that may have occurred at other times in the past (as indeed I claim it has). Interestingly enough, I would further claim that the reason for this misunderstanding has roots in *both* schools of historical interpretation mentioned in chapter one, that is the continental and the analytic-scientific. Both the Heideggerian emphasis on a unique historical trajectory of *Dasein* and the unfolding of being, the nineteenth-century emphasis²⁸ on the particularity and specificity of the various historical *weltanschauungen*, and, perhaps, the influence of Kant and his (and others') belief in the epochal uniqueness of his critical philosophy; as well as, on the other hand, the analytic school's acknowledgement of and reliance on the undoubted linearity of scientific development (which I have argued is in the last analysis peripheral to modernity) have mislead us on this score, mislead us into thinking that what is most characteristic of modern thought must be similarly

²⁷ Of course this was more than mere possibility if we keep in mind Zabarella and the "Paduan" school, and, according to Sgarbi (2012), a British school of now largely forgotten thinkers, whose persistence and influence led to the (not very Aristotelian) empiricism of Locke, Berkeley, and Hume. But as explained in the first chapter, not contemporary NeoAristotelianism, for the simple reason that contemporary thought is no longer modern, and no longer envisions causality along early modern lines.

²⁸ I'm referring here primarily to the thought of Baden school of NeoKantianism, i.e. Windelband and Rickert, as well as various schools of German historicism. For these see, for example, H. Schnädelbach 1984. *Philosophy in Germany, 1831–1933*, Cambridge: Cambridge University Press, chap. 2.

historically specific and unique, that is, a "Modernity", just as one speaks of the "Middle Ages" (proper names both). While historically we may be entitled to refer to a unique and particular modernity, in philosophy I think this can only be a mistake.

A final promissory note: Earlier, I had commented that the relationship of the thought of Duns Scotus to modernity is a complicated one, citing opinions on either side of the issue, and mentioning a resolution in this part of the essay. In fact, a complete resolution of this problem is beyond the bounds of this work, but I would like to briefly sketch how the ideas developed here might contribute to its eventual resolution.

One prominent feature of Scotistic metaphysics, alluded to above (section 3.1), is modal theory, which, as has been mentioned, has been interpreted by some to have much in common with modern possible-worlds semantics. One key feature of this kind of semantics is its branching structure, that is to say, its non-linearity, or in the words of Alanen & Knuuttila (1988), its "referential multiplicity". Possibility in such a semantics is synchronic, that is, the occurrence of an event in the actual world is compatible with the possibility of its non-existence at the same time, and vice-versa. Synchronic possibility thus leads to a branching tree-like structure of possibilities (brought out in modern interpretations of possible worlds semantics)²⁹, enabled by the separation of temporal ordering from the ordering of possibilities.

Yet the dyadic relations that we have discussed, and the structures that instantiate them, are linear structures. If Scotus' theory of modality has a key role to play in his metaphysics, that metaphysics cannot be modeled on the pattern of dyadic relations, which are not only linear, but anti-symmetric, unlike the relations induced by synchronicity, which, as mentioned in the note to the last paragraph, at minimum break up possibility relations into equivalence classes. Equivalence is of course a symmetric relation. It appears, therefore, that the kind of linear domains discussed in this essay may be difficult to integrate into Scotus' thought. I tentatively suggest, therefore, that on this model at least, much of early modern thinking is in conflict with the thought of Scotus.

²⁹ The modern possible-worlds scenario likely needs some additional assumptions. At minimum, Scotus' modal theories lead to a "domain of possibility as an a priori area of conceptual consistency [...] partitioned into equivalence classes on the basis of relations of compossibility." (Alanen & Knuuttila 1988, ix). Sets of possible-worlds are often pictured as having a lattice-like structure, which is not present in a system of equivalence classes. This lattice or tree-like structure must bring in additional assumptions which may or may not be present in Scotus.

Earlier (chapter one) I had mentioned the work of Ernst Cassirer and promised that something would be said about his concepts of functions and relations and their relationship to contemporary scientific developments, and the ideas discussed in this study. Now, at the end of this essay, we have arrived at the point where that promise can be redeemed, for we will find that Cassirer's portrait of the relational underpinnings of the ontology of modern science is, arguably, at least in its ontological foundations, closer to Scotism than it is to the system I have outlined here, despite sharing the common language of relations.

