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Leibniz's More Fundamental Ontology: from Overshadowed Individuals to Metaphysical Atoms

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Leibniz's More Fundamental Ontology: from Overshadowed Individuals to Metaphysical Atoms

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
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DEDICATION

To my family, Maria, Marin, and Michael.

With all my love.

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I am thankful for the advice and encouragement of my committee members. To Douglas Jesseph, for his expertise in early modern sciences and those few directed studies where I was left stupefied by Seventeenth-century physics and his knowledge of mathematics. To Daniel Garber, for being generous with his time and providing valuable comments on my chapters. To Thomas Williams, whose course on “Medieval Voluntarism” taught me a different writing style than my rhapsodically French one. To Stephen Turner, who through his courses made sure I know more about Twentieth-century social and political philosophy than I could write on a piece of napkin. And especially to my advisor, Roger Ariew. To me his work has been an inspiration and a model of doing scholarship from before he “tricked” me into coming to the US.

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TABLE OF CONTENTS

ABSTRACT.....	iii
INTRODUCTION	1
CHAPTER ONE: THE INDIVIDUAL IN LEIBNIZ’S FIRST PHILOSOPHY (1663-1686).....	3
CHAPTER TWO: FROM INDIVIDUALS TO ATOMS: VARIETIES OF SEVENTEENTH-CENTURY ATOMISM.....	27
<i>Minima Naturalia</i> and <i>Semina Rerum</i> : Two Sources for Early Modern Atomism	30
Sennert’s “Religion of Form”: the Divine Origin of Forms	33
Breaking up the Atom: Early Leibniz against <i>Minima Naturalia</i> Theories and Atomism.....	37
Leibniz’s Aristotelian Stance against Atomism in the <i>Confessio Naturae contra Atheistas</i> (1668)	41
<i>Magis Amicus Aristoteles?</i> From Reconcilement to a Neo-Platonic Account of Substantial Forms.....	47
Leibniz against the <i>Minima Naturalia</i> Theory: on the Origin of Forms.....	55
Concluding Remarks.....	63
CHAPTER THREE: FRAMING HYPOTHESES: THE PSEUDO-ENIGMATIC ATOMISM OF YOUNG LEIBNIZ.....	71
Disentangling Presumed Enigmas	76
Handy Influence-Mongering: the “Gassendian” Leibniz	84
Atoms and the Void in Paris and before	91
Leibniz’s Soul Pointilism: from the Resurrection of Body to the Indestructibility of Bugs in Bugs	99
Sources and Uses of the “Flower of Substance” Theory	102
Conclusion: The Fate of “Pointilism” in Leibniz’s Mature Works	109
CHAPTER FOUR: TOWARDS A MORE FUNDAMENTAL ONTOLOGY: THE FATE OF INDIVIDUATION.....	113

Introduction.....	113
Seventeenth-century Views on Individuation: Leibniz’s Critique of Descartes and Cordemoy.....	117
“Astounding Things which have not Come into the Mind of any Scholastic” or Cartesian: The Individual in Leibniz’ Late Philosophy (1686-1714).....	133
CONCLUSION.....	151
REFERENCES	156
Abbreviations.....	156
Bibliography	157

ABSTRACT

I aim to offer an innovative interpretation of Leibniz's philosophy, first by examining how the various views that make up his ontology of individual substance involve a persistent rejection of atomism in natural philosophy and secondly, by exploring the significance of this rejection in the larger context of Seventeenth-century physics. My thesis is structured as a developmental story, each chapter analyzing the discontinuities or changes Leibniz makes to his views on individuation and atomism from his early to late years. The goal is to illuminate underrepresented views on individuals and atoms throughout Leibniz's works and thus bring a clearer understanding of his philosophy.

I, therefore, argue that the *New System of Nature*, published towards the end of Leibniz's middle period (1695), marks an important landmark in his philosophical evolution, a radical terminological and ontological shift in his metaphysics of substance. Once Leibniz elaborates the concept of "simple substance," the future synonym of "monad," the problem of individuation of his early and middle years (1663-1686) becomes secondary. The focus changes from what makes substances "individual" to what makes them "simple" and truly "one," i.e., "metaphysical" atoms.

I prove that this shift was marked by a two-tiered critical confrontation: a first, direct confrontation, 1) with Descartes' physics, through the critique of the notion of extended matter and of Descartes' principle of individuation through shared motion and, a second confrontation,

2) with different strands of Seventeenth-century atomism, including Cartesian Gérauld de Cordemoy's quasi-"metaphysical" atomism and its attempt at improving Descartes' individuating principle. I claim that this double confrontation ultimately led Leibniz to formulate a more fundamental ontology, in terms of the "metaphysical atomism" of his *Monadology* (1714).

My analysis complicates a persistent scholarly assumption in recent Leibniz studies, claiming that, throughout his entire career, Leibniz continued to hold the same fundamental positions on substance, individuation and, implicitly, atoms. Against this type of general continuity thesis, I show that: 1) far from being a constant concern, Leibniz's interest in what makes substances individual fades towards the end of his life (*New Essays* 1703, correspondence with Samuel Clarke, 1714); 2) I trace the changing fate of some of Leibniz's early and middle period views on substance and the individual (the principle of the identity of indiscernibles, space-time as individuating properties) in his late works; and 3) I prove the claim that Leibniz really embraced atomism, either for a short time or all throughout his philosophy is problematic. While he does refer to some sort of atoms during his Paris period (1672-1676), this is insufficient proof of a commitment to atomism. Instead, the episode has to be understood in the broader framework of a bundle of interrelated issues, such as the problem of the cohesion of bodies and the problem of minds or mind-like principles individuating those bodies.

Thus, as I show through an analysis of Leibniz's arguments against atomism in the correspondences with his scientific contemporaries (Christiaan Huyghens 1692-1695, Nicholas Hartsoeker 1706-1714), rejecting physical atomism remains a fundamental and surprisingly constant point of his philosophy.

INTRODUCTION

The scope of this study goes from Leibnizian philosophy in itself to its intellectual context in the Seventeenth-century, to the living philosophical debate between Leibniz and his contemporaries, from Jakob Thomasius and Antoine Arnauld to Christiaan Huygens and Nicholas Hartsoeker. Throughout this study, I contrast Leibniz's views in the published works with the views he exposed to his correspondents, as well as the opinions he chose not to make public and keep in manuscript form.

My approach distinguishes itself from similar work on the early and mature Leibniz by indicating the discontinuities in Leibniz's thought. This goes against a continuist view of Leibniz's philosophy that has increasingly shaped Leibnizian studies for more than a century now and, quite remarkably, has continued to do so over the past few decades. There are several examples of this in secondary literature. Thus, in his 1990's trilogy on early Leibniz's philosophy, Konrad Moll adopts a systematic and continuist view of the German philosopher's intellectual evolution: "In the course of the year 1671, the major lines of [Leibniz's] system were already securely in place."¹ The result, according to Moll, is that, from very early on, Leibniz develops a conception of spiritual points that will come to be known as the "monads" of his late

¹ According to Moll (1996), the decisive turn towards Leibniz's mature metaphysics was represented by "the adoption of, and [...] heterodox interpretation of Thomas Hobbes' concept of conatus [...] in the early summer of 1670." In *Der junge Leibniz III: Eine Wissenschaft für ein aufgeklärtes Europa: Der Weltmechanismus dynamischer Monadenpunkte als Gegenentwurf zu den Lehren von Descartes und Hobbes*, 257.

years.² The last claim is symptomatic of a way of doing history of philosophy that blatantly ignores the historical evolution of a philosopher's thought, the shifts and turns his opinions might have taken throughout his career. It also exhibits a specific type of retrospective hermeneutical interpretation that thrives upon reading late texts into earlier ones. To put this in the words of a more recent commentator: young Leibniz "[...] was already inching his way toward the theory of monads of his mature metaphysics."³ The continuist thesis implies that the foundations of Leibniz's mature theories (substance, complete concepts, monads, etc.) were laid surprisingly early and that the basic features of his philosophy only underwent inconsequential changes before they naturally emerged from them. Another Leibniz scholar seems to hold the idea that most of Leibniz's mature metaphysics was established prior to his stay in Paris in 1672: "Upon leaving Paris [in 1676], the only one of his prominent mature doctrines that has not yet evolved is his account of truth."⁴

My work here aims to contribute to the considerable progress made in recent decades in returning Leibnizian texts to their intellectual and historical context, by dispelling a handful of misconceptions, redressing remaining imbalances between Leibniz's early and mature work, and working out the ways in which a couple of aspects of his thought, individuation and the rejection of atomism, evolved together.

² For a review of the German secondary literature sharing this continuist view, see Goldenbaum, "Transubstantiation, Physics and Philosophy," in Brown 1999, 78-81.

³ Antognazza 2009, 113.

⁴ Mercer 2001, 386.

CHAPTER ONE:

THE INDIVIDUAL IN LEIBNIZ'S FIRST PHILOSOPHY (1663-1686)⁵

In his *Leibniz: Body, Substance, Monad* (2011), Daniel Garber works through, in great detail, the twists and turns in Leibniz's thought, from his early idiosyncratic Hobbesian views, to those he developed in his middle years, and ultimately to the later *Monadology*. Garber reconstructs Leibniz's concerns, almost day-by-day, and the modifications he makes to his views, as he delves into issues about body, motion, and force within diverse philosophical, physical, metaphysical, mathematical, and theological contexts. This, of course, constitutes a concrete repudiation of the kind of history of philosophy, such as Benson Mates' study of Leibniz that strives to produce a "syncretic" picture of the thinker's thoughts. In *The Philosophy of Leibniz* (1986), Mates asserts that "Leibniz did change his mind on many topics, as would be expected. Indeed, he himself tells us about some of these changes, mostly having to do with his views on matters of physical science." However, Mates continues: "But on the fundamental points of his philosophy, his constancy over the years is little short of astonishing. From the first of his publications, at age seventeen, to the end of his life he never wavered in holding to the rather unusual and implausible doctrine that things are individuated by their 'whole being'; that is, every property of a thing is essential to its identity." Mates concludes: "Consequently, in this account of the elements of Leibnizian philosophy I have felt free, on the whole to cite him

⁵ A slightly different version of this chapter was published as "The Individual in Leibniz's Philosophy 1663-1686," (co-authored with Roger Ariew), in *Nita* 2015, 11-25.

without paying much attention to the date of the passage cited.”⁶ I wish to emulate Garber’s method in tracing Leibniz’s views about individuation, his twists and turns, his 180 degree shifts, over a host of disparate theses; but I also wish to limit my story to the period of Leibniz’s early to middle years, from his 1663 (deeply Scholastic) bachelor’s thesis, *Disputatio Metaphysica de Principio Individui*, to his more mature work, *Discours de Métaphysique* (1686); in the process we will also discuss his views of individuation in a number of his other essays, including the *De Transsubstantiatione* (1668), *Confessio philosophi* (1672-1673), and *Meditatio de Principio Individui* (1676).

By tracing this puzzling and intricate path, I argue that, in the *Discourse on Metaphysics* (1686), Leibniz accounts for individuation by bringing together three traditionally distinct and conflicting strategies. His first strategy is to reinterpret the Thomist principle of individuation for immaterial substances as holding for all substances. Individual substances are each their own kind or specifically different, exactly like Thomas Aquinas’ angels. For the second strategy, that of the Scotists, Leibniz transforms haecceities in qualitative internal properties, even though before he had made them into external space-time circumstances (*Confessio philosophi* 1672-1673). The last strategy is individuating substances through complete concepts or the multitude of their internal properties. The relational, spatio-temporal aspect of individuation is now internalized in Leibniz’s theory of complete concepts.

Thus, I prove that by the end of his middle period, Leibniz weaves together three disparate notions about individuation over which, earlier on, his opinion had twisted, turned or even shifted entirely: Thomas’ last species, a Scotist haecceity, and the complete concept view of substance. I show that Mates’ continuist view of Leibniz’s philosophical evolution is false. One cannot see how, even if we *ad absurdum* presuppose a continuity thesis for Leibniz’s entire

⁶ Mates 1986, 7-8.

thought, this claim would be anything other than completely ungrounded. There is no proof Mates offers on whether the first thesis (individuals are individuated by their whole entity) necessarily implies the second thesis he mentions (every property of an individual is essential to his identity) – just as there is no passage in the *Disputatio de principio individui* (1663) which would back up this claim. The mending together of these two theses is specific for a completely unhistorical understanding of Leibniz’s thought. Moreover, there is another reason such a comprehensive and detailed defense of one of his versions of the principle of individuation is nowhere else to be found in Leibniz’s work. After the *Discourse on Metaphysics* (1686), in texts like the *Principles of Nature and Grace* and the *Monadology*, there is a change of terminology: Leibniz abandons the language of individuation (*individual substances*) in favor of a language of unity and simplicity (*simple and truly one substances*).⁷ This textual and genetic fact does not only forbid the retrospective projection of the monadological thesis in the *Discourse*, but also the overlapping of the determinations of individual substance in the doctrine of monads.

It would be unusual, of course, if Leibniz could change his views on matters of physical science and remain constant on the fundamental points of his philosophy. If, Leibniz’s views change with respect to body and substance, one would also expect changes with respect to individuation. And, in fact, not only does he offer a complex response to the problem of what makes up individuals, but his solution changes a number of times throughout his career, involving a unique combination or reinterpretation of components from the history of philosophical thinking about individuation.

Let me start with the endpoint, that is, the notion of individuation Leibniz marshals in the *Discourse*. As Leibniz says there, God chooses the perfect world, one made up of individuals

⁷ I will return to this significant change in Leibniz’s ontology in the last chapter, thus completing the circle.

with actions and passions, given that actions and passions properly belong to individual substances—*actiones sunt suppositorum* (DM § 8). What God creates are subjects, that is, individuals, like Alexander, whose individual notion or *haecceity*, God sees. And what God sees in this individual notion or *haecceity* is “the basis and reason for all the predicates that can be said truly of him, for example, that he vanquished Darius and Porus; he even knows *a priori* (and not by experience) whether he died a natural death or whether he was poisoned, something we can know only through history” (DM § 8). Among the “notable paradoxes that follow,” as Leibniz calls the propositions to which he is committed, are the claims that “every substance is like a complete world and like a mirror of God or of the whole universe” (DM § 9) and that no two substances can resemble each other completely and differ only in number—*solo numero*. Given that two substances cannot differ only in number, Leibniz formulates his positive view as: “what Saint Thomas asserts on this point about angels or intelligences (that here every individual is a lowest species [*quod ibi omne individuum sit species infima*])⁸ is true of all substances” (DM § 9). Thus, in the *Discourse on Metaphysics* Leibniz weaves together three disparate notions – at least in provenance – about individuation: Thomas’ *species infima*, a Scotist *haecceity*, and the complete concept view of substance. These entail the thesis of the identity of indiscernibles.⁹ The seemingly disparate notions can be found together elsewhere in Leibniz’s writings in the 1680s.¹⁰

I should emphasize two points about the three elements concerning individuation, which, for Leibniz in the 1680s, entail the identity of indiscernibles. The first is that Seventeenth-century Scholastics usually distinguished the three from one another. For example, in his *Metaphysics*, Scipion Dupleix (1610) discusses three main opinions about the principle of

⁸ Thomas Aquinas, *Summa Theologiae*, I, q. 50, art. 4.

⁹ Mature Leibniz will not be as positive about these Scholastic remnants. See Chapter IV.

¹⁰ *Notationes Generales* (Summer 1683-1685?), A VI.4, 553. I analyze this passage in the last chapter.

individuation, that of the Thomists, with their *signate* or quantified matter, of the Scotists with their *haecceity*, and of another group which he does not identify with anyone in particular. He grants that the Thomists have the authority of Aristotle behind them, but argues that quantity cannot reveal “the proximate and true formal cause of the individuality and unity of the essence of singular things,” since quantity is always an accident and accidents do not operate at the level of essences.¹¹ Dupleix’s preferred position is the general Scotist position that “in order to establish the individual essence of Socrates, Alexander, Scipion, and other singular persons, we must necessarily add for each one of them an individual and singular essential difference which is so proper and so peculiar to each of them for themselves, that it makes each of them differ essentially from all the others.”¹² His third, anonymous group consists of those who base the principle of individuation on the “multitude of accidents,” given that this multitude “is never found together in any other subject.”¹³ Dupleix (1610) has no problem rejecting this opinion using the same argument he used against the Thomists: accidents cannot be the principles of the essential constitution of substances.¹⁴ So Dupleix (1610) distinguishes the Scotist position he favors from both the Thomist and the third (this latter position can be considered as a forerunner

¹¹ Scipion Dupleix, *La Metaphysique*, 233.

¹² Dupleix, *La Metaphysique*, 235.

¹³ Dupleix, *La Metaphysique*, 232.

¹⁴ René de Ceriziers similarly refers to two groups: 1) those who accept “a real difference that determines the thing’s particular nature, in the way Rational restricts animal to the species of man,” presumably the Scotists, and 2) those who “think that the principle of individuation is nothing more than the concurrence and multitude of the accidents that befall the substantial being of the individual” (De Ceriziers, *Le Philosophe Français* 3, 31). De Ceriziers rejects both of these principles of individuation. Théophraste Bouju also gives a similar argument, but from a Thomist perspective, against those who hold that something is singular by its essence and by its accidents all together, which, he claims, would be not different from the Scotist view that the thing is individuated by its essence alone. Bouju asserts: “The singularity of the thing would be distinguished only rationally from the whole thing, which would amount to things being neither universal nor singular by themselves, but through the consideration of the understanding” (Bouju, *Corps de toute la philosophie*, 237).

of Leibniz's complete concept, in which the principle of individuation is nothing more than the multitude of the accidents that befalls the individual). Dupleix (1610) rejects these two alternatives because he thinks that quantity and quality cannot provide the basis for the individuality and unity of singular things, since they are accidents and accidents do not operate at the level of essences.

The second point is that the views represented by Leibniz's three notions were rejected by him in his 1663 thesis, two of them explicitly and one implicitly; implicitly also, he did not subscribe to the identity of indiscernibles at the time. Leibniz's 1663 *Metaphysical Disputation* was a youthful Scholastic exercise.¹⁵ It begins with a preface written by Jakob Thomasius, Leibniz's professor at Leipzig, which shapes the thesis. The preface provides a guide to the underlying conceptual framework and strategic aim of his student's dispute.

With an expeditious gesture, Thomasius dismisses the controversial problem of individuation as being "more subtle than necessary," while the thesis which his student will defend (the individual being individuated by its whole entity) is characterized as "the most simple and true," set to avoid many thorny difficulties.¹⁶ Moreover the preface advances the Nominalist *tota entitate* principle as the most exemplary treatment of the problem, a thesis notably maintained by Francisco Suárez in his *Disputationes Metaphysicae* (1597). For Thomasius, ancient Greek philosophy can be divided into four sects, sharing an essentially pagan component. In attempting to explain finitude and the origin of evil, Platonists, Aristotelians,

¹⁵ The full title is *Disputatio Metaphysica/ De/ Principio Individvi,/ Quam/ Deo O. M. Annuente/ Et/ Indultu Inclytæ Philosoph. Facultatis/ In Illustri Academiâ Lipsiensi/ Præsidi/ Viro Excellentissimo et Clarissimo/ Dn. M. Jacobo Thomasio/ Eloqvent. P. P. Min. Princ. Colleg./ Collegiato/ Præceptore et Fautore suo Maximo/ Publicè ventilandam proponit/ Gottfredus Guilielmus/ Leibnuzius,/ Lips. Philos. et B. A. Baccal./ Aut. et Resp./ 30. Maji Anni MDCLXIII*. As one can see, Thomasius is given "top billing" (in the largest font); Leibniz's name comes in second (and in smaller font). For more on the relations between Thomasius and Leibniz, see Mercer (2002).

¹⁶ A VI.1, 8.

Zenonists, and Epicurians, all resort to the same dualistic, “manichaeist” program according to which *ex nihilo nihil fit* and thus posit matter as a second metaphysical principle, alongside God, uncreated and coeternal with him.¹⁷ According to this historical reconstruction, the Aristotelian-Thomistic idea of individuation through *signate* matter originates within this ontological setting and is thus unsatisfactory from the point of view of a Christian philosophy. Thomasius argues that since the Thomistic individuation thesis limits itself to corporeal substances, Scotus’ *haecceity* should be favored as the more general solution to the problem of individuation.¹⁸ As Thomasius sees it, Aquinas and his followers cannot contribute to a general solution because they hold a principle of individuation for simple creatures, such as angels, different from the one they hold for corporeal creatures. For Thomas, spiritual creatures are altogether simple in their essence, but have a dual composition of essence with existence and of substance with accidents. Corporeal creatures are composed in addition of potency and act, that is, of matter and form. Thus, the principle of individuation for corporeal creatures, namely *signate* (or quantified) matter, relies on something that angels do not possess. (Each angel, as a result, constitutes its own species.) Given the division of labor between teacher and student, Leibniz is charged with the critique of the Scotistic principle of individuation through *haecceity*, which receives the longest treatment in his bachelor thesis.¹⁹

As a result, in the *Metaphysical Disputation* (1663), Leibniz follows the path traced out by his teacher. He dutifully sets aside Thomas’ solution as not furnishing a single principle of

¹⁷ A VI.1, 6. This judgment on Greek thought is taken up again in Jakob Thomasius (1665).

¹⁸ A VI.1, 6 and note.