In *Substance and Function* (Cassirer 1923), Cassirer advocates for a "critical" theory of knowledge which will abjure traditional "Aristotelian"³⁰ subject-property language, replacing it with a theory best exemplified by modern developments in mathematical logic. These modern developments are crystalized around the concepts of relations and functions, which according to Cassirer, had been sidelined in traditional logic; this neglect had in fact characterized the history of logic up until the current era. For example, we read (Cassirer 1923, 8–9) that,

The category of relation especially is forced into a dependent and subordinate position by this fundamental metaphysical doctrine of Aristotle [...] we recognize further that the essential presupposition, upon which Aristotle founded his logic, has survived the special doctrines of the Peripatetic metaphysics. In fact the whole struggle against the Aristotelian "concept realism" has been without effect on this decisive point [...] the psychological criticism of the "abstract" concept [due to Berkeley], radical as it seems at first sight, introduces no real change here.

It is only with the coming of contemporary developments in mathematical logic, for example with the work of Hilbert in the foundations of mathematics, that the importance of the concepts of functions and relations come to light; not only their irreducibility to traditional concepts of universals, but their importance for an adequate understanding of reality, for according to Cassirer (379),

No sort of things are truly invariant but always only certain fundamental relations and functional dependencies retained in the symbolic language of

³⁰ Cassirer's characterization of Aristotelian metaphysics and logic as substantialist, as opposed to relational (Cassirer 1923, 9) is itself open to question as a fully accurate interpretation, as I have tried to hint at by means of the epigraph which opens this book.

our mathematics and physics³¹.

These invariants, the true objects of science, are only fully revealed in the language of modern logic and science. Furthermore, this "symbolic language" is best exemplified by the modern concept of a mathematical or logical function, for (21; italics original),

In opposition to the logic of the generic concept, which, as we saw, represents the point of view and influence of the concept of substance, there now appears the *logic of the mathematical concept of function*. However, the field of application of this form of logic is not confined to mathematics alone. On the contrary, it extends over into the field of the *knowledge of nature*; for the concept of function constitutes the general schema and model according to which the modern concept of nature has been molded in its progressive historical development.

Thus the modern concept of nature, the end point of a "progressive historical development", finally reveals itself in the form of mathematical functions, functions which furthermore turn out to be no more than "certain forms of relation" (14).

This "critical" picture of reality may seem to resemble the one we have just put forth as an interpretation of early modern philosophy³², at least concerning the centrality of the concept of relation (which Cassirer interprets as best exemplified in mathematics). In what way does Cassirer's picture or interpretation of modernity differ from the one argued for here (aside from my commitment to philosophical pluralism outlined above in chapter two)?

First, we must note that Cassirer does not believe that this functional-relational picture was adequately understood in, nor characteristic of, early modern thought. Despite early modern criticism of the traditional concept of substance, which for Cassirer constitutes the ontological ground of the traditional conception, early modern thought remains rooted in substantialist thinking. Locke may have argued against the knowability of substance, but "In spite of all this, the view of physical and psychical reality, that is constructed on these foundations, has in it the general category of substantiality in its decisive meaning" (331). We have seen

³¹ Cassirer asserts this in the context of a discussion of Einstein's general theory of relativity, but we may take it as reflection of Cassirer's own position.

³² There are also obvious intersections between the work of Cassirer and contemporary structural realism, mentioned above in chapter one, but I shall not speculate on these connections here.

above that Cassirer did not think that this picture was much altered by Berkeley's "psychological" critique of Locke's concept of abstraction. And although Cassirer does allow some measure of innovation in the work of Descartes, especially in his geometry and science of method (which Cassirer believed to be the yet fullest expression of a model of a logical deductive system, in contrast to classical axiomatic geometry, which he contended remained grounded in intuitive elements), he nevertheless thinks that Cartesian innovations remained limited by Descartes' adherence to traditional geometrical problems, which for Cassirer were still grounded in sensuous intuition, and thus (according to Cassirer), the logic of substantiality.

Thus for Cassirer, early modernity is still largely continuous with classical thought; it is only with the gradual development of modern formal logic and axiomatic geometry in the nineteenth century, by Russell and Hilbert (and whatever earlier developments, such as the infinitesimal calculus or projective geometry, can be seen as pathways to these) that the logic of functions and relations truly makes its appearance. Modernity (and with it, the logic and ontology of relations) only fully arrives, for Cassirer, *after* the early modern period.

Second, and more fundamental: Cassirer's understanding of relationality and functionality is, I would claim, assimilatable to Kant's third category of relation (from "Table of Categories" in the "Analytic of Concepts", I.3), that of mutually interacting or symmetrical relationships, or "community". The anti-symmetric dyadic relations which I claim to be characteristic of early modernism, however, are of a different class of relation, which best correspond to Kant's second category of relation: Cause and effect; or, abstracting from any spatio-temporal manifestation: Causality and dependence.