¹⁹ Thomasius is representative of a powerful revival of Aristotelianism on the side of Reformation. His polemic against the Scholastics and the Scotists, in particular, is constant; he regards contemporary metaphysical systems such as Clemens Timpler’s or Suárez’ to be ontologically deviant in their lack of theological premises. For more on his judgment of Scotism, see Thomasius (1665).

individuation for both material and immaterial substances.²⁰ He discusses four other possible solutions to the problem, rejecting three of them, including the Scotist answer, and defends as best the “whole entity” principle of the nominalists.²¹ Perhaps the one novel element in Leibniz’s contribution to the issue of individuation is the taxonomy he provides. Either a single general principle of individuation for all individuals can be given or, because different principles for material and immaterial individuals must be provided, it cannot. With respect to the general principles, the whole entity can be proposed as a principle or something less than the whole entity can be proposed. Within the category of “something less,” the principle can be expressed by negation or by something positive added to the essence. Two views have been proffered for the positive principle, that is, existence and *haecceity*, depending upon whether a physical part or a metaphysical part is added. Since Leibniz disposes negatively of non-general principles (one of which he identifies as Thomas’), he discusses four primary options: (1) whole entity; (2) negation; (3) existence; and (4) *haecceity*. The young Leibniz attributes the first principle he discusses, “whole entity”, to some older and to some recent Scholastics, including Suárez. Further, he classifies the principle as that of the terminists or nominalists and defends it against the attacks of the Scotists (identified as such). There is no mystery about this principle of individuation. Leibniz claims that the whole entity of a composite being is simply its matter and form; he states that he uses the term “whole entity” rather than “matter and form” merely

²⁰ A VI.1, 11, §3.

²¹ It is generally recognized today that Leibniz constantly endorsed or adhered to a nominalist ontology or epistemology. See Fichant (1998, 147), but also Mugnai (1990). As Leibniz says to Arnauld, “I hold this identical proposition, differentiated only by the emphasis, to be an axiom, namely, *that what is not truly a being is not truly one being either.*” (A&G, 86) The passage is a statement of one of the main tenets which make up Leibniz’ “provisional nominalism”: the specific claim to a particularist ontology that only individual substances exist. In a text from 1688 entitled *De realitate accidentium*, Leibniz defines himself as a nominalist, at least “per provisionem”, see Grua II, 547.

because he wants the principle to be general and to cover immaterial substances.²² Moreover, by “matter and form” he does not include accidents, which he specifically omits from the discussion.²³ If Leibniz’s principle works at the level of matter and form without any consideration of accidents,²⁴ then Leibniz in 1663 does not hold the complete concept view of substance and thus he is not committed to the identity of indiscernibles; clearly he also rejects versions of both Thomist and Scotist principles of individuation.

A few years later, in 1668, in the theological context of finding a philosophical explanation for the Eucharist, Leibniz changes his mind and accredits individuation to the substantial form viewed as an active principle directly enacting a divine idea: more specifically, he asserts that bodies are not substances apart from a concurring mind because a substance is a being that “has a principle of action within itself” and “*actiones sunt suppositorum.*” Substance is union with a mind and bodies that lack reason are substances through a union with the universal mind or God. Transubstantiation thus involves the mind of Christ taking on the accidents (bread and wine) in the sacraments, substituting its special concourse for the general concourse of the divine mind. Thus the transubstantiated accidents would have numerically the same substantial form as Christ’s body and since they would not be changed in any respect besides the substantial form of the concurrent mind, they would retain and realize their accidents. Leibniz states in a scholium: “These theorems of ours differ very little from the accepted philosophy. In Aristotle, nature is the principle of motion and rest. But substantial form is

²² A VI.1, 12, §4.

²³ A VI.1, 14, §10.

²⁴ This omission of the problem of individual accidents is another aspect of Leibniz’s jejune treatment of the issue of individuation that points to his limited, second-hand knowledge of Scholastic sources. Francisco Suárez, in his classical treatment of individuation discusses the nature of individual accidents, see *DM XXXVII–XXXVIII*.

properly nature in the same philosopher. Hence Averroes, Angelus Mercenarius, and Jacob Zabarella also assert that substantial form is the principle of individuation.”²⁵ In the 1663 thesis, Mercenarius and Zabarella were cited as supporters of the Scotist view; they are now among those who agree with Leibniz, which places Leibniz in the Scotist camp.²⁶ In case the point is not fully understood, Leibniz also refers to “Those who locate the nature of subsistence in the union of matter and form, like Murcia,”²⁷ thereby distancing himself from that position. Of course, in 1663, Murcia was among those who agreed with Leibniz in holding the “whole entity” principle of individuation. Leibniz emphasizes that he is using the terms substance, transubstantiation, accident, species, and identity in the same sense which the Council of Trent favored, that none of his conceptions are innovations, that he demonstrates “the numerical identity of substance from the numerical identity of the substantial form, in conformity with the principle of the noblest Scholastic and Aristotelian philosophers, for whom substantial form is the principle of individuation.”

Despite his 1668 explanation of transubstantiation claiming that substantial form is the principle of individuation, Leibniz almost immediately began rejecting substantial forms as the Scholastics understood them.²⁸ In 1668 and 1670, Leibniz advocated a nominalistic, particularist

²⁵ A VI.1, 510; Loemker, 117.

²⁶ Leroy Loemker realized this; in a footnote to the passage he writes: “Leibniz’s departures from Thomism are significant; his view of individuality and of the soul here is Scotistic, though he had earlier rejected Scotus’ principle of individuality. The unity of matter as an aggregate is never itself material but logical and mental. The soul itself, in turn, has its own matter, distinct from its body” (Loemker, 120). Loemker is right in thinking of the view as a kind of Scotism, even though, of course, it says nothing about individuals as common nature plus *haecceity*, two things asserted to be formally distinct. Substantial form as principle of individuation would have been considered by Leibniz in the category of “something less” than whole entity, with a metaphysical part being added to the essence.

²⁷ A VI.1, 510; Loemker, 117.

²⁸ In 1668, Leibniz adds a Neo-Platonic spin to his conception of substantial forms: substantial forms are ideas in the mind of God.

ontology and rejected any universals, substantial forms, and real qualities.²⁹ The 1668 account of transubstantiation presents several stumbling difficulties which lead to the rejection of Scholastic substantial forms in Leibniz's 26 September/6 October 1668 letter to Thomasius and his preface to Nizolius (1670). The Academic edition of Leibniz' works transcribes four fragments or samples under the common title of *Demonstratio possibilitatis Mysteriorum Eucharistiae*: the first three fragments from 1668 (among which is *De transsubstantiatione*) start with a critique of English philosopher Thomas White. While these three fragments preserve the use of substantial forms, the fourth one (1671) does not mention substantial forms any more, only referring to them negatively as the "fictional and monstrous entities" of the Scholastics.³⁰ Moreover, in the letter to Thomasius from 26 September/6 October 1668, Leibniz shows his support toward the new mechanistic philosophy and accordingly sets up the program of reconciling Aristotle and the *novatores*. Leibniz adopts as a common rule of mechanism the simple formula that all corporeal properties of bodies have to be explained through their primary attributes, i.e. magnitude, figure, and motion. Even though in 1668-1670 Leibniz' adoption of this rule is not yet paralleled by a carefully formulated natural theory, he uses it as the grounds for a renovation of the proof of the existence of God as Prime Mover. This renewed demonstration was supposed to be a part of chapter 4 of the first part of the plan of his *Catholic Demonstrations*.³¹ A preliminary version of it can be found in the introduction to *De Arte combinatoria*.³² Each body or corporeal nature

²⁹ This does not seem very different from Leibniz's earlier adherence to nominalism in the earlier *Disputatio*. Yet, explaining the reasons for Leibniz' rejection of substantial forms in 1668-1670 enables an understanding of the larger context which ultimately led him to positing an external principle of individuation in the *Confessio philosophi* of 1672-1673.

³⁰ Same fragment: A VI.1, 516.

³¹ "Demonstratio ex eo principio, quod in corporibus nulla sit origo motus," A VI.1, 494.

³² GP IV, 32-33.

receives its mechanistic features and primary attributes from a unique and incorporeal principle or being: God as governor of the material world. A mechanistic explanation of nature requires a Prime Mover, since the cause of motion in the universe cannot be a principle physically immanent to the corporeal nature of bodies. Bodies do not move because each of them would possess an immaterial entity or internal principle of activity responsible for their autonomous motion, but as a consequence of reciprocally transmitting or transforming motion through their primary attributes.³³ Despite its apparent Aristotelianism, Leibniz's attempt at renewing the proof of the existence of God as Prime Mover is quite un-Aristotelian: for Aristotle, the unmoved mover causes the motion of other bodies through final causation and not as an efficient cause.³⁴ In this case, the unmoved mover, God, is a "full" efficient cause, responsible for all efficient causation in the universe. Early Leibniz's God is a full efficient cause, because all finality is, in the end, absorbed in him. God is both responsible for the origin of forms and the cause of movement – he alone ensures the ontological consistency of substances. Thus, the notion of God Leibniz marshals in this early period is that of mechanist philosophy, conceiving the primary relation between God and the world of corporeal substances in terms of an overarching, external principle imprinting motion onto bodies. In conclusion, Leibniz rejects the traditional Scholastic interpretation of substantial forms both on the count of their unnecessary multiplication and because mind-like substantial forms which would enable bodies to move through themselves,

³³ *Confessio Naturae Contra Atheistas*, GP IV, 108-109: "[...] cum corpora motum habeant, non singula ente incorporali, sed a se invicem."

³⁴ The prime mover causes the movement of other things as a final cause and not as an efficient cause: it is the purpose, the end of the moving. For Aristotle, an efficient cause imprinting motion onto the world would itself be affected by that movement or push, which it cannot since it is an unmoving cause, Aristotle (1910-1952), *Metaphysics*, book Λ, 1072 a26–b4.

without an incorporeal mover outside of them, would shut off the proof of the existence of God as Prime Mover.³⁵

On the other hand, in his 1669 program-letter on natural philosophy³⁶, discussing the origin and generation of forms, Leibniz reiterates the Scholastic *dictum* that forms have to be “educated from the passive power of matter” and not directly from the active power of God.³⁷ Here, the substantial forms of bodies are described as the Scotist *forma corporeitatis*, educated from matter through a process of *mechanist heterogenesis*.³⁸ This assumption about the origin of forms goes against those *novatores* who assumed their celestial origin, and Leibniz condemns Scaliger, Sennert, Sperling and their ilk, for believing that forms are created not from the passive power of matter, but from the active power of the efficient cause.³⁹ This, he argues, would imply that God is the prime matter of all things and that, furthermore, extended, physical matter would act through itself *qua* matter. Both these consequences are unacceptable for Leibniz, since he claims that the pre-existing matter, from which substantial forms are derived, is a non-being – purely passive (and objective) potentiality.⁴⁰ The unnecessary multiplication of substantial forms is an ontological blunder of which Scholastics and contemporary *novatores* are equally chargeable: countless incorporeal entities glued onto the extended body of each substance would

³⁵ A II.1, 11.

³⁶ It is worth noting that Leibniz chose to publish the text of this 1669 more extended letter as an Appendix to his own *Dissertatio preliminaries* to Marius Nizolius’ *De veris principiis et vera philosophandi* (republished in 1670).

³⁷ The “education” of forms from the passive power of matter was a theory held by the majority of medieval philosophers, Aquinas in particular, but also Sixteenth-century textbook authors, such as Franciscus Toletus and Benito Pereira.

³⁸ See Chapter II, “Concluding remarks,” pp. 63-70.

³⁹ A II.1, 14.

⁴⁰ A II.1, 16.

risk introducing thought into matter and leading to a divinization of nature.⁴¹ As I will show through an extended analysis of this letter in the second chapter, at this stage, Leibniz really believes that, behind the medieval *vulgata* of commentaries on Aristotle, there is an authentic Aristotelian thinking that needs to be recovered. Both his attempt at construing a valid, reformed mechanistic philosophy (against and with the *novatores*) and his adherence to the tenets of a nominalistic ontology that back it up, explain why Leibniz gave up traditional or contemporary interpretations of substantial forms, early on after his essay on transubstantiation.

In 1668 Leibniz was keenly interested in keeping substantial forms, but to this purpose he had to use an opposite strategy to that of the *neo-Scholastici*, the liberal Jesuit (and mostly Spanish) Scholastics of the Counter-Reformation. Despite the reference to the common Scholastic adage *actiones sunt suppositorum*, Leibniz subverts the medieval concept of substantial form by conceiving it in a much more Neo-Platonic than Aristotelian way. Forms assume ontological reality only as instruments of God's own action, since bodies have to rely on their direct enactment of divine ideas for both their potentiality towards motion and the principle of activity of said motion.⁴² There is even a slight imprecision in Leibniz' recourse to *actiones sunt suppositorum*: his argument that the substance or being subsisting by itself, taken individually, is the support for the accidents and actions belong to these supports.⁴³ Generally speaking, the majority of substances are considered to be *supposita*. In *On Transubstantiation* the difficult issue that Leibniz' explanation of the Eucharist has to face concerns Christ's body,

⁴¹ A II.1, 22: "Ita reditur ad tot deunculos, quot formas substantiales [...]." This would amount to placing as many little gods into things, as there are substantial forms.

⁴² A VI.1, 513. Divine ideas are the substance of things: "Ideae Dei et Substantiae rerum sunt idem re [...]."

⁴³ That is, according to the Aristotelian-Thomistic dictum. "Nam Ens per se subsistens seu substantia hæc vel illa in individuo sumta est Suppositum. (Scholastici enim in usu habent Suppositum definire individuum Substantiale). Iam actiones sunt Suppositorum" (A VI.1, 497).

its corporeal substance. The substance of the body of Christ is not a *suppositum*. His divine nature is, because this corporeal substance subsists in the person of the divine *logos*. If in order to show that substances have a principle of action within themselves Leibniz makes all substances *supposita*, the immediate unwanted consequence would be that he is submitting to Nestorianism while attempting to explain transubstantiation, allowing two persons in Christ.⁴⁴ Yet, there are other reasons which, given Leibniz' choice for a principle of individuation in 1668, make his explanation of transubstantiation turn out to be even more problematic. First, he has to explain the temporality and succession of forms and second, to find a way of reconciling his account of transubstantiation *via* substantial form with one of the basic principles undergirding the "provisional" nominalism adopted in the Preface to Nizolius (1670), text in which he rejected the existence of universals, forms, and real qualities.

In *De transsubstantiatione* (1668), Leibniz had stressed his continuity with the Tridentine Council with regards to defining substance, accidents, species and transubstantiation.⁴⁵ The Council of Trent stated that, given the unique and miraculous nature of transubstantiation, the operation it involves cannot be explained in terms of similar natural transformations or transmutations. Since, in the Eucharist a part of common matter is "consecrated", transubstantiation involves a complete conversion: as striking as it may seem on a sensible level, the substances of both bread and wine disappear entirely.⁴⁶ As a consequence, examples of

⁴⁴ The conspectus of *Catholic Demonstrations* included, in its 3rd part, a chapter on the Augustinian *congruentia incarnationis* and a reference to Saint Anselm's *Cur Deus homo*. The next chapter, on incarnation, was planned: "[...] contra Arianos et Nestorianos" (A VI.1, 497).

⁴⁵ *Scholia*, A VI.1, 510.

⁴⁶ Marbeau-Charpentier 1923, *Catéchisme du Concile de Trente*, II, XIX, 1.

physical transformation such as natural accretion (in food digestion)⁴⁷ or fermentation (the transformation of wine into vinegar), are not considered adequate in conceiving transubstantiation. Complete conversion is a conversion not only of the substantial form of a substance into the substantial form of another substance, but also a change of matter: from the matter of the bread and wine to the corporeal substance of Christ's body. Thus, this conversion cannot be defined as a mere variation or succession of substantial form, but as a change occurring in the corporeal substance or matter of things. The matter and form of the species make a complete passage into the corporeal substance of Christ. It is unclear how the succession between God's general concourse and Christ's concurrent mind could represent a viable solution in explaining transubstantiation, since in this case, Leibniz' particular choice of an individuating principle for inanimate bodies involves the risk of drifting dangerously close to pantheism and conceiving God as a world soul. The significant issue here is theological more than metaphysical; it involves ascribing to non-human corporeal substances like the Eucharistic bread and wine not yet informed by the mind of Christ, ideas-forms that share the same separate status with God's concurrent mind: accidents and species *sub specie aeternitatis*.

Secondly, what is the ontological status of accidents in a non-realist, nominalist ontology whose main assumption, among others, is resolutely anti-Platonic: do only individual substances exist? In the *Isagoge*⁴⁸, Porphyry gave a dual definition of accident, leaving open the possibility that accidents could possess an existence or reality separately from substance. Some accidents (like "sleeping", in the case of man) are separable, while others (the "being black" of a raven) are inseparable. Following this definition, the nominalist tradition had tried to redefine accidents

⁴⁷ In the first fragment on the Eucharist from 1668, Leibniz had specifically criticized Thomas White's analogy between transubstantiation and *augmentatio*: see A VI.1, 501.

⁴⁸ Libéra & Segonds 1998, Porphyre, *Isagoge*, V, 1, 15.

according to the metaphysical presuppositions of its own singularist ontology. Ockham's *Summa Logicae* put forward four different meanings of accident: first of all, the accident is something really inhering in a substance the way "heat really inheres in the fire and whiteness in wall."⁴⁹ In this sense, an accident is something which cannot be subtracted from its underlying subject without corrupting or annihilating it. In its second influential sense, accident would be a predicable and thus it would not amount to something absolutely inseparable from the subject, but would attach itself to different substances. In this latter meaning, an accident could be separable (at least through the power of God) or inseparable from its subject. The nominalists including Ockham share a common task in proving that this second meaning of accident only possesses a mental reality and that accidents only exist in nature as inherent to substances. The issue of the separability of accidents on a natural level is an authentic *cul-de-sac* for Nominalist ontologies as it is for Leibniz, who adopts the first understanding of the concept of accident, one that is intimately related to his conception of individual substance. If accidents are just modifications of their respective substances, inherent to and inextricably bound to their subjects so that they have no existence outside these substances; they are only abstract things with no reference to the things themselves. It is difficult to see not only how Leibniz would reconcile this view with the separability of accidents – the *sine qua non* condition for any eligible explanation of the Eucharist in an Aristotelian-Thomistic framework – but also with the manifestation of these accidents under the form of the species at the sensible, phenomenal level.

In both the notes annexed to *On transubstantiation*⁵⁰ and in a closely dated text on hypostatic union (*De incarnatione Dei seu de unione hypostatica*, 1669-1670), Leibniz seems to argue that the Scholastics have uselessly complicated their explanations of transubstantiation and

⁴⁹ Ockham 1975, 102-104.

⁵⁰ A VI.1, 513.

hypostatic union, notions he had re-grounded on the presupposition of God's mediated action through minds or substantial forms. Right after his rejection of substantial forms in the letter to Thomasius (26 September/6 October 1668) and the preface to Nizolius (1670), Leibniz once again dismisses substantial forms, this time in the context of finding an appropriate philosophical solution to the problem of resurrection. Surprisingly enough, in the first part of his paper "On the resurrection of body" (1671), Leibniz claims that some version of atomism or corpuscular theory of matter could cope with bodily identity problems related to resurrection better than hylomorphism. He takes into account the Scholastic view of matter and form, but does not consider that it provides an adequate framework to explain the resurrection of the same body: "For since the followers of Aristotle believe that the essence of each thing consists in matter and a certain substantial form which is extinguished by the corruption of the thing and since they hold as an axiom that there is no return from privation to possession, they have been unable to grasp how the same flesh can return."⁵¹ There is no return from privation to possession – *a privatione ad habitum non dari regressum* – yet again the problem of the temporality, duration of substantial forms, is particularly problematic in the case of bodily resurrection. Leibniz invokes here another Scholastic *dictum*, based partly on Aristotle's *Metaphysics H* 1044b34-1045a6 and found in the works of thirteenth century Thomas Aquinas and Roger Bacon.⁵² The *reditus* or return principle states that privation and habit subsist differently and are as opposed as affirmation and negation are. As a consequence habit can change into privation, but not the other way around: a blind man, Aristotle says, cannot recover sight.⁵³ What is deprived of substantial

⁵¹ A II.1, 183.

⁵² Aristotle also exposes this principle in the 10th book of his *Categories*. For a detailed analysis of the use of this principle as a weapon against atomism, see Newman 2006, 50-54; 104-105; 115-116.

⁵³ Aristotle, *Categories*, X, 13a17.

form cannot regain it: no natural thing can be restored with numerical identity in the event that it undergoes corruption or annihilation. In order for numerical identity to be restored something other than substantial form is needed.

As evidenced by the previous passage as well as the fourth fragment on transubstantiation (1671) and its general rejection of the “fictional and monstrous entities” of the Scholastics”,⁵⁴ whatever its meaning for Leibniz, substantial forms tend to disappear from his vocabulary after 1671.⁵⁵

Furthermore, all the difficulties implied in postulating substantial form as a principle of individuation lead to Leibniz’ radical departure from the common Scholastic, internal principle of individuation in the *Confessio philosophi* (1672-1673): identifying *haecceity* as the principle of individuation consisting in the external spatio-temporal circumstances. Leibniz further emphasizes the distinctiveness of his interpretation and his break with Scholasticism by having his interlocutor assert: “You speak of astounding things, which, I believe, have not come into the mind of any Scholastic even in a dream, but which, nevertheless, no one can disavow, for they are taken from practical experience.”⁵⁶ He also starts his discussion by distancing himself from

⁵⁴ A VI.1, 516.

⁵⁵ Even though his reflection on the *Elementa de Mente* and *de Corpore* continues to develop (as announced in the 1668-1669 plan of the *Catholic Demonstrations*, see A II.1, 175-176. This also raises doubts whether anything like a primitive theory of complete concepts is developed at an early stage in Leibniz’ thought.

⁵⁶ Sleight 2005, 104-105. The paragraph continues: “For no man reasons otherwise when he must distinguish things that are entirely similar.” Leibniz’s distancing himself from the Scholastics in the *Confessio* takes on greater import when one considers his deep knowledge of Scholasticism, knowledge he himself is proud of. In a 1678 letter to Herman Conring, Leibniz felt he needed to defend himself against the accusation that he simply did not know any Scholastic philosophy: “You say that my estimate of the Schoolmen’s metaphysics would be more favorable if I had read them.” Leibniz responded: “Yet I esteemed [the Schoolmen’s metaphysics] most favorably, for I had written to you, if you remember well, that I believe many excellent metaphysical demonstrations are to be found in them which deserve to be purged of their barbarism and confusion. And I could not have said this if I had not wanted you to believe that I had read them.” Leibniz claimed that he had examined the writings of the Scholastics, and done so

the traditional way of posing the problem: “This question seems difficult, but more because of the tortured manner of asking the question, than from the nature of the problem. It touches upon the very thorny consideration of the *principle of individuation*, that is, of the discrimination of things differing solely in number.” The example Leibniz uses is that of two eggs similar in every way such that not even an angel can observe a difference; he asks “yet who can deny that they differ?” and replies:

At least they differ in this: that one is this one, the other, that one, that is, they differ in *haecceity*, or because they are one thing and another thing, i.e., because they differ *numerically*. But what do we mean when we count, that is, when we say *this* (for to *count* is to repeat *this*). What is *this*? What is it to determine something? What is it except the perception of time and place, i.e., of motion either, on the one hand, of a given thing in relation to us or to a thing already determined, or, on the other hand, of our own movement (e.g., the motion of our hand or the finger by which we point), or the motion of some already determined thing, like a stick, in order to point to a given thing? There you have it, what may amaze you, the principle of individuation, outside the thing itself. For between these eggs no difference can be assigned either by an angel or, I have the audacity to say, by God (given the hypothesis of the greatest similarity possible) other than that at the present time this one is at place *A*, and that one is at place *B*.⁵⁷

even “more immoderately and eagerly” than his teachers approved, so that they “feared that he would cling too tightly to these rocks.” He also claimed that when he began to study philosophy at the universities he made “some original and profound comments” on Scholastic topics, such as “the principle of individuation,” and he “never since regretted having sampled these studies” (GP I, 197-198; Loemker 190).

⁵⁷ Sleigh 2005, 103.

In the 1663 *Disputatio*, confronted with both Scotism and nominalism, Leibniz had interpreted Scotus' *haecceitas* as a formalistic element (privileging form over matter).⁵⁸ Later reinterpretations of the concept seem to insist on its realistic elements: identification with quantity or synonymy with numerical difference consisting in the perceptions of time and place (*sensus temporis et loci*).⁵⁹ The originality and directness of the *Confessio* consist in Leibniz' commitment to the idea that the principle of individuation of a thing is not internal to itself.⁶⁰ Thus he accepts a radically reconsidered notion of *haecceity* and does not fully embrace a complete concept view of substance or the identity of indiscernibles.⁶¹

In the Parisian period, once Leibniz advances his criticism of Descartes' theory of extension and expounds upon the concepts of space and time as mere relations or orders of coexistence and non-simultaneity, the external spatio-temporal individuating circumstances will be ready to be internalized, as contained in their complete concepts. We can see the beginnings

⁵⁸ A II.1, 16: Leibniz introduces the Thirteenth-century medieval distinction between the form of the whole and the form of the part, while considering haecceity to be "more like form since it contracts and distinguishes."

⁵⁹ *Confessio philosophi*, A VI,3, 147.

⁶⁰ The concept of *haecceity* will further evolve up until the period of the *Discourse on metaphysics* and afterwards, when Leibniz would define individuals as *haecceities*: "where there is space and time." *De divisione praedicati*: "Individualia seu haecceitates ubi locus et tempus" (A VI.4, 927). Thus Leibniz reinstates the Scotistic principle of *haecceitas* in an un-Scotistic fashion, as quantity, understanding the latter in a vaguely realistic sense, as the true "principle of individuation" for physical beings. He states, as definitions in another 1672 essay: "Quantitas est modus, quo res cogitator determinate, aut potius quo res cogitator tota. [...] Seu quantitas est ipsa haecceitas, qua res cogitator haec. Qualitas est modus, quo res cogitator mutabilis seu posse agree et pati. Quo res cogitator cum relatione non ad sensum, sed intellectum. Quantitatis enim est conceptio relationis rei ad sensum. Hinc ratio patet cur sola ex accidentibus quantitas auferri non possit, continet enim ipsam rei haecceitatem" (A VI.2, 488-489). This kind of conflation between haecceity and quantity, or haecceity as the spatio-temporal circumstances which individuate a substance (in the *Confessio philosophi*, 1672-73) brings to mind the Neo-Platonic residues in the final corollaries of the *Disputatio*, where Leibniz considers that the essences of things are like numbers or that matter possesses its own *actus entitativus* and is *realiter* identical with quantity. It might be interesting to see, in this regard, what influence Erhard Weigel, Leibniz's other philosophy teacher, might have had on him; see Piro 2005, 10.

⁶¹ We can now reaffirm the inference that Leibniz did not hold the complete concept view of substance and the identity of indiscernibles in 1663.

of Leibniz's more mature view encompassing the thesis that two substances cannot resemble each other completely and differ only in number in an essay from 1676 entitled *Meditatio de Principio Individui*. There Leibniz considers two rectangles or two triangles coming to constitute two indistinguishable squares, as an example of different causes producing an effect that is perfectly the same. Of his two squares Leibniz asserts "neither of these can be distinguished from one another in any other way, not even by the wisest being." Based on the principle that the effect involves its cause "in such a way that whoever understands some effect perfectly will also arrive at the knowledge of its cause," Leibniz argues that:

[...] if we admit that two different things always differ in themselves in some respect as well, it follows that there is present in any matter something which retains the effect of what precedes it, namely a mind

Thus, for matter to be individuated, it has to be connected to a mind that will retain the memory or traces of its construction. Leibniz concludes:

This argument is very fine and proves that [...] we cannot think of anything by which matter differs, except by mind. [...] This principle is of great importance.⁶²

Of course, the mind Leibniz is referring to could be either inside or outside the thing, a universal soul or a mind, individual soul, substantial form, or individuating form, that is, a *haecceity*.

Leibniz chooses to locate the principle of individuation inside the thing and thus derives something like the identity of indiscernibles:

[...] unless we admit that it is impossible that there should be two things which are perfectly similar, it will follow that the principle of individuation is outside the thing, in its cause."⁶³

⁶² See A VI.3, 491; also Parkinson 1992, 51-53.

In the two-year period between 1670 and 1671 the concept of substantial form is overshadowed. The concept of mind and its interpretation through indivisibles or points takes its place. Although between 1672 and 1676 Leibniz had not yet developed an elaborate physical theory, an idea guides his Parisian writings: matter is always connected to mind, held together by a mind or a mind-like substance; it only exists in virtue of a relation to mind.⁶⁴ It is after this fruitful period of confrontation with Cartesianism that the views Leibniz had developed on mechanics in his physical theories of *Theoria motus abstracti* and *Hypothesis physica nova* (1671) became subject to a drastic revisionism. This revision of his first physical theories was initiated after the Parisian period and his return to Hanover through a reconsideration of the laws of motion between colliding bodies. In 1676 (in *De Arcanis motus* and *Meditatio de Principio individui*), Leibniz believes he has arrived at a possible solution in reconciling the empirical laws of motion and an *a priori* principle of conservation: this “Ariadnic thread” was the regulative principle of the equipolence between full cause and entire effect. The *Meditation on the Principle of the Individual* (1676) is particularly important not only because it gives an overview of Leibniz’ views on individuation at a crucial time, but also through the fact that the text itself is an early formulation of the principle of equivalence between full cause and entire effect, equivalence which is maintained through phenomenal changes.

But Leibniz’s mature view about individuation also develops through the revival of the Aristotelian concept of primary substance and a reinterpretation of the Thomistic angelic principle of individuation as *species infima*. In the *Discourse on Metaphysics*, the individual for Leibniz corresponds to the Scholastic last species he had declined to discuss in the *Disputatio*. Its

⁶³ Leibniz, A VI,3, 491; Parkinson 1992, 51. The argument is repeated as late as 1685 in Leibniz’s “Notes on Cordemoy’s Treatise *On the Distinction between Body and Mind*,” see A VI.4, 1799; Arthur 2001, 279. I discuss this last iteration of the argument in the final chapter.

⁶⁴ See, in particular, his *Notes on Science and Metaphysics* (18 March 1676; Arthur 2001, 55).

particularity is that each individual is, in itself, its own last species – not an exemplar of a specific essence, but a unique one with all its accidents. Leibniz' main originality is that to this individual essence or last species there corresponds a complete concept. I have traced Leibniz's views on individuation from 1663 to 1686. We can say without equivocation that the only constancy about individuation during these years is Leibniz's willingness to change his mind completely about a host of issues, as he works through various problems of disparate provenance and adjusts his thinking accordingly, using one result in one domain against another in another domain and then reversing himself, repeating the process.

CHAPTER TWO:
FROM INDIVIDUALS TO ATOMS: VARIETIES OF SEVENTEENTH-CENTURY
ATOMISM

When discussing atomism in the Sixteenth or Seventeenth-century, the common view is that early modern corpuscular theories of matter have their origin in the revival of different strands of ancient atomist thought, whether Democritean, Lucretian, or Epicurean. Since it witnessed the publication of Lucretius' *On the Nature of Things*, one cannot underrate the impact the rediscovery of ancient atomism⁶⁵ had in the Fifteenth-century. Yet reducing the origin of Sixteenth or Seventeenth century atomism to this influence alone represents a risky gamble since it fails to understand the varieties of "atomism" available to early modern thinkers. Therefore, understanding the complexity of early modern atomism as a diverse philosophical movement will help better grasp those theories about the ontological fabric of the world that leading philosophical figures such as Leibniz or Descartes were coming up against.

We first have to start by making several important distinctions. Sometimes corpuscular doctrines were motivated by physical or mathematical considerations about the continuum (Galileo; the famous problem of Poysson⁶⁶; Gassendi's distinction between "mathematical" and "physical" atomism), other times they set aside "physical" or classical atomism and relied upon alchemical or "chymist" sources in developing "qualitative", non-mechanist versions of atomism

⁶⁵ The *editio princeps* of Lucretius' *De rerum natura* was published in 1473, three years after the publication of the first Latin translation of Diogenes Laertius' *De vita et moribus philosophorum*; the last two chapters dealt with Democritus, Leucippus, and Epicurus.

⁶⁶ On several solutions to Poysson's problem, see Lynn Joy 2002, *Gassendi The Atomist*, chapter 5.

(as was the case for Libavius, Scaliger, or Sennert).⁶⁷ Another important difference was that, while classical atomism admitted the void, this was sometimes not the case for early modern atomism. Influential atomists such as Basso or Sennert replaced the Democritean interstitial vacuum with a subtle, fifth element, the ether, permeating all bodies and filling the gaps between the atoms of the four elementary kinds.

Secondly, for the Seventeenth-century, the word “atom” itself ended up designating a wide range of different things besides “indivisible extended corpuscles.” Sometimes it was used to refer to mathematical units or indivisible substances and other times, early moderns simply replaced the traditional indivisible atoms with divisible corpuscles, in their explanations.⁶⁸ The point is varieties of atomism available at the beginning of the Seventeenth-century cannot be fitted under a single umbrella or univocal description. Any history of early modern atomism has to take into account the complex relationship between mechanical philosophy, Aristotelianism and “chymistry” or alchemy. Even on the level of historiographical categories, there was just as much “innovation” or empirical backing and experimental proofs for atomism⁶⁹ (Daniel Sennert), as there was “renovation”, the mere modernizing or Christianizing of the ancient Democritean or Epicurean theories (Nicholas Hill, Sebastian Basso, Pierre Gassendi). If this suffices to point out how in the case of early modern atomism, we are dealing with a complexity of sources matching a similar variety of views, one can also envision something of a lowest common denominator between them: anti-Aristotelianism. At the start of the Seventeenth-

⁶⁷ On the influence of Libavius and Scaliger on Sennert, see Newman 2006.

⁶⁸ Lüthy&Murdoch&Newman eds. 2001, *Late Medieval and Early Modern Corpuscular Matter Theories*, 17-18.

⁶⁹ One must note that the Seventeenth-century witnessed the discovery of some remarkable chemicals: the mineral acids. In their various forms (sulfuric, hydrochloric, nitric, *aqua regia*), these chemicals enabled the dissolution and separation of metals and thus provided the necessary tools for atomists such as Sennert to prove the existence of atoms through the famous *reductio in pristinum statum* (Newman 2006, 98-99).

century, internal problems within the Scholastic framework had weakened the Aristotelian position to the point hylomorphism became problematic even for Scholastic philosophers. Thus, in their challenge to Scholastic Aristotelianism, early modern atomists were presented with the alternative of 1) either completely rejecting the basic building-block of its ontology and natural philosophy (substantial forms) and instead proposing a range of specific alternatives (elemental mixture doctrines, physical atomism, *semina rerum* theories) 2) or engaging in revisionist interpretations of Aristotle ascribing new meanings to substantial forms (*minima naturalia* doctrines, Sennert's inclusion of substantial forms in atoms).

Yet, since substantial forms were a necessary prerequisite in a hylomorphic description of a world of bodies and qualities, their rejection attracted several conceptual problems. For example, if substantial forms are denied, how does one explain obvious changes in the sensorial qualities of bodies (color, taste, solubility) during chemical reactions without appealing to a change in substantial forms or without appealing to real accidents? One of the paths of accounting for real qualities in early modern atomism and avoiding the rigidity of classical or mechanical atomism was to suggest theories of matter supposing that atoms incorporate every possible quality, each atom being the corporeal hypostasis of a single quality. The development of this type of qualitative, non-classical atomism and its revisionism towards Aristotelian doctrines was connected to the enormous success of two distinct doctrines which did not entirely fit within the mechanist or Epicurean traditions: the *minima naturalia* theory and the *semina rerum*. These two doctrines directly contributed to the emergence of early modern corpuscular theories of matter. In the first part of this chapter I explore the two alternative traditions which influenced Sixteenth and Seventeenth-century atomism: the *semina rerum* and *minima naturalia* corpuscular theories of matter. In the second part, I focus on Wittenberg Professor of Medicine

Daniel Sennert (1572-1637), probably the most interesting and complex figure in early modern atomism, an author whose commitment to hylomorphism did not prove to be an obstacle to the successful development of an atomist program.

***Minima Naturalia* and *Semina Rerum*: Two Sources for Early Modern Atomism**

As noted earlier, Sixteenth and Seventeenth-century atomism offered several alternatives to Aristotelian substantial forms and to Aristotle's traditional "four elements" theory. This alternative tradition was the result of the resurgence of alchemy or "chymistry," exemplified in the works of Paracelsus, Theophrastus von Hohenheim (1493-1541), Petrus Severinus (1542-1602), or Johannes van Helmont (1579-1644).

Paracelsian alchemical doctrines explained the structure of bodies and the interactions of their parts through combinations or transmutations of three "chymical" principles or basic elements: the *tria prima* of salt, sulphur, and, mercury. However, for all their denial of substantial forms and the replacement of Aristotle's elements with the *tria prima*, Paracelsian alchemists were not as critical towards other ancient or Aristotelian notions. Central to the works of von Hohenheim and his followers, the complex Greek notion of *semina rerum* resurfaced in Renaissance philosophy and medicine, until through its various reinterpretations it became part of corpuscular and atomist theories of matter in the first decades of the Seventeenth-century. A wide range of views on *semina* can be found in various philosophical contexts prior to the early modern period: from Epicurus' and Lucretius' use of seminal principles or atoms, to the Stoics' *logoi spermatikoi*, or Augustine's idea of seminal reasons acting as immaterial principles informing matter at the creation of the world. The Sixteenth-century re-conceived the ancients' *semina rerum* as an alternative to Aristotle's notion of substantial form: invisible living entities

of an immaterial and semi-divine nature or active particles of matter “endowed with some sort of formative power or potential for growth.”⁷⁰ In medicine, for example, Girolamo Fracastoro’s (1476-1553) work on contagion conceived of “seeds” as invisible particles of matter, agents responsible for the communication of diseases. Thus, by the early decades of the Seventeenth-century, the notion of *semina* led to the idea that matter is non-homogenous, since some atoms or corpuscles are endowed with different powers and formative forces. The works of Etienne de Clave, Daniel Sennert, Anselmus de Boot (1550-1632), Nicholas Hill (1570-1610) and others, reinterpreted *semina rerum* as corpuscles and explained processes of natural change (generation, corruption, qualitative alteration, quantitative augmentation or diminution) at the level of the ultimate constituents of matter.

A different strand of early modern thought about the continuum involved a number of chymists and Aristotelian natural philosophers trying to bridge between alchemical and Aristotelian theories of matter. They held the view that the primary elements of each substance can be divided into minimal parts that would lose their status as elements if divided beyond a certain limit. The notion of a natural *minimum* of any given element or compound body is based on the Aristotelian doctrine that substantial forms are not preserved beyond a given limit “in the direction either of the greater or of the less.”⁷¹ As Antonio Clericuzio notes,⁷² although it had originally dealt with the particular problem of placing limits to the division of a substance (the

⁷⁰ Clericuzio 2000, 14.

⁷¹ This doctrine is a reinterpretation of Aristotle’s claim in book I, part 4 of the *Physics* that: “[...] if a part of a thing can be arbitrarily big or small, the thing itself must also be able to be arbitrarily big or small. [...] But since it is impossible for an animal or a plant to be arbitrarily big or small, clearly none of its parts can either (because by the same token the whole could too). Now, flesh and bone and so on are parts of animals, and fruits are parts of plants, Obviously, then, it is impossible for flesh or bone or anything else to be of an arbitrary size – either arbitrarily large or arbitrarily small.” (Waterfield 1996, 187 b13-b22, 18).

⁷² Clericuzio 2000, pp. 9-10.

division-to-dust problem) and was seen as distinct from atomism, by the Seventeenth-century, the *minima naturalia* doctrine developed into at least three distinct versions: 1. substances cannot exist below a certain minimal size; 2. substances are unstable below a certain limit of magnitude; 3. *minima* are physical, indivisible parts of bodies, preserving their substantial form.

The last of these alternatives, the transformation of *minima* into ultimate units of matter paved the way towards the establishment of corpuscular philosophy. In the second half of the Sixteenth-century, in his *Exotericarum Exercitationum Libri XV*, Julius Caesar Scaliger (1484-1558) introduced an innovative reinterpretation of the *minima* of both elements and compound bodies as actual physical particles endowed with indivisibility, size, and, motion.⁷³ Scaliger posited *minima* of different substances, as well as of earth, water, air, and fire different in size and used them to explain a variety of physical and chemical phenomena. Different states of bodily aggregation are explained through the arrangement of *minima*, while density and rarity are produced by their motion. Yet what made this doctrine highly significant in the context of Sixteenth or Seventeenth-century atomism was that, in comparison to *semina rerum* doctrines, the *minima naturalia* theorists never rejected the Aristotelian concept of “substantial form,” the distinction between the minimal parts of bodies relying on their different forms or essences.⁷⁴

A good example of an early Seventeenth-century corpuscularian alchemist working within both the tradition of *minima* and the *semina rerum* doctrine is Daniel Sennert. Sennert’s work reunites these strands of corpuscularianism by straightforwardly transforming Scaliger’s *minima* into atoms. By endowing his atoms with substantial forms and chemical properties, he supported

⁷³ Scaliger 1557, 35.

⁷⁴ As Daniel Garber pertinently notes, this view “fails to satisfy Boyle’s definition of the mechanical philosophy.” In “Physics and Foundations,” 2006, 47.

a version of atomism that was, in several respects, very different from classical atomism. In the first place, Sennert uses “atom” to mean a corpuscle resisting division by means of chemical laboratory techniques and therefore de-emphasizes the absolute physical or mathematical indivisibility of traditional Democritean atoms. Sennert’s second point of originality is abandoning the Democritean uniformity of all atoms differentiated only by shape, size, and spatial orientation: different sorts of atoms have their own essences. He therefore combines the atomist idea of basic substantial units with the hylomorphic notion of causally active forms: his atoms are form-bearing *minima*. We are far away from anything like a purely mechanical atomism based on size, shape and motion. Sennert’s atomism is qualitative, his corpuscles being differentiated either by their structural characteristics or through the essences residing in their substantial forms. Moreover, in contrast to ascribing the origin of forms to their eduction from matter, Sennert embraces a version of traducianism claiming substantial forms are self-multiplicable and they propagate through *semina rerum*. These seeds are composed of a spiritual and material part, and, as agents endowed with formative power, they constitute the vehicle for souls (themselves self-multiplicable) as well as substantial forms. The spiritual part of these seminal principles organizing matter is a spirit, or semi-material substance acting subordinately and instrumentally to these immaterial formative principles (form or soul) in plants and animals.