To see this, it is likely best to look at Cassirer's idea of critical theory. This ideal, perhaps fittingly, takes on many manifestations in Cassirer's thought—in his account of the theory of general relativity, of the semantics of modern formal logic, in the idea of relation, of mathematical functions, of the process of scientific inquiry, and even in the general development of culture.

However, in (Cassirer 1923), it is the idea of a mathematical function which serves as the prime exemplar of criticality. For Cassirer, here, the internal logic of relations is best revealed by the concept of a mathematical function, and what is most characteristic of a function is the property of regulated variability, and what is most characteristic of regulated variability is the prominence of the entire series of variable assignments itself, over and above any particular assignment, over and above the

individual paring of input to output³³.

In other words, for Cassirer, a function cannot be reduced to a set of ordered pairs. A function is not simply a correlation between domains of elements, but a "whole", and in this way differs from the kind of relation that I claim is important for early modern thought, which, as I have tried to argue, is nothing but one to one correlation, the bare idea of correlation taken in its "brute" self.

Another way of thinking about this feature of regulated variability that is not reducible to a set of pairs, is as a form of mutual interrelatedness. Cassirer often uses the language of mutuality³⁴; mutuality, by interchanging the domain and range of a relation, especially when seen as a process (as is so often the case in Cassirer's work), serves to reinforce the idea that such functions cannot be reduced to sets of pairs, that these functions rather take the form of a totality of possibilities. Strictly speaking, with the language of mutuality we leave the idea of a function behind, as a function is a directed single-valued mapping of one set to another (domain to codomain), not a process of interconnection—a function need not have an inverse, or *a fortiori* be equivalent to it. But this only illustrates the somewhat intuitive and metaphorical nature of Cassirer's thought, despite the appearance of a reliance on formal models. It also may indicate that Cassirer's real concern was likely not logical or mathematical forms as such, but (in keeping with his NeoKantian inheritance) transcendental (i.e. the essential constitutivity of experience), which for Cassirer was especially tied to the concept of relation.

³³ (Cassirer 1923, 26): "The content of the concept cannot be dissolved into the elements of its extension, because the two do not lie on the same plane [...] the meaning of the law that connects the individual members is not to be exhausted by the enumeration of any number of instances of the law; for such enumeration lacks the generating principle that enables us to connect the individual members into a functional whole."

³⁴ For example (Cassirer 1923, 95), "The extension of mathematics beyond traditional bounds is still more striking in the case of the theory of groups; there the immediate object is not determinations of magnitude or position, but a system of operations, which are investigated in their mutual dependency [...] in its general meaning, the task of mathematics does not consist in comparing, dividing or compounding given magnitudes, but rather in isolating the generating relations themselves, upon which all possible determination of magnitude rests, and in determining the mutual connection of these relations."

Mutuality implies an at least weak form of symmetry³⁵; thus, despite Cassirer's own insistence on the importance of asymmetrical relations for the constitution of the progression and order of a series (38), and the importance of series for the concept of function, it is really the idea of totality, which is achieved by the idea of mutual or symmetric relations, that is important for Cassirer. Cassirer claims that symmetrical relations are important for the creation of equivalence classes, which lead to new ideas, such as that of energy; but even more, individual relations, at least as long as they represent things in the real world, themselves can only be understood as part of a totality, for (326),

The problem of knowledge, instead of leading us to a metaphysical dualism of the subjective and the objective worlds, has led us to a totality of relations [...] what these relations are in their purely logical meaning, can only be learned from the meaning they gain in the total system of science.

Relations, in other words, are not simply totalities, but are themselves part of a totality, and cannot be fully grasped without knowledge of their place in it.

Thus, Cassirer's project diverges from the present one in at least two aspects: First, for Cassirer, the utility of relational analysis only fully manifests itself in the thought that postdates the early modern era; and second, the relations that interest Cassirer (and which for Cassirer, in fact, constitute the only essential reality of all relations) consist of mutually interacting relata, or are symmetric, unlike the kinds of relations that I contend are crucial to early modernism. In this second aspect, Cassirer's work, like that of Duns Scotus, (and of the NeoAristotelian tendency in contemporary causal dispositionalism, mentioned in chapter one), by focusing on a different category of relation ("community"), or, perhaps, a different aspect of relationality (the totality of relational connections themselves within a system, instead of the bare fact of connection) would appear to diverge significantly from that of early modern thought.

³⁵ For instance, an asymmetric relation together with its inverse.

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