Sennert’s “Religion of Form”⁷⁵: The Divine Origin of Forms

Sennert’s name comes up in a rather lengthy list of *novatores* Leibniz sends to his former teacher at the University of Leipzig, Jakob Thomasius.⁷⁶ Writing to his former Leipzig professor in 1669, Leibniz adds:

⁷⁵ I borrow this expression from Newman 2006, 149.

[...] it seems to me that, Scaliger, Sennert, and Sperling (who publicly claims to be the later's disciple) align themselves with this opinion that God is the prime matter of things, since they claim that forms are educed, not from the passive power of matter, but from the active power of the efficient cause. Consequently, they believe God produces creatures from his own active power, instead of the objective power or, so to speak, passive power of nothingness. Thus, according to their position, God produces things from himself (*ex se*) and is their first matter.⁷⁷

What is the view of substantial forms and their origin that Leibniz describes here? I leave aside Leibniz's own critique of the atomist and *minima naturalia* conception on the origin of substantial forms for now, since I will tackle this issue in the following section of this chapter. Instead, I want to focus on a general overview of Sennert's conception of substantial forms and its sources.⁷⁸ In doing so, I disregard Newman's claim that issues such as the creation of forms *ex nihilo* are extraneous to early modern problems.⁷⁹ Throughout this study, I show, on the contrary, that disentangling the various early modern doctrines on the origin of substantial forms

⁷⁶ Leibniz's letter to Thomasius from 20/30 April 1669 mentions a large number of *novatores*: Patrizi, Telesio, Campanella, Bodin, Nizzoli, Fracastorio, Cardan, Galileo, Bacon, Gassendi, Hobbes, Descartes, Basso, Digby, Sennert, Sperling, Derodon, and Deussing.

⁷⁷ A II.1, 14-15.

⁷⁸ Similarities between Sennert's qualitative, "chymical" atomism and Leibniz's "substantial" or "formal atomism" have led recent scholars to claims of Leibniz's commitment to atomism (Arthur 2003, "The Enigma of Leibniz's Atomism"; or Blank 2011, "Sennert and Leibniz on Animate Atoms"). Indeed, I believe one could argue that, in a way, Sennert and Leibniz are the two faces of the same coin, what Newman calls a "theistic religion of form." But as I will argue in the following chapters, Leibniz is never an atomist *per se*, whether in his early or mature period. It suffices for now, to point how Leibniz's main objection against *minima naturalia* theorists is that, by rejecting the doctrine of the eduction of forms from the passive power of matter, they conceive of matter as an active power from which forms are derived and, as a consequence, by identifying prime matter to God, they relate the origin of forms to God's efficient action.

⁷⁹ Newman 2006, 106, n. 58.

can give a better grasp of the intellectual debates between early atomists and Late Scholastics on connected issues such as, for example, the status of prime matter.

In the introduction I pointed out how the first half of the Seventeenth-century witnessed a weakening of Aristotelian hylomorphism. One of the problems relating to the erosion of hylomorphism was that of the origin of substantial forms, namely, the assumption that they are created *ex nihilo*. In his *De generatione et corruptione* (I 4 319b6-21) Aristotle argued that the generation of new substances occurs when not just the qualities of a thing are changed, but the whole sensible substrate in which these qualities inhere is changed and, more so, beyond recognition. Thus, the Aristotelian theory of mixture explained the transmutation of elements or the formation of new compounds by assuming the substantial form of the final result appeared out of nothing, while the forms of the initial elements disappeared into nothing.⁸⁰ Could processes such as alteration or corruption result in the annihilation of the elements themselves and their forms? This Aristotelian conundrum was highly debated in both Medieval and Late Scholastic times. Sixteenth-century Averroism, for example, taught that during the process of mixture, forms of the elements only undergo a remission and thereby become “broken” (*refractae*). Another influential opinion had its source in Avicenna and concluded to the persistence of substantial forms in a compound, yet dominated by a supervening *forma mixti*. It seems that this last position inclined some atomists such as Sennert to argue for the immutability of forms. For Sennert there are two types of change at the atomic level: either the substantial form remains constant and only the material structure in which it inheres undergoes alteration; or

⁸⁰ This seemed to agree with the Aristotelian *reditus* principle in the 10th book of his *Categories*: what is deprived of substantial form cannot regain it. No natural thing can be restored with numerical identity in the event that it undergoes corruption or annihilation: once wine becomes vinegar it cannot be recaptured as wine.

the dominating form is removed and replaced by a subordinate one.⁸¹ In both cases, the conclusion is the same: whether replaced or not the form itself does not witness any change, it is entirely immutable. For Sennert argues, forms are not educed from matter on a continuous basis, but at the time of the first Creation, God made every species of things and endowed all beings with enduring self-multiplying forms.⁸² In beings that come to be by spontaneous generation, the forms are present in “seeds”, *semina rerum*. How does Sennert’s view conflict with those of his contemporaries, in particular, with those of the Late Scholastics? Several early modern atomists, including Sennert, compile lists of Scholastic versions of substantial forms doctrines. There seems to have been little consensus among early modern natural philosophers on the issue of the origin of substantial forms. Thus, a Seventeenth-century atomist like Etienne de Clave, notes how:

Scarcely three philosophers together can reach accord on this subject, even though they all agree that the form is what gives being to a thing [...]. Some hold that the form is educed from the potency of matter; others from the diverse mixture of the elements; others, from the temperament [...]; others that it is enclosed in a seminal spirit [...]; some hold that form is purely celestial and comes from the stars [...].⁸³

In what follows, I look at early Leibniz’s rejection of contemporary atomism from two perspectives: his Aristotelian stance against atomism in the *Confessio Naturae Contra Atheistas*

⁸¹ Newman 2006, 148.

⁸² Sennert, *De Chymicorum* 1619, 330-331; 341.

⁸³ *Paradoxes* 1635, 404-406. Contemporary atomists such as Sebastian Basso or Pierre Gassendi compile similar lists describing different versions of substantial form theory; see Basso, *Philosophiae naturalis adversus Aristotelem libri XII*, 148-159; Gassendi, *Syntagma philosophicum, Opera omnia*, vol. I, 469-470.

(1668) and his rejection of contemporary atomism on the issue of the origin of substantial forms in the correspondence with Jakob Thomasius (1668-1669).

Breaking up the Atom: Early Leibniz against Minima Naturalia Theories and Atomism

In a letter written to Nicolas Rémond, counselor to the Duc d'Orléans in Paris, in July 1714, Leibniz retrospects on his early philosophical development:

As for Gassendi, of whom you ask my opinion, I find that he has great and wide knowledge and is well versed in his reading of the ancients and in both secular and ecclesiastical history and all classes of learning. But his thoughts satisfy me less now than they did when I first began to drop Scholastic views in my own schoolboy days. Since the atomic theory satisfies the perceptual imagination, I gave myself to it, and it seemed to me that the void of Democritus or Epicurus, together with their incorruptible atoms, would remove all difficulties.⁸⁴

The late date of this letter, at the end of Leibniz's long life, has led to a generally cautious approach amongst scholars concerning both the accuracy of the autobiographical account and its possible rhetorical purposes. This might well be the case since Leibniz gives several similar accounts of his intellectual formation. In a 1689 dialogue entitled *Phoronomus or on Power and the Laws of Nature*, Leibniz summarizes his youthful views about the continuum and recalls of this as a period in which he had subscribed, not without enthusiasm, to the ideas of the "new philosophy." He again claims to have supported "atomism and the void" at an early stage in his thought. Recently, Leibniz commentators have commonly made these Leibnizian biographical accounts the grounds for researching and proving some more or less stronger measure of commitment to atomism, intermittent throughout the period from 1666 to 1676.

⁸⁴ Loemker, 657.

For now, leaving aside the issue of trustworthiness, such examination of Leibniz's thought based on a purely mnemonic clue has completely disregarded the literal indication of the account: atomism *and* the void are mentioned, and, moreover, as related doctrines sustained for a long extent of time. I think here we have to stress the importance of the coordinating conjunction, "and." While there is certainly room to argue for some sort of penchant towards an atomism of a kind or another in Leibniz's youthful work, it is nonetheless difficult, if not impossible – given that Leibniz was a committed plenist in the tradition of Aristotle – to find probatory texts supporting his repeated claim that at one point he had held both atoms *and* the void. It is my contention that early texts such as the *Hypothesis de Systemate Mundi* (1671) which, as far as I know, is the only text to include a discussion relating atomism and the void, are not indicative of a strong commitment towards the one or the other. It is true that in a letter written to Henry Oldenburg on the 15th of October 1671, Leibniz seems to exhibit similar views by stating that "[...] as I believe the world to be made of globules, bubbles, vortices, and spheres I hold for certain that vacuous spaces are included [in it]," but he immediately adds that he does not think "an observable vacuum can be obtained experimentally [...]." ⁸⁵ While the late 1671 *Hypothesis* does describe the world as "a space full of globes, touching each other only at points," ⁸⁶ and with voids in the gaps between them, ⁸⁷ atomism in this *brouillon* is explicitly based on hypotheses

⁸⁵ Hall&Hall 1971, VIII, 298.

⁸⁶ This image of globes touching each other only at points seems to be an indication that we are not necessarily dealing with atoms, but some sort of Hobbesian indivisibles. Even texts such as Leibniz's aforementioned letter to Oldenburg refers to some type of un-extended points or Hobbesian indivisibles and the void: see the earlier letter (18th September 1670), where Leibniz claims that "Truly wonderful is the nature of points, for although the point is not divisible into separable parts (parts placed outside parts), still it is divisible into parts not separated from one another, or into parts that were previously interpenetrating." (Hall&Hall 1970, 168).

⁸⁷ A VI.2, 294.

(such as the existence of a vacuum) which contradict, for example, those of the more extensive physical treatise *Hypothesis physica nova* (1670).

As I show throughout my study, it looks as if early Leibniz toys with different types of theories of matter or principles of individuation. In this particular case, the testing of hypotheses (*hypothetibus fingendis*), non-dogmatic in character, seems to lead to the idea that for young Leibniz, a particular doctrine such as Gassendian atomism (or even Hobbes' reductionist epistemology) is less of an actual instrument giving access to reality or the nature of physical phenomena and more of a hermeneutical tool allowing to understand contemporary historical thinking. The requirement of a nominalist type of hypothetical simplicity corresponds to the simplicity of nature: atomism is far-removed from it as well as from experiments, disconnected as it is from an authentic understanding of natural phenomena.⁸⁸

In order to understand Leibniz's early philosophical thought, we must understand its place in the Seventeenth-century debate over Aristotelian natural philosophy. All throughout his early years (Leipzig/Mainz 1668-1672), Leibniz is concerned with finding adequate metaphysical and physical explanations which would allow him to develop the "true notions" of substance, motion, and body. It also has to be stressed that during this period, the driving force behind Leibniz's work on metaphysics was theologically informed by the necessity of proving the existence of God and defending the doctrines and the mysteries of the Christian religion (Eucharist, incarnation, trinity). Thus, his aim was to build a metaphysics consistent with two sets of doctrines to which he was deeply committed: the mechanistic explanation of nature put forward by the "moderns" or *novatores* and the central tenets of the Christian religion.

⁸⁸ *Theoria motus concreti*, A VI.2, 248: "Credidi tamen semper, quicquid de atomis varie figuratis, de vorticibus, ramentis, ramis, hamis, de uncis, globulis tantoque alio apparatu dicatur, lusui ingenii propius, a nature simplicitate, et omnino ab experimentis remotius, aut jejunius esse, quam ut manifeste connecti cum Phaenomenis possit." I will discuss Leibniz's view of atomism as a mere intellectual game in the next chapter.

Accordingly, the purpose of this chapter is to analyze three different aspects of early Leibniz's natural philosophy, including his own judgments, views, and relationship with Seventeenth-century Aristotelian natural philosophy and corpuscular or atomistic theories of matter. Therefore, in the first part of this chapter, I analyze how early on, in his first contributions to modern natural philosophy, the *Confessio Naturae contra Atheistas* (1668) and the correspondence with Jakob Thomasius (1668-1669), Leibniz took a definite and formative stance against the atomist theories of contemporaries Julius-Caesar Scaliger, Daniel Sennert, and Johannes Sperlring.⁸⁹ By itself, my claim that the *Confessio Naturae* is an essentially anti-atomist text is not entirely new.⁹⁰ My approach is original in showing that Leibniz's rejection of atomism was essentially Aristotelian (*De Generatione et Corruptione*) and how it further shaped and rendered problematic his program of reconciling Aristotle's natural philosophy with early modern corpuscular theories of matter. But while his argument for rejecting atomism was indeed Aristotelian, his account of substantial forms in the 1668-1669 correspondence with Jakob Thomasius was less so. I thus re-configure the different accounts of substantial forms from Leibniz's early years and attempt to place them in a more adequate framework. Accordingly, in the second part, I contend that this initial stage in Leibniz's thought about natural philosophy led to, on the one hand, his abandonment of the project of conciliation between Aristotle and the

⁸⁹ Gianfranco Mormino 1999, "Atomismo e volontà divina nei primi scritti leibniziani (1663-1671)" instead claims the *Confessio* and the two letters to Thomasius show the start of a truly atomist phase in Leibniz's thought ("[...] the most complete expositions of corpuscularian atomism in young Leibniz."), as long as one sees Leibniz as defending a voluntarist conception of God's action in the world; only after this, once Leibniz will try to exclude the actions of God from physics and will abandon voluntarism, he will also abandon Gassendi's atoms (n.39, 264).

⁹⁰ Duchesneau 1994, *La dynamique de Leibniz*, chapter 1, "Le projet initial", 21-23; Fichant 2004, "L'invention métaphysique," 33. But also, Francesco Piro 1999, *Varietas identitatae compensata...*, 69-70, 78; and Konrad Moll, *Der Junge Leibniz*, vol. I, 17; all see the *Confessio Naturae* as an anti-atomist text.

novatores and, on the other hand, his abandonment of substantial forms in natural philosophy up to his middle years (1678).

Leibniz's Aristotelian stance against atomism in the *Confessio Naturae contra Atheistas* (1668)

As Leibniz writes to Thomasius in 1669, in the first months of 1668 he had written a short composition in which he attempted to prove the immortality of the soul and the existence of God. This writing published under the title *Confession of Nature against Atheists* represents a key document for understanding Leibniz's views about nature, body, form, matter, space, and motion during his formative years. Physics and metaphysics, the science of bodies and the science of minds respectively (*elementa de corpore, elementa de mente*⁹¹), are grounded upon the principle of sufficient reason. The principle occurs for the first time in the *Confessio*, albeit indirectly, through the constant use of the formula "rationem reddere."⁹² At this early stage in Leibniz's thought, the principle of sufficient reason simply holds that "nihil est sine ratione." The principle's meaning is made explicit through a demand aimed at contemporary *novatores*. Under the holistic presupposition that nature has a unique author, God, who orders and harmonizes its parts, adequate, rational causes (and not just material causes⁹³) have to be given for natural phenomena. These truly capable contemporaries have examined how to save or to explain natural, bodily phenomena without assuming God and incorporeal, substantial forms or introducing them into their arguments. On the other hand, Leibniz attempts to establish,

⁹¹ A VI.1, 494.

⁹² A VI.1, 489-493. For an extended analysis of Leibniz's early versions of a principle of sufficient reason, see Francesco Piro, 2002, 1-78.

⁹³ Letter to Thomasius from 19/29 December 1670, A II.1, 73.

considering the anatomy of bodies, whether sensory appearances can be explained (*rationem reddere*) without assuming a non-corporeal cause. A refutation is intended, of those “[...] contemporary philosophers who have revived Democritus and Epicurus and whom Robert Boyle aptly called corpuscular philosophers such as Galileo, Bacon, Gassendi, Descartes, Hobbes, and Digby.”⁹⁴

Leibniz starts by accepting as his premise that every single property of substance has to be deduced from that which structures corporeity, namely, its primary qualities: magnitude, figure, and motion. Yet, if it turns out that these primary qualities cannot be deduced from the “definition of body”, it would become evident that the “reason” for this has to be derived not from the body itself, but from something “extrinsic to it.”⁹⁵ The ensuing demonstration on the nature of bodies works with a definition of body originating in Cartesianism: the essence of body is to “exist in space” since body is everything we find in space and, conversely, we call what we find in some space a body. The definition raises a problem as to: “[...] why a body fills this much space and this particular space rather than another, why it should be three feet long rather than two, or why square rather than round.”⁹⁶ Differently formulated, even if it is true that spatial extension derives from a consideration of the essence of bodies, it is nonetheless impossible for definite corporeal figures to be generated or produced from a matter that is in itself indeterminate. If matter is indeterminate, one would have to admit to indirectly subjecting matter to some form of causality external to it. But Leibniz rejects both the hypothesis that bodies possess a determinate form (ex., square) from all eternity (since eternity cannot be the cause of anything) and the hypothesis of an efficient action exercised by an external impact or

⁹⁴ A VI.1, 489-490; Loemker 109-110.

⁹⁵ A VI.1, 490; Loemker, 110.

⁹⁶ A VI.1, 490; Loemker, 110-111.

motion (which would involve an infinite regress in the causal chain of motions). Consequently, no reason can be found for either magnitude or figure in the nature of bodies themselves.

Analogously, he sets out to prove how neither motion, nor other properties of bodies such as resistance, firmness or cohesion can be deduced from the definition of corporeity conceived as the filling up of space. Mobility arises from the nature of body, while motion itself does not.⁹⁷ Therefore, given the impossibility of deriving adequate reasons for the motion, magnitude, figure, and cohesion of bodies from the nature of body itself, some ancient as well as modern philosophers (Democritus, Leucippus, Epicurus, and Lucretius; Gassendi and Jean Chrysostôme Magnen) were led to postulate the existence of indivisible atoms. Through various combinations, these infinitely hard particles produce both the different figures of bodies and their sensible qualities. In the *Confessio*, Leibniz's response to corpuscularianism and atomism is fundamental for understanding his scientific formation as well as the way he conceptualizes natural and organic phenomena. The principle of sufficient reason expressed throughout the text by terms such as *ratio reddendae rationis* or *ratio reddenda plena*, cuts through the core of atomism.

Offering an adequate explanation of the cohesion of bodies was, from the beginning, one of the great stumbling-blocks for atomism and an issue Leibniz persistently dealt with in his early years (from 1668-1676 onwards). Atomist explanations have theorized all sorts of imaginary contraptions in order to account for what holds bodies together and makes them one. But Leibniz argues that, while the cohesiveness of macroscopic, observable bodies can be explained in terms of hooks, crooks, and eyes, like Gassendi does, this account leaves the cohesion of the atoms themselves unexplained. Must we, he then asks, suppose hooks on hooks onto infinity?⁹⁸ The atomists assume that the division of matter comes to an end with the division

⁹⁷ Loemker, 111.

into atoms, “but no reason for cohesion and individuality appears within these ultimate corpuscles.” Therefore, the explanation of the ancients was, he claims:

[...] so inept that their recent followers were ashamed of it, namely, that the parts of atoms cohere because no vacuum comes between them. From this it would follow that all bodies, once they touch each other, ought to cohere inseparably in the manner of atoms, since there can be no intervening vacuum when any two bodies touch.⁹⁹

But for Leibniz, nothing is more absurd or far removed from experience than the atomist hypothesis. Through itself, it neither explains why indivisible atoms exist, nor the reason why there is an initial motion, in other words, an indirect cause of all remaining motions in the universe. What is the source of this Leibnizian argument or objection against atomism?

The classical argument for the indivisibility of atoms goes back to Democritus and Leucippus. It relies on the perfect solidity or firmness of atoms and their lack of inner void. Thus, a body is susceptible to division only if it contains an internal vacuum.¹⁰⁰ In the *Confessio*,¹⁰¹ Leibniz makes the counterargument he would further develop during his mature years,¹⁰² that if the atomists assume mere contact without an intervening vacuum as a sufficient reason for cohesion, then atoms should cohere with one another upon contact. Consequently, all bodies once they touch each other should cohere inseparably in the same way as atoms, since there would be no intervening void between two touching bodies.

⁹⁸ Loemker, 112.

⁹⁹ Loemker, 112.

¹⁰⁰ Pyle 1995, *Atomism and its Critics*, 651.

¹⁰¹ Loemker, 112.

¹⁰² “Critical Thoughts on Descartes’ *Principles*”, Loemker, 406.

This, I claim, is a fundamental objection to atomism, one that Leibniz would take up, rework, and develop over the years, to the point that it would become the most articulate objection against atoms of his philosophical maturity.¹⁰³ More importantly for this section's purposes, it has its direct source in a pertinent objection Aristotle made in the 1st book of *De Generatione et Corruptione* against the Democritean argument for the indivisibility of atoms. If, as the Stagyrite claims, the mere absence of intermediate void is sufficient for cohesion, atoms should coalesce on collision. Since all atoms are made of the same fundamental matter, "why, when they come into contact, do they not coalesce into one, as drops of water run together when drop touches drop (for the two cases are perfectly parallel)?"¹⁰⁴ Leibniz immediately recognizes that the arguments Aristotle raised to oppose the reductionist theories of his atomist precursors have not lost their strength against Seventeenth-century atomism. On the assumption that mere contact would be sufficient for cohesion, he echoes, atoms should progressively coalesce like snowballs rolled through the snow. The outcome would be nothing more than the adamantine firmness of an absolutely solid and immutable mass of matter: a quasi-Parmenidean bulk of being.¹⁰⁵

Facing these intrinsic difficulties physical considerations such as those exposed by the atomistic theory of matter have to be overcome through a higher metaphysical consideration. As

¹⁰³ The strong Aristotelian stance against atomism Leibniz takes in the *Confessio naturae* will resurface in his mature writings, where the same argument will be reworked, refined starting with "A Demonstration Against Atoms taken from the Contact of Atoms" of 1690 (in GP VII, 284-288), the letters to Christiaan Huygens from 16/26 September 1692 and 10/20 March 1693 (A III.5 386-396; 514-526), and the *Animadversiones in partem generalem Principiorum Cartesianorum* of 1692: "Itaque capientur a se mutuo duae Atomi simplici contact velut visco quodam [...]. Ex his porro sequitur progressu naturae, continue debere crescere atomos, instar pilae nivis per nivem provolutae, ae tandem futurum esse, ut omnia in plusquam adamantinam duritiem coalescant et aeterna glacie obtorpescant, quando causa coalitionis datur, dissolutionis non datur." (GP IV, 387).

¹⁰⁴ Aristotle, *On generation and Corruption*, I, 8, 326a 32-33.

¹⁰⁵ Comparison belonging to his critical remarks on Descartes' *Principles*. See Loemker, 406.

demonstrated, bodies do not possess definite quantity, figure or motion through themselves without necessarily presupposing an incorporeal being. This being is all the more unique, given the harmony of all things among themselves (*harmoniam omnium inter se*¹⁰⁶). Leibniz marvels that neither an atomist such as Gassendi, nor any other insightful Seventeenth-century philosopher had noticed this excellent opportunity for proving the existence of God.

There are two points I wish to underscore here. First, the analysis of bodies is structured by a dual, methodological and ontological, use of the principle of sufficient reason: nature is organized according to intrinsic rational criteria and governed by rules of harmony as well as symmetry. On the one hand, Leibniz readily concedes natural laws can be discovered and explained autonomously through geometrical and mechanistic concepts. On the other hand, he emphasizes the need to distinguish between the physical and metaphysical levels that ground both natural phenomena and the physical laws that govern them. Hence, it is necessary to appeal to incorporeal principles, such as God, in explaining both natural phenomena in general and bodily phenomena in particular.

Secondly, the *Confession of nature against atheists* marks what I believe to be Leibniz's radical departure from anything close to corpuscularianism or atomism. As I have shown, at this earlier stage, Leibniz takes a definite stance against atomism, a position even more significant since its nature is clearly Aristotelian. The primitive counterargument against atomism is based on a fitting objection regarding atomic cohesion and individuality. Despite its apologetic character, the critical apparatus of the *Confessio* is not merely limited to underlining the indispensability of the concept of God in understanding natural phenomena. This initial objection will be constantly reworked in Leibniz's mature thought and its various instances will mark his definitive rejection of atoms. Thus, there is little doubt that the thesis claiming some form of

¹⁰⁶ A VI.1, 492.

proximity or commitment to atomism on Leibniz's part after '68-'69 becomes *tout court* highly problematic.¹⁰⁷

Magis Amicus Aristoteles? From Reconciliation to a Neo-Platonic Account of Substantial Forms

Earlier in the chapter it was pointed out that Leibniz's first philosophical enterprise was oriented by ample theological concerns involving both natural theology (proving the existence of God) and revealed theology (defending the doctrines and mysteries of Christian religion). Among Leibniz's early concerns was finding a valid philosophical explanation for the Christian mystery of the Eucharist and the process it involved, transubstantiation. Therefore, in 1668, as a part of his larger plan of the *Catholic Demonstrations*, Leibniz explains transubstantiation by accrediting individuation to substantial form. Form is viewed as an active principle directly enacting a divine idea. Christ's mind substitutes its special concourse for the general concourse of the divine mind. Thus the form of this concurrent mind transubstantiates accidents by replacing their substantial form and being numerically the same form as Christ's body. My analysis in the 1st chapter has shown how this account presented several intrinsic difficulties regarding the origin, generation, and temporality of substantial forms. The same year, within a few months (September/October 1668 – April 1669), Leibniz writes two letters to German Aristotelian Jakob Thomasius, the master under the aegis of whom he had pursued his first philosophical studies at Leipzig. Several interpreters have previously highlighted the importance of Leibniz's correspondence with Thomasius, whether as the first sketch of a "systematic program" to be found in his youthful

¹⁰⁷ As a consequence, I also find the claim, according to which there is a strong background presence of Gassendist ideas in Leibniz's early work, controversial. This type of handy influence-mongering finds its source in Konrad Moll's, *Der junge Leibniz: Der Übergang vom Atomismus zu eine mechanistischen Aristotelismus; die revidierte Anschluß an Pierre Gassendi*, 2nd vol., 21.

writings (Konrad Moll) or as a privileged hermeneutical key for understanding the “originary metaphysics” and methodological eclecticism transplanted in his mature works.¹⁰⁸

These letters are significant for several reasons. First, by setting out the plan of reconciling Aristotle and the moderns, they are immediately connected with the *Confession of Nature against Atheists*, thus allowing, in tandem, a thorough reconstruction of Leibniz’s initial philosophical thought. Secondly, it is worth noting that the German philosopher had chosen to publish the revised text of the 2nd, more extended letter (1669), as an Appendix to his own *Dissertatio preliminaris* to Marius Nizolius’ *De veris principiis et vera philosophandi* (republished in 1670). As a consequence of his Nominalist-minded philosophical program, in both his 1668 letter to Thomasius and the *Preface* to Nizolius, Leibniz rejects the substantial forms he had previously and unsuccessfully used to explain transubstantiation.

In continuity with my previous analysis of the *Confessio*, I follow a dual purpose: first, I outlay and examine Leibniz’s problematic program for reconciliation between Aristotle and the *novatores*. Consequently, in light of the dismissal of atomism in his first account of natural philosophy, the *Confessio*, I analyze a second rejection of corpuscularianism in his April 1669 letter to Thomasius: Leibniz’s critical confrontation with *minima naturalia* theorists (Scaliger, Sennert, Sperling) concerning the status of prime matter and the origin and generation of forms. Granted that, as it will appear, Leibniz’s attempt at proving the compatibility of Aristotle and the innovators is intrinsically problematic and his critique of *minima naturalia* theorists is not without inaccuracy, I at least hope to have proven that, in light of his philosophical theology and natural philosophy, interpretations claiming a youthful Leibnizian commitment to atomism are, if not unsustainable, at least highly problematic.

¹⁰⁸ Mercer 2003, 109-129.

In his 1668 letter to Thomasius, Leibniz expresses the hope that, given the new discoveries of mechanistic natural philosophy, the Seventeenth-century would soon be in possession of “a reformed philosophy (*philosophia reformatata*) for the use of humankind.”¹⁰⁹ After showing his support towards the new mechanistic philosophy, he then sets up the program of reconciling Aristotle and the *novatores*. In itself, this is not just a reference to the ideas of a “reformed philosophy” defended by his master Thomasius, himself a representative of a revival and reinterpretation of Aristotelianism on the side of Reformation. Leibniz goes even further by immediately emphasizing the connections between the reformed philosophy of the moderns and Aristotelian philosophy. Hence, in this epistolary exchange, he intends to prove the bold thesis that the reconciliation between Aristotle and the *novatores* is not only possible, but also provable. Yet, bold as it may be, this idea was neither innovative, nor particularly original at the time. Later on, in the *Preface* to Nizolius’ treatise, Leibniz recollects how his attempt at reconciling Aristotle with early modern natural philosophy had already been undertaken by both Sixteenth-century Paduan Aristotelians¹¹⁰ and contemporary Aristotelians such as Thomas White, Kenelm Digby, Johann de Raey, or Jakob Thomasius himself. Following these predecessors, any attempt at showing the “wonderful” consistency of Aristotle with the *novatores* has to start by distinguishing between the former’s authentic philosophy and the layers of corrupted interpretations through which the Scholastics have adulterated its meaning.

Without further ado, in this letter, Leibniz once again adopts the rule of mechanism expressed in the formula that corporeal properties are to be explained through magnitude, figure,

¹⁰⁹ A II.1, 10.

¹¹⁰ Among the most important names he cites: Agostino Nifo, Marco Antonio Zimara, Cesare Cremonini, and Jacopo Zabarella, see A VI.2, 425.

and motion: the primary attributes of bodies.¹¹¹ Now, Leibniz claims, Aristotelian prime matter can easily be equated with an inert mass which lacks movement, and thus – in a universe excluding void – lacks shape or figure. In accordance with the demonstration of the *Confessio*, he goes on to argue that movement is imprinted onto bodies from the outside, and that figures produced by a group of motions and the disposition of parts are the intimate, first forms of bodies. These forms are derived from the (passive) power of matter upon which an external incorporeal principle had imprinted motion. What Leibniz expounds here is a straightforward mechanistic interpretation of form, where substantial forms of bodies are seen as objects of a geometrical discourse, expressing only potentialities of the motion of the body itself. Saying that forms are deduced from the passive power of matter is synonymous with saying that it is from this movement of matter and position of its parts, that the figure of the whole is derived. Through the union of two triangles, a ▲ and b ▼, and their moving, material power in mutual contact, we can derive the form of square c ■. Despite lacking an elaborate physical theory, Leibniz uses the rule of mechanism to constitute the grounds for a renovation of the proof of the existence of God as Prime Mover. Each body has its magnitude, figure, and movement from an incorporeal being, God. In this context, mechanism for Leibniz amounts to a denial of all physical causality immanent to the corporeal nature of bodies: corporeal nature receives all its mechanistic features from God as the governor of the material world. Substantial form is thus ruled out from the constituents of bodies inasmuch as it would amount to including something like an internal, autonomous, and spontaneous causality regarding their movement. This is what Leibniz considers to be the meaning of substantial forms as the Scholastics had understood them. The direct consequence is that incorporeal, mind-like substantial forms that would enable bodies to move

¹¹¹ Previously in the *Confessio*, he had worked with an essentially Cartesian definition of body and granted the rule of mechanism as a premise, only to gradually disprove it.

through themselves without an incorporeal mover outside of them, would shut off the proof of the existence of God as Prime Mover. Thus, they have to be rejected.

The idea that the Scholastics have been misinterpreting Aristotle's *Physics* all along was generally accepted by Seventeenth-century German Aristotelianism and largely diffused in Leibniz's contemporary academic environment.¹¹² As a result of this cultural background, in his long letter to Thomasius from 1669, Leibniz delineates a plan to show the compatibility of Aristotelian theses with those of the *novatores*. Redefining the terms of his position in relation to the innovators' theses, he daringly asserts that in the chapters of Aristotle's *Physics* he has found more approvable opinions than in Descartes' meditations. To this he adds that all eight of Aristotle's books of the *Physics* can be accepted, while at the same time preserving reformed philosophy.¹¹³ The arguments in Aristotle's *Physics* regarding matter, form, privation, nature, place, infinity, time, and motion are proven certain, while the ones concerning the void and motion in the void have to be rejected or at least considered doubtful.¹¹⁴ Here, Leibniz considers the debate on the problem of the void as unnecessary to natural philosophy.

After setting up this theoretical platform, Leibniz believes that, once it is demonstrated that the fundamental concepts of Aristotelian natural philosophy (form, matter, change) can easily be translated in the modern terms of figure, size, and motion, the possibility of reconciliation between Aristotle and the *novatores* is immediately proven. As a consequence, he sets up an attempt to redefine the Aristotelian principles of the physical world in modern concepts. The first such concept is prime matter, defined as mass itself, the sum of extension and impenetrability

¹¹² Petersen, *Geschichte der Aristotelischen Philosophie*, 151-152.

¹¹³ A II.1, 15.

¹¹⁴ A II.1, 15.

(*antitypia*).¹¹⁵ Matter is continuous and undivided into parts – thus no actual boundaries can be identified between its “internal parts”.¹¹⁶ In order to contrast a possible objection against the Thomistic conception of prime matter as pure potency being a *non ens*, Leibniz makes matter an entity prior to all form, possessing its own existence, and identical with Averroes’ indeterminate or indefinite quantity. As a result, the (passive) power of this indeterminate matter *is* its divisibility. What breaks up the uninformed, pure homogeneity of prime matter is form: nothing but “figure” or *terminus corporis*, i.e., that which delimits and characterizes the specific structure of an individual body with respect to others.¹¹⁷ That figure could be identified with Aristotelian form was certainly a possibility left open by Aristotle himself, when in the *Physics* he had talked about the coinciding limits of the container and the contained (*περιεχόμενον*) and of those whom identify place with form.¹¹⁸ While entirely passive and not an essential property of natural things, figure sometimes “recurs in physical arguments as a kind of stand-in or likeness of form, especially substantial form.”¹¹⁹ In his commentary on Aristotle’s *Physics*, a late Scholastic like Franciscus Toletus (1532-1596) underlines the analogy and marks it as an error:

[...] the figures of things are strongly analogous to substantial forms. For as proper substantial forms are consequent upon singular things and species, so too are their exterior

¹¹⁵ A II.1, 16. It is worth noting that in comparison to his definition of “body” in the *Confessio naturae* Leibniz finds it necessary to specify how matter cannot consist only in extension (a result of surrounding space): it is a configuration of something thicker and impenetrable, that is, capable of withstanding and transmitting collisions.

¹¹⁶ A II.1, 16.

¹¹⁷ This is the actual definition of substantial forms Leibniz gives in A II.1, 15. It seems to imply that substantial form is not the specific difference between two equally (and ontologically) robust substances, but the substantial difference between two individual bodies. It opens the way to the idea that individual bodies differ substantially only through their figure, as specified on 16-17.

¹¹⁸ Aristotle, *Physics*, IV, 4, 211 b 12-14.

¹¹⁹ Des Chene, “Matter, Quantity, Figure”, 109.

figures; so that indeed many have mistakenly judged that substantial form is nothing other than this exterior form.¹²⁰

We can see that in 1669, Leibniz considers it unnecessary to unjustifiably multiply entities as the Scholastics have done and thereby adopts this “error”: a non-Scholastic and non-Aristotelian account of substantial forms. Forms are not “incorporeal entities” glued onto the extended body of each substance, but rather figures: actual dispositions of matter.¹²¹ In my view, his definition of substantial form as figure or *terminus corporis* is a clear attempt to geometrize Aristotelian forms by appealing to the Euclidean definition of figure, i.e., that which is contained (περιεχόμενον) by some boundary or boundaries.¹²² Again, similar to 1668, no internal, autonomous, and spontaneous causality is attributed to bodies *via* forms regarding their movement. Forms are a principle of mobility residing in the nature of bodies, not a principle of motion through themselves.¹²³ A principle of movement is not to be sought after in the substantial forms *per se*, like Scholasticism had erroneously claimed. Instead, motion necessitates the intervention of an external efficient causality through which it generates a kind of mutual flow of the parts of a body in different directions, thus creating determinate figures. This movement is necessary for the generation of forms, since division originates from motion and the boundaries of different parts derive from division. The figures or forms are deduced from these boundaries. As a result, forms

¹²⁰ *In Phys.* 7c3q3, Opera 4.198va, quoted in Des Chene, 109.

¹²¹ A II.1, 17.

¹²² *Elements*, Book I, def. 14. This also dismisses the idea of an atomist Leibniz, whose definition of figure *qua* geometric form in 1669, would have been influenced by Gassendi’s *Syntagma philosophicum*, in *Opera omnia*, vol. I, 232, where geometrical figure is a property of atoms. In addition, parts of matter do not stick out leaving interstitial *vacua*, because through their fundamental contiguity, form-figures are subject to movement, A II.1, 17.

¹²³ This brings to mind the *Confessio Naturae*, where mobility arises from the nature of body, while motion itself does not, see Loemker, 111.

derive from the power of matter not by generating something new, but by chiseling away the default, the old (like a column modeled from a block of marble). Dividing existing matter they form new boundaries of bodily parts.¹²⁴ The primary origin of movement is a first form *realiter* abstracted from matter and causally efficient, a *Mens*. To return Aristotle's Prime Mover,¹²⁵ the primary and efficient cause of motion is the free and spontaneous activity of mind as the *ens cogitans* radically heterogeneous with respect to corporeity.¹²⁶

In conclusion, by being the reason for both the diversification of matter and the origin of substantial forms, movement becomes the common denominator that allows for an understanding of natural multiplicity. While inspired by Aristotle,¹²⁷ the analogy between sculpting and the natural process generating forms is, in last analysis, not only radically mechanistic, but also Neo-Platonic. Writing to Thomasius in 1668, Leibniz controversially claims that after metaphysics, geometry was among the *perfectissima scientiarum* for Aristotle¹²⁸: a flagrant misinterpretation in his master's opinion.¹²⁹ Rather than answering this hammering objection, in another letter from 1669, Leibniz once more reiterates that geometry deals with substantial forms, rejects their traditional interpretation, and surreptitiously construes them on a dualistic, Cartesian basis. Furthermore, this construal is, withal, resolutely Neo-Platonic. Since both are abstracted from matter, *Mens*, the primary and causally efficient form responsible for movement, has the same

¹²⁴ A II.1, 17.

¹²⁵ In 26 September/6 October 1668, while rejecting substantial forms on the basis of the renovation of a proof of the existence of God as Prime mover, Leibniz thinks that: "[...] necesse est causa motus esse extra corpus. [...] extra corpus nihil sit cogitabile, praeter ens cogitans, seu mentem, erit mens causa motus. Mens autem universi reatrix est Deus.", see A II.1, 11.

¹²⁶ A II.1, 20.

¹²⁷ Aristotle, *Metaphysics* 1048 a 32-33.

¹²⁸ A II.1, 11.

¹²⁹ A II.1, 12.

separate status with the pure (and qualified as substantial) form studied by geometry. It generates forms by introducing organized motions into a matter that in itself is inert and indeterminate. The arithmetical and geometrical nature of forms (as *figurae*) is a Neo-Platonic cosmological interpretation of all forms that organize matter.¹³⁰ Yet, while it was rejected by Late Scholastics such as Toletus, Aristotle's open possibility was exploited by more than just ancient Neo-Platonists. Along with a similar role attributed to God as Prime Mover, we find the same interpretation of Aristotelian substantial forms *qua* geometrical, Euclidean figures in Erhard Weigel, Leibniz's other influential teacher at Jena.¹³¹ In his *Philosophia mathematica*, Weigel emphasizes one of his main teachings and states that: "[...] only God will be nature acting as nature [...] moving all without being moved himself."¹³² This is very similar to Leibniz's fundamental argument from the *Confessio Naturae* and the 26 September/6 October 1668 letter to Thomasius that the cause of motion for bodies is not an internal incorporeal being, but a mind that governs the whole world, i.e., God.¹³³

Leibniz against the *Minima Naturalia* Theory: on the Origin of Forms

The highly idiosyncratic non-Aristotelian¹³⁴ and non-Scholastic account of forms fleshed out in the previous section is Leibniz's response to the *vexata controversia* of the origin and

¹³⁰ Napolitano Valditara, 1988, 577-589.

¹³¹ The source for this Leibnizian interpretation of forms seems to have been Weigel's *Aristotelica ex Euclide restituta*, 1658, book III, ch. 2-3, especially 183-184.

¹³² Weigel 2006, §6, 81.

¹³³ A VI.1, 492, Loemker, 112. I want to add that despite random references to atoms or atomism scattered throughout these early letters, for Leibniz the fundamental physical explanatory principle is not, like in atomism, a multitude of discontinuous indivisible particles moving in the void, but rather a continuum of divisible prime matter, subjected to an external movement impressed by God. His position requires, even more so than the atomist one, the intervention of God in the beginning of nature.

generation of substantial forms. He believes a contemporary such as Hermann Conring could not solve this controversy, other than through postulating the generation of forms *ex nihilo*.¹³⁵ Armed with this account of substantial form, Leibniz sets out to defend the Scholastic and supposedly Aristotelian doctrine of the *eduction* of forms against a triad of *novatores* and *minima naturalia* theorists. The most significant of these *novatores* is Wittenberg professor of medicine and atomist Daniel Sennert (1572-1637).

As noted earlier, Seventeenth-century revisionist interpretations of Aristotle's natural philosophy flourished in German universities. Directed towards Aristotelianism, this revisionist hermeneutical wave was connected to the enormous success of two distinct doctrines that directly contributed to the emergence of early modern corpuscular theories of matter: the *minima naturalia* theory and the *semina rerum* doctrine. One important aspect of the first of these doctrines was that, although usually seen as distinct from atomism, the *minima naturalia* theories of matter never rejected the Aristotelian concept of substantial form. A 2nd half of the Sixteenth-century supporter of the natural *minima* doctrine, Julius Caesar Scaliger reinterpreted *minima* as particles, thus paving the way to corpuscular philosophy and the legacy of Daniel Sennert's

¹³⁴ Leibniz assimilates forms with the external, spatial configuration of bodies, thus explicitly contradicting the Aristotelian view which sees this configuration only as a determination of quantity (*Categories*, 6, 5 a 5). Also, in his 2nd October 1668 answer to Leibniz's previous letter, Thomasius objects to the inaccuracy of his former student's rendition of Aristotle: by equating figure with form, Leibniz is positing as substantial form congruous with that which Aristotle treated as accidents of substance, thus conflating between accidental form and substantial form. This would also lead to a second absurdity in Thomasius' opinion. If the substantial form of humans is their corporeal figure and not the informing rational soul, a human being will not be a unitary substance, but a dual union of strictly autonomous substances, see A, II.1, 12-13. As I will show later, Leibniz classifies substantial forms dualistically, according to *mens* and *extensio*. Only the latter substantial forms are properly speaking form-figures and thus divisible and material.

¹³⁵ A fearless anti-Cartesian and tireless correspondent of both Sennert and Leibniz, Conring had published a dissertation entitled *De Origine Formarum* (Leyden, 1629) in which he rejected both the Avicennian Scholastic account of a *dator formarum* and its modern relative, the celestial account of forms (in terms of a 5th substance).

qualitative atomism (*minima* as atoms).¹³⁶ While supporting atomism against Aristotle, Sennert's disciple, Johannes Sperling (1603-1658), also pointed out the Scholastic misinterpretations of Aristotle's *Physics*. His *Institutiones physicae* were reprinted six times between 1642 and 1672 and were adopted as one of the basic textbooks in the majority of German universities. These are three natural philosophers, atomists, or *novatores*, whom Leibniz sets out to attack on account of their view of substantial forms.

In the letter to Thomasius from April 1669, Leibniz follows his teacher's footsteps in giving a rather lengthy list of the *novatores*.¹³⁷ From this extended general list, Leibniz selects, retracing Thomasius' historical-comparative approach, *minima naturalia* theorist Daniel Sennert¹³⁸ and his disciple Johannes Sperling, to whom he adds Julius Caesar Scaliger. Through this name association, Leibniz is able to accurately identify the lineage of a very particular doctrine: Scaliger as a source for Sennert and Sperling's *minima naturalia* theories. Thus, in his response to Thomasius, he discusses this group's view on the particular issue of the origin of substantial forms. Together with his letter from the 2nd of October 1668 Thomasius sent Leibniz a short disputation he had publicly defended on the 20th of June 1668. In the booklet, he was taking a stand against the assimilation of God with prime matter.¹³⁹ In his long 1669 letter, Leibniz adds his own personal comments to the disputation:

¹³⁶ For a thorough historical analysis of these theories, see Antonio Clericuzio, *Elements, principles, and corpuscles. A Study of Atomism and Chemistry in the Seventeenth Century*, Kluwer, Dordrecht, 2000, on which my previous remarks are based.

¹³⁷ A II.1, 14: "*multa nomina.*" Patrizi, Telesio, Campanella, Bodin, Nizzoli, Fracastorio, Cardan, Galileo, Bacon, Gassendi, Hobbes, Descartes, Basso, Digby, Sennert, Sperling, Derodon, and Deussing are mentioned.

¹³⁸ I remark in passing that in the controversy with Groningen professor of medicine, Johannes Freytag (1581-1641), Sennert claims he is not a *novatore* or an anti-Aristotelian like Paracelsus and adds that he merely wishes to provide corrections to Aristotle's view of substantial forms, see *Hypomnemata physica* (Wittenberg, 1636), Book I, 136.

Moreover, it seems to me that, Scaliger, Sennert, and Sperling (who publicly claims to be the later's disciple) align themselves with this opinion that God is the prime matter of things, since they claim that forms are educed, not from the passive power of matter, but from the active power of the efficient cause. Consequently, they believe God produces creatures from his own active power, instead of the objective power or, so to speak, passive power of nothingness. Thus, according to their position, God produces things from him self (*ex se*) and is their first matter.¹⁴⁰

In this comment Leibniz reiterates a reference to the Scholastic *dictum* that forms derive from the passive power of matter (*forma educitur a materia*), a position he had previously adopted in 1668.¹⁴¹ Thomasius responds by defending the traditional meaning of this *dictum*. He attributes its origin to Aristotle, who, contrary to Plato situating substantial forms in God, believed that forms are immersed in matter: therefore the expression that forms are derived from the passive power of matter. Despite its supposed origin, the expression is not found in Aristotle's work, the controversial proposition being attributed to Aristotle by the Scholastics. The Majority of medieval philosophers held this theory, Thomas Aquinas in particular, but also Sixteenth-century textbook authors, such as Franciscus Toletus (1535-1610), Benito Pereira (1535-1610) or young Leibniz's acquaintance, Francisco Suárez (1548-1617).¹⁴² Aquinas, for instance, classifies two different types of substantial forms. On the one hand, the rational souls: the only subsisting incorporeal forms. On the other, the inhering, perishable material forms that are

¹³⁹ Jakob Thomasius, *Theses philosophicae ... de quastione: and Deus sit materia prima*, J. F. Heckel, Leipzig 1668.

¹⁴⁰ A II.1, 14-15.

¹⁴¹ A II.1, 10. "Haec formam educitur a materiam."

¹⁴² Suárez gives an extensive treatment of what it means for forms to be educed from the power of matter: *On the Formal Cause of Substance*, 2000, 54-57.

educated from matter. He thus holds the view that all forms other than the human rational souls, the material substantial forms, are not created but educed from pre-existing matter and destroyed when the body disintegrates. Thus, a natural substantial change consists in a new material form emerging from the non-being or pure *potentia* of prime matter: what Leibniz here calls the passive power of matter.¹⁴³

In the preface to the reader of his 13th *Books on Natural Philosophy*, Sennert lays down some of the doctrines concerning the origin of substantial forms:

There are the greatest disagreements among the philosophers concerning the true origin of the form [...]. Aristotle and his commentators say that neither matter nor form is generated but a composite [...]. If you ask a Peripatetic [...] where the form comes from, he will say it's educed from the potency of matter [...] Others hold, with Plato, that the Ideas are the effective cause of forms, and from him later writers introduced the world soul. Avicenna thought the cause was the tenth Intelligence, in his language *Cholcodea* [...]. Fernel, and others with him, stated the heavens to be the effective cause of forms [...]. Some Peripatetics say that matter does not actually contain forms in itself, but that there is in matter a certain disposition towards form which. When completed, becomes in actuality what it already was potentially.¹⁴⁴

Throughout his treatise Sennert opposes the first among these doctrines: the education of forms from the power of matter. Against the education theory of substantial forms, he affirms that the generation of natural things depends on the multiplication and propagation of souls. The education

¹⁴³ In contrast, when discussing the education of forms from matter, an atomist such as Emmanuel Maignan (1601-1676) considers that prime matter as pure potentiality is a “mere figment” in natural philosophy, the matter of generation consisting in already formed elements, see *Cursus Philosophicus*, 1st ed., Toulouse 1652, vol. I, 142.

¹⁴⁴ *Epitome Scientiae Naturalis, Opera omnia*, vol. I, 10-11. Translated in Emerton 1984, 61.

of forms from the passive power of matter, Sennert adds, is an opinion originating in ignorance regarding the creation of the world. He finds the ascribed source of this doctrine, whether Aristotelian or Averroist, questionable. However, its remote source might be found in the treatise on *Meteors* (Book I, ch. 4), in which Aristotle makes a distinction between actuality and potentiality in this world and actuality is ascribed a celestial origin. This distinction led Scholastics to postulate an external agent responsible for bringing some disposition towards form into matter. But in Sennert's opinion, the doctrine of eduction is based on the commentators of Aristotle misunderstanding the analogy between the artificial and natural generation of things. He argues that in the classical example of a statue or column sculpted from marble or wood there is nothing like a form induced into matter, but only an accident, quality or shape. Consequently, there is no power of matter involved, if not an obediential one. Sennert claims that when it comes to the natural process of the generation of forms, the example used by Aristotle in *Metaphysics* 1048 a 32-33, muddled the issue of artificial and natural generation.¹⁴⁵ There is a first difference at stake here between Sennert and Leibniz regarding the natural process generating forms. For Leibniz sees the Aristotelian analogy with sculpture as paradigmatic and perfectly parallel with the mechanist, natural process of the genesis of forms.

Sennert's account of forms and their generation admits a plurality of hierarchical forms, both supervening substantial forms and subordinate ones. In living things, souls are the specific supervening form; in inanimate things, Sennert adopts Scaliger's view "[...] that every form of every perfectly mixed body, although it is not a soul, it is a fifth essence or substance, far

¹⁴⁵ Book Θ: "[...] we say that potentially, for instance, a statue of Hermes is in the block of wood and the half-line is in the whole, because it might be separated out [...]."

different from the four elements.”¹⁴⁶ Further on in *Hypomnemata physica* (1636) he fleshes out several properties of forms. First of all, forms have no quantity and therefore cannot be divided; secondly, they are extended according to the extension of matter, since form fills its entire matter. Lastly, although forms are indivisible in themselves, because they are coextensive with the whole body possessing quantity and therefore being dividable, they are capable of number and multiplication into many individuals. While grounding his rejection of the doctrine of the education of forms, this power of self-multiplication is not one and the same for plants, animals, and humans. The view that substantial forms are self-multipliable (as opposed to education) presupposes that forms propagate through *semina rerum*, seeds composed of a spiritual and material part, as agents endowed with formative power. Seeds are the vehicle for souls (themselves self-multipliable) and substantial forms. The spiritual part of these seminal principles organizing matter is a spirit or semi-material substance, acting subordinately and instrumentally to these immaterial formative principles (form or soul) in plants and animals. These seeds are composed of a spiritual and material part, and, as agents endowed with formative power, they constitute the vehicle for souls (themselves self-multipliable) as well as substantial forms. The spiritual part of these seminal principles organizing matter is a spirit, or semi-material substance acting subordinately and instrumentally to these immaterial formative principles (form or soul) in plants and animals. What about the prime matter these forms or seeds organize? Sennert maintains that, although prime matter has a proper essence and being of its own, since it is characterized by indeterminate extension, matter has no specific length, breadth or depth unless determined by a substantial form. Therefore, matter does not have an actual

¹⁴⁶ Sennert 1650, *Hypomnemata physica, Opera Omnia*, vol. I, 166. “[...] omnem formam, cuiuscunque perfecte mixti, etsi non est anima, ut in adamante, naturam esse quintam, longe aliam a quatuor elementis.”

existence apart from substantial form.¹⁴⁷ In 1669, Leibniz also admits prime matter is characterized by indeterminate extension, but, contrary to Sennert, he regards matter as more substantial than corporeity itself. Prime matter is an entity anterior to any form, possessing its own actual existence. Defined by occupying some space even without movement or discontinuity, its essence or *forma corporeitatis* consists in impenetrability (*antitypia*).¹⁴⁸ His main objection against *minima naturalia* theorists is that by rejecting the doctrine of the eduction of forms from the passive power of matter, they conceive of matter as an active power from which forms are derived. The consequence of this last assumption would be that by identifying prime matter to God, *minima naturalia* theories relate the origin of forms to divine efficient action. It becomes clear from this objection that, for Leibniz in 1669, the adoption of anything like a *semina rerum* or *minima naturalia* doctrine in order to account for the generation of forms, would imply that somehow material, physical mass would act *qua* mass. This is an implication Leibniz is unwilling to admit because it would violate the principle according to which matter is purely passive. Thus, the contrasting position he lets us understand indirectly is based on a distinction between creation *ex nihilo* (from the objective power of nothingness) and the generation of forms (from the passive power of matter). But we also have to note that the second point of his critique against Sennert is very problematic. The claim that Sennert ends up relating the origin of forms to God's efficient action seems to disregard a distinction present in the Wittenberg atomist's work, between the action of God in the beginning of creation and the origin of specific forms¹⁴⁹, in the sense that Leibniz seems to misunderstand God's role in the

¹⁴⁷ Sennert 1632, *Epitome Scientiae Naturalis*, Oxford, 35.

¹⁴⁸ A II.1, 16.

generation of individual forms.¹⁵⁰ Grounding his objection on the difference between the passive power of matter of the Scholastics and the supposed active power of God invoked by the *minima naturalia* doctrine, Leibniz claims that Sennert, Sperling, and Scaliger were led to posit God as the prime matter of things: an extremely controversial claim.

It is therefore, unclear whether as early as 1669 Leibniz had an actual profound knowledge of Sennert's writings, and consequently, whether at this stage he could have supported an atomist position of Sennertian influence.

Concluding Remarks

In what follows I will summarize Leibniz's positions with respect to the problem of individuation and atomism between 1668 and 1671.

Leibniz's pre-Parisian writings were informed by several philosophical and theological concerns. Ursula Goldenbaum believes that Leibniz's 1668 attempt to give an adequate philosophical explanation of the Christian mystery of the Eucharist was central to these preoccupations and therefore "[...] we have to see all his writings in light of this concern."¹⁵¹ A closely dated text such as the *Confessio naturae contra atheistas*, is no less significant. First, as I have demonstrated throughout this chapter, there Leibniz takes a definite stance against atomism. Secondly, it is an important attempt on Leibniz's behalf to reconcile the new mechanistic

¹⁴⁹ Sennert 1636, *Hypomnemata...*, Frankfurt, Book I, "De Rerum naturalium Principiis," chapter III, 16. "Deus nimirum in prima creatione rebus suas formas dedit, per quas generationis ordo continuatur et absolvitur."

¹⁵⁰ Sennert 1633, *De Chymicorum consensu...*, Paris, chapter IX, "De Origine formarum et causa formatrice corporis animati," 95. Here Sennert distinguishes between the first forms made by God at creation and the multiplicative forms that have since propagated themselves through "traduction." By claiming Sennert accredits the origin of forms to God's efficient action, Leibniz seems to completely disregard the last part.

¹⁵¹ Goldenbaum, *Transubstantiation, Physics and Philosophy*, 96.

philosophy with Christian orthodoxy. The conception of God and his role in the *Confessio naturae* permeates all throughout Leibniz's other writings from this period. Leibniz demonstrates that mechanical philosophy cannot satisfactorily explain its central concepts (shape, size, motion) and therefore it has to appeal to an external, incorporeal moving and individuating principle, "a mind ruling the whole world, that is, God."¹⁵² Indeed, when we first get a glimpse of Leibniz's view of substantial forms, in a text attempting to demonstrate the possibility of transubstantiation (*De transubstantiatione*, 1668), he gives a Neo-Platonic account of forms and defines them as active principles, enactments of divine ideas. Consequently, this external principal of individuation was held only for human beings and God, because any other corporeal substances can only be individuated through the general concourse of God and his mind. But the Eucharistic species, bread and wine, are not each and every substance: this interpretation of substantial forms led to difficulties concerning the individuation of corporeal substances besides Christ's body and the Christic corporeal substance in the Eucharist. When formulating the first rudiments of a natural philosophy, Leibniz had to extend substantial forms from theology to physics. Therefore, to address these issues, in the letter to Thomasius from 26th September/6th October 1668, Leibniz now defines substantial forms of corporeal substances as the disposition of parts, educed through motion from the passive power of matter, and states that: "It is not absurd to call substantial form the intimate figure of the parts of a body."¹⁵³ Less than a year later, writing to the same correspondent, Leibniz develops an account of substantial forms conceived as geometrical figures. No longer merely ideas in God's mind, substantial forms are now important for the body itself and central to an understanding of the physical world. "Form-figures" were obviously meant to give a better account of the individuation of corporeal

¹⁵² A VI.1, 492; Loemker, 112.

¹⁵³ A II.1, 11.

substances in the realm of natural philosophy, away from revealed theology. Yet, in his attempt to reconcile Aristotle and the *novatores*, Leibniz is both non-Aristotelian and an anti-atomist. First, he is a non-Aristotelian, because he rejects the traditional Scholastic interpretation of forms conceived as omnipresent, immaterial entities, principles of activity internal to corporeal substances and thus responsible for their autonomous motion. Secondly, he is an anti-atomist, as a result of attacking the account of forms of the *minima naturalia* and *semina rerum* corpuscular theories of matter. In his opinion, Sennert's view of substantial form encasing atoms or *minima* would lead to a divinization of nature.¹⁵⁴ Thus, both the Scholastic and the contemporary atomist view of forms are rejected for unnecessary multiplying incorporeal entities.¹⁵⁵ However, while criticizing the Scholastic interpretation of substantial forms as self-moving principles inherent to bodies, Leibniz is much more charitable towards Scholastic accounts of the origin and generation of forms. Leibniz explains the eductive origin of substantial forms by introducing motion into matter through a primary form, that's abstracted from it (leading back to the revival of the proof of the existence of God as Prime Mover). Thus, roughly speaking, there are two types of substantial forms, according to a dualist, almost Cartesian reclassification:

Who could imagine an entity which does not participate neither to extension, nor to mind? What use to posit incorporeal souls of beast and plants, and substantial forms of elements and metals which would not possess extension?¹⁵⁶

We can now make more sense of Leibniz's account of substantial forms in 1668-1669. On the one hand, the ontological fabric of the world includes the indivisible, spiritual principles of

¹⁵⁴ The objection also regards Scaliger, A II.1, 22: “[...] ita reditur ad tot deunculos, quot formas substantiales.”

¹⁵⁵ This rejection leads back to Leibniz's commitment to a Nominalist, particularist ontology, underlined in the 1st chapter, 18.

¹⁵⁶ A II.1, 22.

activity, the substantial forms of human beings, and the primary immaterial form, which is endowed with efficient causality and is responsible for motion. This first form is identified with *mens seu ens cogitans* and, in last analysis, with God as the governor of the natural world, the efficient cause of movement in the universe. A second ontological layer is made up by the extended and thus divisible, material form-figures of non-rational beings (animals and plants) and inanimate bodies (elements, metals). These entities have to rely on God *qua concurrent mens* or *ens cogitans* as their principle of activity and motion, since freedom and spontaneity belong only to minds.¹⁵⁷

Given this classification of substantial forms, Leibniz explains their production through what I call, “mechanist heterogenesis.”¹⁵⁸ Against accounts of the generation of forms based on the propagation of seeds or astral influences, common to both atomism and corpuscular theories of matter,¹⁵⁹ young Leibniz explains the generation of new forms through a sort of *heterogenesis*. Strictly speaking, this is not a generation of new forms, since the eduction of forms happens through the chiseling away of the old material. In this way, forms of living beings or inanimate bodies do not arise from the imposition or propagation of form on suitably disposed matter, but rather through the corruption of older forms and the emergence of newer ones out of them. In his famous 1669 letter to Jakob Thomasius, referencing Hooke’s *Micrographia*’s examples of

¹⁵⁷ A II.1, 20. Until at least 1678, if not later, Leibniz still doubts animals are endowed with souls. See the letter to Conring from 19th March 1678, Loemker, 190.

¹⁵⁸ I owe this term to Justin E.H. Smith’s, *Divine Machines. Leibniz and the Sciences of Life*, ch. 6, “Games of Nature”, 214-215.

¹⁵⁹ Norma Emerton (1984, 57-58) distinguishes between a higher view of form, influenced by Albertus Magnus and popular among Sixteenth-century *novatores* such as Jean Fernel (1497-1558) or Scaliger, and a lower view of form, having its source in Scotism. The first tradition considered form superior to matter and ascribed a celestial origin to forms, where all forms are imparted by the power of the heavens. The second view, derived from Scotus’s concept of *forma corporeitatis*, assimilated form much closely to matter. Specifically, this view tended to blur the distinction between accidental and substantial forms and insist that forms are “determined and emerge from a particular sort of matter,” i.e., *forma educitur a materia*.

spontaneous generation, Leibniz indicates that the new discoveries of microscopy have revealed a sort of universal heterogenesis, not just of biological, animated creatures but of elements and metals as well. As a consequence, he adopts the *novatores*' simplified account of change in terms of local motion and makes sense of Aristotle's four-part analysis of cause (generation and corruption, increase and decrease, alteration, and change of place) by reducing substantial change to accidental change or alteration, viewed mechanistically as the subtle movement of parts:

I observe in advance that numerically one and the same change may be the generation of one being and the alteration of another; for example, since we know that putrefaction consists in little worms invisible to the naked eye, any putrid infection is an alteration of man, a generation of worm. Hooke shows similarly in his *Micrographia* that iron rust is a minute forest which has sprung up; to rust is therefore an alteration of iron but a generation of little bushes.¹⁶⁰

Thus, rejecting spontaneous generation, Leibniz claims that forms are generated from the environment, not *ex nihilo*, but rather from the preexisting material of other forms. The alteration of these forms brings about what we call "generation," which can be explained along mechanistic lines, in terms of change of place alone. This is the meaning of forms being educed through motion, from the passive power of matter. Once again, I wish to underline that, throughout this period, Leibniz defines body as space or extension and figure as the limit of the body. Bodies can move by reciprocally transmitting motion, but the source of this capacity, for non-human bodies, must be outside the body. Since the principle of action or motion in a body cannot be the body itself, bodies lack an internal principle of individuation or motion. This principle has to be either the divine mind, or the human mind.

¹⁶⁰ A II.1, 17.

Did this highly idiosyncratic account of substantial forms enjoy any continuity in Leibniz's work? Interestingly enough, the same view of substantial forms is repeated almost *verbatim*, a couple of years later, in a physical treatise, *Theoria motus concreti* (Winter 1670/1671), in which Leibniz claims that:

The mind aside, certain substantial forms, are not, even in Aristotle's sense, absolute beings, but a certain relation, proportion, number or intimate structure of the parts of the bodies.¹⁶¹

Therefore, by the time he elaborates a consistent (and less jejune) physical theory, Leibniz still seems to hold the same view of substantial forms from his letters to Thomasius. Yet, between the first Latin letter to Arnauld written in November 1671, and the few letters exchanged with Hermann Conring in February-March 1678, there is only one other textual occurrence of "substantial form" in his early works. In a text dating from the Parisian years, 1673-1675, Leibniz reinterprets substantial forms in the framework of his doctrine of *conatus*:

What then shall we add to extension to complete the concept of body? Certainly nothing which sense does not verify. Sense, namely, establishes three things at once: that we sense; that bodies are sensed; and that what is sensed is varied and composite, or extended. To the concept of extension or variety, therefore, is to be added that of action. A body is therefore an extended agent. It can be said that it is an extended substance, only if it be held that all substance acts, and all agents are substances. It can be shown adequately from the essential principles of metaphysics that what does not act does not exist, for there is no power of acting without a beginning of action. You say there is no little power in a bent bow, yet it does not act. But I say, on the contrary, that it does act; even before it is suddenly released, it strives. But all striving [*conatus*] is action. For the

¹⁶¹ A VI.2, 247.

rest, much that is excellent and certain can be said about the nature of *conatus* and the principles of action, or as the Scholastics called it, of substantial forms.¹⁶²

Two points stand out in this passage. First, Leibniz criticizes the Cartesian conception of matter: body is conceived as an “extended agent” and no longer merely as an extended thing filling up space. Secondly, in an equally unorthodox interpretation, Leibniz claims that what is substantial about the body as *agens extensum* is a principle of action, *conatus* or substantial form, “as the Scholastics called it.”

In light of these idiosyncratic and sometimes contradictory developments, it becomes clear that between 1668 and 1670, Leibniz toys with different and, at times, unsatisfactory understandings of substantial form. Consequently, he does not maintain the same view when it comes to individuation for very long. He also rejects contemporary atomism on several counts:

1. Gassendian atomism’s inability to provide an adequate explanation for the cohesion of bodies (*Confessio naturae*);
- 2) Sennertian atomism’s view of substantial forms and their origin (Correspondence with Thomasius)
- 3) It seems that given early Leibniz’s great concern for giving an adequate explanation of transubstantiation, atomism contradicts the dogma of real presence: how could the body of Christ really be present in the Eucharist, if only impenetrable, material particles and their motion in the bread and wine exist?

There are also broader consequences of these early Leibnizian attempts at explaining the origin and duration of substantial forms. The account Leibniz gives of substantial forms in 1669 will be abandoned because it was dangerously close to pantheism and the doctrine of God as World-Soul. As a consequence, no other elaborate attempt at developing the use of substantial

¹⁶² Loemker, 271.

forms in natural philosophy will be advanced by Leibniz until the re-establishment of substantial forms in 1678-1679 (*Conspectus libelli elementorum physicae; Thoughts for the Instauration of a New Physics*). Furthermore, even his grandiose project of reconciling Aristotelian natural philosophy with the physics of the *novatores* will not enjoy any posterity once Leibniz develops his first elaborate physical theories: the 1671 *Hypothesis physica nova* and the two theories of motion (*Theoria motus abstracti; Theoria motus concreti*).

CHAPTER THREE
FRAMING HYPOTHESES: THE PSEUDO-ENIGMATIC ATOMISM OF YOUNG
LEIBNIZ

“You have hit the nail on the head.

And I am amazed there has been no one hitherto who has sensed that this is my game.

For it is not the job of philosophers to always take things seriously.

In framing hypotheses, as you rightly point out, they try out the force of their *ingenium*.”¹⁶³

Leibniz to Christopher Matthäus Pfaff, 2 May 1716

The second-hand origin of one of Leibniz’s last letters makes it difficult to establish this account’s credibility. Nevertheless, one can distinguish an underlying tone that is genuinely Leibnizian: a significant hint towards understanding Leibniz’s philosophical attitude that discloses a profound feature of his thought. Philosophers invent or “frame” hypotheses, thus testing the capacities of their intellectual abilities. The general impression we get is that, for Leibniz, philosophy involves a disengaged attitude tending to assimilate, in the last instance, the activity of philosophizing to a kind of intellectual play. Of course, what I have in mind here is something rather contingent: neither a matter of the exoteric/esoteric distinction like Bertrand

¹⁶³ *Acta Eruditorum*, 1728, 127. In full this passage concerns the *Essais de Théodicée*: “Ita prorsus est, Vir summe reverende, uti scribis, de Theodicaea mea. Rem acu tetigisti. Et miror neminem hactenus fuisse, qui lusum hunc meum senserit. Neque enim philosophorum est rem serio semper agere, qui, in fingendis hypothesibus, uti bene mones, ingenii sui vires ex periouitur. Tu, qui Theologus es, in refutandis erroribus Theologum ages.”

Russell had argued,¹⁶⁴ nor some Straussian persecution drift. Leibniz's thought twists and turns, sometimes in the space of only a few months, sometimes from one interlocutor to another. This feature emerges even more clearly when it comes to some of his life-long projects, such as the attempt to reunify the Catholic and Protestant churches. In discussions with representatives of different confessions, his opinion seems to shift from one correspondent to the other, whether he is speaking with the Catholic Bossuet or the Protestant Paul Pellisson-Fontanier. No doubt the ecumenical concern is authentic. Yet it seems Leibniz is more interested in achieving pragmatic results than in doctrinal orthodoxy. In other circumstances, those of his published scientific articles, he tailors his language to his audience so that it will appear more familiar to them:

In those [journals] of Leipzig I accommodate what I say to some extent to the language of the School [Scholasticism]; in the others [Paris, Holland] I accommodate myself rather to the style of the Cartesians.¹⁶⁵

Thus, as the opening passage suggests, the philosopher or scientist limits himself to constructing coherent hypotheses endowed with explanatory power, but he does not directly commit to the truth-value of his conjectures or claim that they give an accurate description of reality independent of our knowledge. In matters that normally imply strong feelings, the philosophical attitude dictates that he assume a position far from any emotional and personal involvement. If we thoroughly scavenge the gigantic amount of material Leibniz left behind, we can certainly

¹⁶⁴ Russell, *A History of Western Philosophy*, New York: Simon and Schuster, 1945, 581–596. The distinction between an exoteric and an esoteric presentation of Leibniz's philosophy has been recently revived by John Whipple, "Leibniz's Exoteric Philosophy," <http://plato.stanford.edu/entries/leibniz-exoteric/>.

¹⁶⁵ Leibniz to Remond, 26th August 1714, GP III, 624. The learned journals Leibniz refers to are the Latin-language *Acta Eruditorum* (Leipzig, from 1682) and the French-language *Journal des savants* (Paris, from 1666), *Nouvelles de la République des Lettres* (Amsterdam, from 1684), *Histoire des ouvrages savants* (Rotterdam, from 1687), and *Mémoires pour l'histoire des sciences et des beaux arts* (Trévoux, from 1701).

argue for such different make-ups of his philosophy. According to different texts, these might be a Platonic theory of ideas, the revival of the Aristotelian doctrine of substance, at the same time realism and idealism, sometimes maybe even occasionalist or Spinozistic leanings. With a conspicuous exception, his passionate hostility towards what he sees as different forms of materialism, Leibniz brings together disparate and sometimes even radically opposed philosophical doctrines. This seems to be his stance towards all philosophical doctrines:

I have found that most of the sects are right in a good part of what they propose, but not so much in what they deny. The formalists, Platonists and Aristotelians, for example, are right in seeking the source of things in final and formal causes. But they are wrong in neglecting efficient and material causes and in inferring from this, as did Henry More in England and certain other Platonists, that there are phenomena which cannot be explained mechanically. The materialists, on the other hand, or those who accept only a mechanical philosophy, are wrong in rejecting metaphysical considerations and trying to explain everything *in terms of that which depends on imagination (ce qui depend de l'imagination)*.¹⁶⁶

Yet, and this is easy to concede, there are few philosophical doctrines or positions Leibniz is more passionate about throughout his career than the rejection of atomism. As early as the *Confession of Nature Against Atheists* (1669) in which Leibniz offers his first detailed critique of atomism, it is clear that his negative target was materialism, which he perceived as a reductionist “naturalism” that would eventually lead to atheism. His idea of materialism is that of a description of the natural world aiming at offering an exhaustive explanation of all physical

¹⁶⁶ Leibniz to Remond, 17th February 1714, GP III, top of 607. Leroy Loemker translates the underlined part as “in terms of sense experience.” I chose to translate the passage literally, because, as I show in this section, from early on to his late years, Leibniz sees the source of atomism as being a misguided over-reliance on imagination.

phenomena on the sole basis of the concepts of *matter* and *movement*. In Leibniz's time, the prevailing materialist account of the physical world was offered by the atomistic point of view. Atomism rested on the assumption of the existence of congeries of very small parcels of matter endowed with infinite hardness, which aggregate and disaggregate, therefore giving rise to ordinary bodies.

In his mature years, Leibniz reacted vehemently against the view that the nature of matter is particulate. I, therefore, return to my question from the previous chapter, in which I delineated the reasons for Leibniz's strong Aristotelian opposition to atomism and the *minima naturalia* doctrines of Scaliger and Sennert on the specific issue of the origin of substantial forms. Did early Leibniz truly embrace atomism between 1666 and 1676?¹⁶⁷ Was atomism an actual ontological commitment or merely a "framed" hypothesis meant to play a negative role in his natural philosophy and then subsequently abandoned? Attempting to answer this set of questions will not only help clarify the relationship between the two main issues that form my concern here, individuation and atomism in Leibniz's philosophy, but will also eventually lead to the main point of my thesis: what was the motivation behind the "atoms of substance" of late Leibniz's more "fundamental" ontology?

Let me illustrate the point in more detail. Leibniz does refer to some sort of atoms, *minima*, vortices, etc. during his Paris period and before that. Texts from early on in *De Summa Rerum* seem to show him ready to admit the existence of a void,¹⁶⁸ while others, sometimes

¹⁶⁷ This presumed short atomist phase in Leibniz's thought is seen by some interpreters (Mormino 1999, 255) as more than just a marginal chapter in the general history of atomism. Free from the burden of showing the compatibility between Christianity and atomism (a task already successfully accomplished by Gassendi), Leibniz's thorough approach had even rendered a service to the atomist theory.

¹⁶⁸ A VI.3, 466 – December 1675.

written only a few months later, seem to argue for the existence of both atoms and a plenum.¹⁶⁹

Before Paris, he also refers to *bullae*, “flowers of substance”, *semina rerum* or similar notions.

These views are indeed similar to some of the ancient or even contemporary Seventeenth-century atomist theories and might have been influenced by them. Yet the question persists: does the sometimes confusing and contradictory, nevertheless complex variety of views Leibniz expounds during this decade, indicate that he truly and fully upheld atomism? My answer in this chapter would have to be a negative one, followed by several clarifications.

First of all, it appears that early on, Leibniz’s theory of matter and his attempted solutions to both the continuum problem and mind-body problem needed some sort of elementary or particulate constituents (*bullae*) or even physical indivisibles (“obscure” flowers of substance). In this sense, I believe that Leibniz does flirt with some kind of atomism during the Paris years. Yet, as I argue in this section, the Paris episode has to be understood in the larger framework of a bundle of interrelated problems: cans of worms both his tentative, youthful writings on individuation and the more elaborate attempts at physical theories (*Hypothesis Physica Nova*, *Theoria Motus Abstracti*) left open. These problems can be summarized as follows: how do bodies cohere, how do they manifest their qualities on a phenomenal level, and – more importantly – what makes them individual bodies? In the first and second chapters, I showed how between 1663 and 1672, Leibniz toyed with different solutions to the problem of individuation until inherent difficulties resulting from postulating substantial forms as individuating principles led him to abandon substantial forms altogether and search for specific alternatives. The concept of substantial form is replaced, with various degrees of commitment, by either an entirely external principle of individuation (*Confessio Philosophi*, 1672-1673) or by

¹⁶⁹ A VI.3, 524-525 – early 1676; A VI.3, 585 – 12 December 1676.

the concept of mind and its interpretation through indivisibles or points.¹⁷⁰ But cohesion and individuation, the problems Leibniz had to deal with all throughout his early years, could not be solved without addressing an even more fundamental problem: *how to integrate minds into the system?* And, as I claim in the opening chapter, there is always a guiding thread to Leibniz's Parisian notes: matter is always connected to mind, held together by a mind or a mind-like substance; it only exists in virtue of a relation to mind.

Disentangling Presumed Enigmas

The claim that in his early years and Paris period (1666-1676) Leibniz had subscribed to both atomism and the void rests upon several types of arguments or textual support:

1. Leibniz's different accounts and claims about his own intellectual formation (specifically the claim that he at some point supported both atomism and the void).
2. Surface readings overstating the "influence" early Seventeenth-century atomists such as Gassendi and Sennert might have had on young Leibniz.¹⁷¹
3. Texts lending support for an atomist phase in Leibniz's thought dating from either the Paris period, or pre-dating it.¹⁷²

¹⁷⁰ As I show in the following section of this chapter, one such specific alternative to Scholastic hylomorphism is represented by Leibniz's early doctrine of the "flower of substance".

¹⁷¹ Especially Moll's trilogy *Der Junge Leibniz*, volume 2 on Leibniz and Gassendi; and Arthur: "Animal Generation and Substance in Sennert and Leibniz", 304-359 in *The Problem of Animal Generation in Modern Philosophy* edited by Justin Smith. Cambridge: Cambridge University Press, 2005; "The Enigma of Leibniz's Atomism", *Oxford Studies in Early Modern Philosophy*, Volume 1, 183-227, 2003.

¹⁷² In the case of atomism, Leibniz secondary literature exhibits a symptom of what I call "the-Play-Doh-Leibniz:" picking and choosing texts to make one's point, molding them whichever way one wants or likes. Arthur (2001, "Atoms and the Void," xliii-li) at least claims Leibniz might have been and atomist for four years (1672-1676). This is too much for some. Mormino (1999, "Atomismo e volonta divina nei primi scritti leibniziani (1663-1671) is bent on contending nothing less than Leibniz's explicit adoption atomism for more or less than a year (roughly from September/October 1668 to Leibniz's 1669 *De rationibus motus* or the physical works of 1670-1671), so that he procrusteanly forces some of these early

I will try to treat each of these points one at a time, supporting my argument with close-readings of the early Leibnizian *corpus* and, more specifically, with a useful comparison between Leibniz's published and unpublished works throughout his early period.

I argue that although some of the early writings show Leibniz flirting with atomist notions, these texts can only be taken for granted to a certain extent. Thus, whichever conception about atoms Leibniz appears to be presenting there, the sum of the instances does not amount to definitive proof towards claiming a serious commitment to atomism on his behalf. I address claims to the contrary¹⁷³ by re-examining the context in which Leibniz's views were formulated from several angles: 1) the early published and manuscript textual sources and the differences between them, 2) the several accounts Leibniz gives of his intellectual formation, 3) early Leibniz's view on the source of atomism, 4) the fundamental differences between early Leibniz's views and the supposed "influences" of Sennert and Gassendi, 5) the continuity between some of Leibniz's early anti-atomist views and the mature position. Finally, against both the strong commitment thesis (Arthur) and the continuity thesis (Mercer¹⁷⁴), I reveal that in spite of his Parisian flirtations with atomism, Leibniz does arrive at something far more significant than either an atomist theory of matter or proto-atoms of substance or proto-monads. Leibniz discovers the regulative principle of the equivalence between full cause and entire effect, the

texts. If that's not enough, most of the connections he makes with early Seventeenth-century atomist literature are highly conjectural (Mormino 1999, 260-261).

¹⁷³ Arthur 2003, "The Enigma of Leibniz's Atomism." Throughout his article, Arthur argues that Leibniz was committed to atomism during his early years (1666-1676). In her monograph on Leibniz (*Leibniz's Metaphysics* (2001), Mercer argues that young Leibniz's "bubbles", "atoms", "flowers of substance" and so on, are simply early versions of his later atoms of substance, metaphysical rather than physical indivisibles. I address this continuist view indirectly in the next section.

¹⁷⁴ For Mercer (2001, 386), most of Leibniz's mature metaphysical doctrines were established way before his arrival in Paris in 1672: "Upon leaving Paris [in 1676], the only one of his prominent mature doctrines that has not yet evolved is his account of truth." Thus, Leibniz always upheld atoms, from 1668 onwards, although these are to be conceived of as "atoms of substance" or corporeal substances.

“Ariadnic thread” that would lead him outside the labyrinth of the continuum and into his mature, anti-atomist natural philosophy and metaphysics. This principles helps him formulate what will become two landmark doctrines of his maturity. He can now, 1) reformulate an internal principle of individuation stating that for matter to be individuated, it has to be connected to a mind that will retain the memory or traces of its production ¹⁷⁵ and, 2) arrive at a primitive version of his mature theory of complete concepts.¹⁷⁶

Let me start *ad fontes*, the textual basis itself. More recently or not, several Leibniz commentators, most notably Richard Arthur,¹⁷⁷ have argued for an atomist phase in early Leibnizian thought, with slightly different degrees of commitment to atomism on Leibniz’s part. For the most part, the textual support offered towards these claims is a large collection of notes, *marginalia*, or workshop drafts penned down by Leibniz right before and during his Paris stay. Published by the *Akademie Ausgabe* as volume VI.3, this extended body of work, making up almost seven-hundred pages, lends proof to Leibniz’s wide variety of philosophical, physical, metaphysical, and theological concerns.

A first section (A. Specimina Physica) includes Leibnizian texts about physics and natural philosophy, in which he delves into issues such as the consistency of bodies, minimum and maximum, incorporeal substances, or mechanical principles. Two other sections (C and D) include Leibniz’s excerpts and annotations upon reading the works of his contemporaries: Galileo, Descartes, Cordemoy, or Spinoza. It is also important to note that, while in Paris, Leibniz writes his *Confessio Philosophi* (Fall of 1672 or the Winter of 1672-1673),¹⁷⁸ in which

¹⁷⁵ *Meditatio de Principio Individui*, 1 April 1676, A VI.3, 491; also Parkinson, 51-53.

¹⁷⁶ *Notes on Metaphysics*, December 1676, A VI.3, 400; also Parkinson, 115.

¹⁷⁷ Arthur 2001, 2003, 2005, 2014.

he briefly argues for an external principle of individuation. Finally, the most substantive collection of texts, *De Summa Rerum* (section F), the same body of work recent commentators have used to argue for a Leibnizian commitment to atomism during the Paris years, is also the one in which we find Leibniz presenting almost every possible view on both atoms and the void, in addition to related topics like body and motion, soul and God.

Naturally, when confronted with this voluminous and diverse amount of work in a short amount of time (1672-1676), a question springs to mind: what did Leibniz publish during his Paris period? The answer is striking: almost nothing and definitely none of the philosophical essays from *De Summa Rerum*. First, a quick glance at Ravier's bibliography of Leibnizian works shows that during the Paris years, the only two texts published by Leibniz were a short political writing on German peace (1672) and a 2nd edition (1674) of a work he had himself edited and published in 1670, Marius Nizolius' *Anti-Barbarus Philosophicus*.¹⁷⁹ In fact, we have to wait for Leibniz's return to Hannover three years later in 1677 in order to see anything, albeit again non-philosophical, published.¹⁸⁰ Secondly, when it comes to articles published in journals, in 1675 Leibniz publishes "Extrait d'une Lettre de M. Leibniz a l'Auteur du Journal touchant le principe de justesse des Horloges portatives, de son Invention (avec une planche)",¹⁸¹ but once again we have to wait until 1677-1678 to see an increase in his publishing activity.¹⁸²

¹⁷⁸ AVI.3, editors' note, 115.

¹⁷⁹ See Ravier 1966, 19: *Breve illustramentum Pacis Germanicae. Cum Rege Christianissimo Super Articulo Et ut eo sincerior*. A.C., 1672, 12 pp; *Marii Nizolii Anti-Barbarus Philosophicus, Sive Philosophia Scholasticorum impugnata*, Frankfurt, 1674, 360 pp.

¹⁸⁰ Ravier 1966, 19: *Caesarini Fürstenerii de Jure Suprematus ac Legationis Principum Germaniae*, 1677, 245 pp.

¹⁸¹ See *Journal des Savants*, 25th March 1675, 94-99.

¹⁸² Ravier 1966, 47-48.

Furthermore, if we compare the end product of Leibniz philosophical work in Paris with his previous and in a sense less productive or resourceful years in Mainz and Leipzig, the result is, once more, surprising. Between 1663, the date of his Bachelor's thesis, and 1672, we witness the publication of Leibniz's *Dissertatio de arte combinatoria* (Leipzig, 1666); the *Hypothesis Physica Nova* and *Theoria Motus Abstracti* were published in both Mainz and London the same year (1671). In 1669, Theophilus Spizel publishes his *Confessio naturae contra atheistas* anonymously, attached to a letter sent to Antonius Reiser and without Leibniz's consent.¹⁸³

The analysis of Leibniz's publishing activity shows that even though recent scholars¹⁸⁴ unanimously agree in regarding the Paris episode as one of his most intensive and productive periods of intellectual activity, Leibniz himself deemed none of the work produced during these years worth publishable. Of course, against this argument, one could object that publications were not the only means through which early modern philosophers presented their work to an audience. The importance of learned correspondences for the propagation of philosophical ideas during the Seventeenth-century is itself widely acknowledged. Furthermore, Leibniz's own correspondence is central to understanding his philosophical work. But his intellectual and scientific correspondence also seems to wane around this time. If we take a closer look at the early and middle-years, without taking into account the extensive late correspondences with De Volder (1698-1706) or Des Bosses (1706-1716), we get the following picture: between 1663 and 1672, the Leipzig and Mainz period, a total of 106 letters, from Leibniz to different correspondents and vice versa. The Hannover years, 1676-1685, include a total of 126 exchanged

¹⁸³ Ravier, 1966, 119.

¹⁸⁴ Antognazza 2009, "Old Wine in New Bottles: Paris, London, and Holland (March 1672–December 1676)," 139-178; Garber 2009, "Leibniz goes to Paris: Continuity and Transition (1672–1678)," 44-48.

letters. Comparatively, although spread throughout a shorter time frame (1672-1676), the Paris episode attests to a mere 24 letters: a significant reduction in Leibniz's epistolary exchanges.

This part of my argument strengthens a line already taken by André Robinet and Philip Beeley, who dismiss the unpublished papers in which Leibniz refers to atoms as mere “workshop drafts” that do not indicate a committed atomist position. According to Beeley, the claim that during his Paris period Leibniz embraced atomism is “a mistake” resulting from the “over-interpretation of work-shop drafts”.¹⁸⁵ The various unpublished manuscripts wherein Leibniz talks about atoms should simply be considered as further experiments in his “workshop of ideas,” hypotheses framed in order to test a theory. Robinet claims the concept of atom undergoes violent twists in the fragments from 1672-1676 because Leibniz's elimination of indivisibles also destroyed the concept of “physical atom.” This process was a result of what he calls “a series of ephemeral hypotheses, all these documents being written in the style of *«videndum est»*. (“It must be seen whether [...]”).”¹⁸⁶

At the beginning of the 2nd chapter, I pointed out how one of the main arguments for early Leibniz's commitment to atomism relies on a mnemonic clue. Thus, the specific claim that in his early years and the Paris period (1666-1676) Leibniz had subscribed to atomism *and* the void rests upon textual support found in several accounts he gives of his intellectual formation.

The first of these accounts dates from 1689. Reminiscing about his early views on the continuum Leibniz describes his youth as a period of enthusiastic subscription to the “new philosophy” and recalls that he:

[...] indulged other dogmas of this kind, to which people are prone when they are willing to entertain every imagination, and do not notice the infinity lurking everywhere in

¹⁸⁵ Beeley, 1997, 74 and 82.

¹⁸⁶ Robinet 1986, 189.

things. But although when I became a geometer I relinquished these opinions, *atoms and the vacuum held out for a long time* [my italics], like certain relics in my mind rebelling against the idea of infinity; for although I conceded that every continuum could be divided to infinity in thought, I still did not grasp that in reality there were parts in things exceeding every number, as a consequence of motion in a plenum.¹⁸⁷

Leibniz locates the source of atomism in a weakness of the imagination: its failure to observe the infinity “lurking everywhere in things.” This is an argument against atomism he will repeat from his early to his late years.¹⁸⁸ One has to highlight that here he claims to have supported both atomism and the void for an extended period of time. A similar account of his intellectual formation is given in 1695, in *A New System of Nature*:

In the beginning, when I had freed myself from the yoke of Aristotle, I accepted the void and atoms, for they best satisfy the imagination. But on recovering from that, after much reflection, I perceived that it is impossible to find *the principles of a true unity* in matter alone, or in what is only passive, since everything in it is only a collection or aggregation of parts to infinity.¹⁸⁹

This resounds with the same judgment of atomism as a “weakness” of the imagination, *blandiens intelligendi facilitas*, from the *Phoronomus* (1689). Three years later, in *De Ipsa Natura (Acta*

¹⁸⁷ Leibniz 1689, *Phoronomus*; translated in Robinet, 803.

¹⁸⁸ Beeley (1997, 82) suggests that by the time he leaves Mainz, Leibniz is well aware of the source of atomism, as an over-reliance on imagination. In a letter to Huet from March 1679, Leibniz speaks of Aristotle, who with his *Physics*, freed the true notion of the continuum from the “[...] plausible errors of the atomists.” (A II.1, 467) The same judgment is taken up again in 1710, when writing to Nicholas Hartsoeker, Leibniz states that “[...] atoms satisfy only as regards the imagination, but they shock superior minds. They are the effect of the weakness of our imagination which likes to rest and which hurries to arrive at an end in subdivisions and analyses.” (GP III, 507) Here, as well as earlier, in the *Hypothesis physica nova*, atomism is seen as a kind of intellectual game (*lusus ingenii*).

¹⁸⁹ A&G, 139.

Eruditorum, September 1698), Leibniz simply rejects his earlier flirtation with atomism during the Paris period as a youthful prejudice:

But having overthrown the prejudices of youth, I have realized for a long time now that atoms should be rejected, along with the void.¹⁹⁰

Despite their differences, all these texts serve to illustrate Leibniz's conception of his own intellectual development. Since they bear the status of a personal testimony, should we take these accounts literally, at face-value? As French philosopher Paul Ricoeur brilliantly argues in his study of memory, history and forgetting, "[...] we have nothing better than testimony and the critique of testimony to give credibility to the historian's representation of the past."¹⁹¹ In this case, historiographical interpretation has its point of departure in personal testimony: Leibniz's act of producing a verbal representation of some part of his past as a text. But as Ricoeur notes, this act of producing a representation of the past is in itself always rhetorical and therefore interpretative. Moreover, it is bound up with personal memory. Since we are not Jorge Luis Borges' character Ireneo Funes, who had no deficiency of memory, only of forgetfulness,¹⁹² something about the past is undoubtedly no longer accessible to us, as it was no longer accessible to Leibniz. Memory is infamously imperfect, it embellishes and adds to those traces of the past that remain and through which we try to represent our past to our present selves. Therefore, historical accounts, lacking a positivist image of the past "as it happened," are only partial and susceptible to misrepresentation.

¹⁹⁰ GP IV, 514; A&G, 165.

¹⁹¹ Ricoeur, *Memory, History, Forgetting*, 278.

¹⁹² Ohad Nachtomy 2004, "Locke, Leibniz and Borges: Universal and Particular Concepts in the *Nouveaux Essais*," presentation at the NE Conference, Montreal, October 2004.

Handy Influence-Mongering: the “Gassendian” Leibniz

Some interpreters argue the case for early Leibniz’s commitment to atomism by underlining or pointing out the influence two early modern atomists such as Gassendi and Sennert’s might have had on the former’s views of matter and substance.¹⁹³ Early on, in 1669, Leibniz criticized Sennert’s account of the origin of substantial forms and this critique was in itself contentious, since it seemed to stem from either a limited knowledge or a misreading of Sennert’s works. In the case of Gassendi and Sennert’s influence on early Leibniz’s “atomism,” it seems to me that Leibnizian texts encourage intuitive surface readings that can make his views seem closer to contemporary opinions than they actually are. In contrast to many of his contemporaries (Descartes being the best example), Leibniz brings together a wealth of philosophical doctrines handed down by tradition: “I have found that most of the sects are right in a good part of what they propose, but not so much in what they deny.”¹⁹⁴ He often declares to have read copiously from ancient, medieval and modern texts, but the extent to which he actually might have embraced contemporary ideas is highly debatable. Indeed, Leibniz rarely writes anything without using a large number of eclectic references: a clear sign that he appeals to the claims of well-regarded historical and contemporary figures to illustrate and support his own views. Yet, in most of the cases in which Leibniz references an author, it is unclear how much of that author’s work he had actually read and how deep of a knowledge of his doctrines he actually possessed. I therefore have difficulties with the type of approach adopted by Arthur or Moll in investigating the “atomist” sources and influences on Leibniz’s first philosophy. Claims of influences have to be grounded, that is, accurately identified in Leibnizian texts themselves. As a

¹⁹³ Especially Richard Arthur 2005, “Animal Generation and Substance in Sennert and Leibniz”; and Konrad Moll 1982, *Der junge Leibniz*, vol. II.

¹⁹⁴ See Leibniz to Remond , 17th February 1714, GP III, 607.

result, in this section, I do not attempt to discover handy influences, but instead I focus on what Leibniz actually wrote on Gassendi: the explicit reception of the latter's work through textual occurrences.

Specifically, what did Leibniz write on Gassendi during the Paris period? André Robinet has published 2-and-a-half pages of a Leibnizian reading of Gassendi's *Opera* (1658) dating from 1673-1675. These notes refer to Gassendi's mathematics, celestial observations, and his physical experiments. As Robinet writes, Leibniz annotates Gassendi's works in a context, the Parisian years, during which time Gassendi's discoveries or observations were already made obsolete by Christiaan Huygens inventions. Once he had arrived at the principle of the equivalence between cause and effect, Leibniz would abandon Cavalieri's indivisibles, the hypothesis of a point-like soul and Gassendi's atoms.¹⁹⁵ We find no trace of atoms or atomism in the few annotated pages. This type of *marginalia* or reading notes generally illustrate the working process of "[...] someone like Leibniz, who would often just read the first few pages of books in order to get inspiration, or better, set his thought in motion (in many ways the typical method of the autodidact)."¹⁹⁶ Robinet's publication of these *marginalia* on Gassendi's *Opera* casts doubt over the former claim Leibniz makes towards the end of his stay in Paris, that he read Bacon and Gassendi more thoroughly than the Cartesian *corpus*:

I admit that I have not yet been able to read all his writings [Descartes'] with all the care I had intended to bring to them, and my friends know that, as it happened, I read almost all the new philosophers before reading him. Bacon and Gassendi were the first to fall into

¹⁹⁵ Robinet 1997, "Notes de lecture des *Opera* de Gassendi par Leibniz," 297; in *Gassendi et l'Europe (1592-1792)*, edited by Sylvia Murr, Paris, J. Vrin, 295-300.

¹⁹⁶ Beeley, "Response to Arthur, Mercer, Smith, and Wilson," Symposium on *Kontinuität und Mechanismus*, *Leibniz Society Review*, Vol. 7, 1997, 97.

my hands; their familiar and easy style was better adapted to a person who wants to read everything.¹⁹⁷

But Gassendi's influence on early Leibniz cannot be overstressed for reasons that go beyond the German philosopher's reading or name-dropping practices.¹⁹⁸ Philip Beeley has already argued for a fundamental difference between early Leibniz's theory of matter and Gassendi's atomism, especially in terms of the broader picture, the problem of the continuum.¹⁹⁹ Gassendi rejects both the orthodox Aristotelian position²⁰⁰ and the position Leibniz adopted from early on that the continuum is actually divided into infinite parts. The French atomist replaces infinity with his own concept of inexhaustibility. But I believe there is another fundamental separation between the two: early Leibniz's view on substantial forms and their origin and Gassendi's position on the same issue.

In my previous chapter, I showed that facing several problems in explaining the nature of body, Leibniz developed a highly idiosyncratic theory of substantial forms, as such generated

¹⁹⁷ Letter to Simon Foucher, 1675, in A II. 1, 247; A&G, 2. Leibniz admits to not have possessed a detailed knowledge of Cartesian physics in his early years to different correspondents (see his letter to Fabri, end of 1676, in A II.1, 289). His first marginal notes on Descartes' *Principia* date from 1675-1676 (A VI.3, 213-217).

¹⁹⁸ Another line of influence Gassendi's atomism might have had on early Leibniz is developed by Arthur 2003, 217: "[...] it is difficult to resist seeing something of Gassendi's *flos materiae* ("flower of matter") in Leibniz's talk of a *flos substantiae* ("flower of substance") in his letter to Duke Johann Friedrich in May 1671 and subsequent writings. Indeed, it seems to me that once it is realized that Gassendi advocated a principle of action in every body, and indeed "forms" in matter whose effects would always be motions of parts of matter, one can begin to appreciate that Leibniz's later remarks about his early debt to Gassendi may not have been framed simply for their rhetorical effect." My next section proves Leibniz's doctrine of the "flower of substance" had several influences which sprung from Paracelsianism and its interest in *palingenesis*. Thus, if there is anything similar to atomism in early Leibniz, it had a strong alchemical source and it was more or less a highly original, quirky view.

¹⁹⁹ Beeley 1997, 80.

²⁰⁰ Aristotle denied that the infinite divisibility of the continuum resulted in it being composed out of indivisibles and the idea of an actual infinity. Therefore, the Aristotelian view holds the infinity of the parts of the continuum to be only potential: *Physics*, 231b 15-18; 207b 16-21.

through *education* or, what I called, “mechanist heterogenesis”. Discussing the origin of forms in the natural world, Gassendi presents a terribly unsatisfying argument. He objects to the traditional answer that form is educed through the potentiality of matter by claiming that education:

[...] is mere words. For if they mean that form is educed in such a way that it is only a mode of matter like the shape of a statue into which bronze or wood is formed, then they are indeed saying something, but form will be merely passive, like the matter whose mode it is, and not at all an active principle. However, if they mean that it is some super-added entity, then they cannot say at all whence this entity exists, since the potential of matter has been put aside, nor from what source its power of acting comes, since the potential of matter is merely passive and in no way active.²⁰¹

Gassendi agrees with the basic assumption of hylemorphism that matter is entirely passive. Nonetheless, he objects that a genuine active principle, a form, cannot be educed from the potential of a purely passive thing. This, he believes, always amounts to “all active potential being derived from merely passive potential.” Therefore, he concludes, since “it is impossible to hold that matter supplies power to the form,” we must either abandon the claim that matter is entirely passive, or abandon the position that form is educed from its power. Both these options seem to be dead-ends in Gassendi’s argument. Surprisingly, Gassendi’s objections are not much different from the ones held by the other presumed influence on early Leibniz’s atomist leanings. On similar lines with Gassendi, Sennert argues that in the classical Aristotelian example of a statue or column sculpted from wood (*Metaphysics* 1048 a 32-33) there is nothing like an active principle educed from matter, but only an accident, quality or shape. As a consequence, there is no power of matter involved and the example used by Aristotle merely muddled the issue of

²⁰¹ Gassendi, *Opera Omnia*, vol. I, *Syntagma*, 335b.

artificial and natural generation. In contrast to both Sennert and Gassendi, young Leibniz not only sees the Aristotelian analogy as entirely unproblematic, but he also embraces the traditional, Scholastic theory of the eduction of forms from the passive power of matter. Since whether or not Leibniz actually read Gassendi's *Syntagma* is subject to debate, let me now turn to the explicit reception of the latter's work in Leibnizian texts.

Leibniz writes to Fabri upon leaving Paris and clearly states his points of disagreement with Gassendi's Democritean philosophy by declaring that the latter's "corpuscles, unsplitable in their nature" do not exist.²⁰² Even several years earlier, in a letter to Oldenburg from the 18th of September 1670, Leibniz notes how in order to avoid the inherent difficulties in explaining the cohesion and resistance of bodies, Gassendi had joined his atoms together through hooks and barbs. This leads into an infinite argument trap, which leaves the solidity/rigidity, the cohesion of these contraptions themselves – unexplained. Caught in this Gordian knot, Leibniz says, Gassendi had to appeal to divine will. Thus, in order to explain atomic cohesion, "one must resort to a perpetual miracle."²⁰³ This point of view on atomism had already been adopted by Leibniz the year before, in his *De rationibus motus* (1669). Rejecting atomism, this short writing tries to explain the cohesion or resistance of bodies as an effect of motion, against both:

[...] sectatores Democriti et Epicuri, et inter eos egregium Gassendum a quibus supponitur esse quaedam corpuscula (ipsi atomos vocant) ita solida, ut etiam cum quiescunt, impactu cujuscunque alterius corporis, non dissolvantur.²⁰⁴

Here, Leibniz even considers Descartes' explanation of cohesion (the three element doctrine) to be atomistic. But in the natural state of things, he notes "[...] there is no such ramified structure,

²⁰² A II.1, 289.

²⁰³ Hall&Hall 1970, 167.

²⁰⁴ A VI.2, 161.

no such cohesion, no such continuity.”²⁰⁵ Since at this stage he directly assimilates the Cartesian corpuscularian position with the Gassendian atomist position, Leibniz clearly did not have an in-depth knowledge, if any at all, of Cartesian physics. Another instance of this conflation as well as the distinction early Leibniz operates between atomism and mechanical philosophy is found in a text from 1671 entitled *De actionibus ope aeris exercitis*. In this work, Leibniz defends mechanical philosophy “[...] that explains everything through size, shape and motion”²⁰⁶ against the corpuscular philosophy “[...] Gassendi and Descartes have partially revived and partially modified.” Once again the principles of atomism or corpuscular philosophy are considered altogether inadequate, too remote from experience to explain the qualities of bodies, “[...] if not through a frightful leap.”²⁰⁷

In both these preliminary writings to *Theoria motus abstracti* and *Hypothesis Physica Nova* (1670-1671), Leibniz attempts to explain cohesion without appealing to divine will. Thus, I believe, at this point, anti-atomism became a firm point in his thought. He already takes a strong anti-atomist stance even before leaving for Paris in 1672. *De rationibus motus*, written under the influence of the discovery of Huygens and Wren’s laws of motion and collision between bodies, develops an objection to atomism that Leibniz will repeat obsessively in his mature arguments against atomism. Writing to Huygens in 1/11 April 1692, Leibniz claims that:

This last time, reading your explanation of gravity again, I noticed that you support atoms and the void. I admit I am having difficulties in understanding the reason for such firmness [of atoms] and I believe that in order to prove it, one would have to appeal to a

²⁰⁵ A VI.2, 161.

²⁰⁶ A VI.2, 325.

²⁰⁷ A VI.2, 325. “[...] nisi immani saltu.”

sort of perpetual miracle. I do not find it necessary to resort to such extraordinary things.²⁰⁸

Against Huygens' atomist claims in the Appendix to the *Discours de la cause de la pesanteur*,²⁰⁹ Leibniz thinks it is impossible to give a reason for absolute firmness without having recourse to a sort of perpetual miracle. But this constant divine intervention is ultimately unexplainable and unjustifiable because it cannot be reduced to mechanical causes. On the contrary, if firmness is an intelligible quality of bodies, it has to come from movement, since "[...] motion is the only thing diversifying bodies."²¹⁰ Otherwise, the perfect firmness of Huygens' corpuscles is an occult quality similar to doctrines such as Aristotle's theory of gravity, Newton's attraction, and the sympathies, antipathies and other similar occult qualities of the Paracelsians. In early texts, Leibniz applies the same objection to Gassendi. In his excerpts from Honoré Fabri's *Physica*, there is a passage where explanations of bodily cohesion grounded on the existence of hooked, striped or spiral atoms such as Gassendi's are judged to be simplistic. In this sense, he compares with Paracelsian explanations through occult sympathies and qualities.²¹¹

In late texts, Leibniz again attacks atomism's explanation of the firmness of its corpuscles for making recourse to perpetual miracle. In a couple of letters to another Dutch atomist, Nicolaas Hartsoeker, he claims:

There is no need to find a reason for the divisibility of matter, since naturally, if nothing impedes it, a part, different from another, can be separated. One would therefore have to find a reason for this impediment [firmness that avoids separability – my note]. But to

²⁰⁸ A, III.5, 291.

²⁰⁹ Huygens 1690, *Discours de la cause de la pesanteur*, 162.

²¹⁰ A III.5, 393.

²¹¹ Aus und zu der Physik von Honorato Fabri, in A VI.2, 190.

establish this as originary or primitive in certain parts of matter is to appeal either to a miracle, or to an imaginary, occult quality.²¹²

Appealing to God's will in physical arguments is an insufficient reason for explaining natural things. And after looking at all these texts – according to Leibniz, this has been common practice among Seventeenth-century atomists from Gassendi to Huygens and Hartsoeker.

Atoms and the void in Paris and before

In a text from *De Summa Rerum* (1676), Leibniz rhetorically asks whether the existence of atoms is consistent with reason.²¹³ If we follow mature Leibniz's own indications about his intellectual development, we are inclined to believe that in his youth he had supported the idea that reality is constituted by atoms and the void, i.e., that he was an atomist. Since there is only one early text where Leibniz seems to clearly advocate both atoms and the void (the *Hypothesis de Systemate Mundi*), unless one can build a strong case for Leibniz's adoption of atomism based on a single piece of textual evidence, the claim that he had in fact, in his youth, embraced an atomist theory of matter is difficult to probe. Building upon the previous chapter, I argue that Leibniz was already aware and clearly articulated his anti-atomist stance somewhere between 1669 and 1671. The multitude of self-contradictory and almost irreconcilable notes about atoms from the Paris years are merely, like Philip Beeley calls them, workshop drafts – Leibniz's own testing of hypotheses. The description Leibniz gives of his own early views, atoms and the void holding out for a long time, does not correspond with any of his early texts. Even when it does, his claims in those texts are difficult to make sense of.

²¹² See Leibniz to Hartsoeker, 1710, GP III, 500; a similar claim is made in the letter to the same from the 8th February 1712, GP III, 532-33.

²¹³ A VI.3, 473.

One of the most representative texts for the period between 1666 and 1671 is the *Dissertatio de arte combinatoria* (1666). The atoms Leibniz presumably adopted during this time are characterized by infinite divisibility; thus, they are not indivisible atoms in any classical or physical sense. In the *Dissertatio* (1666), Leibniz claims both that matter is infinitely divisible and that the nature of matter is constituted by ultimate particles or atoms, two claims that cannot be easily reconciled.²¹⁴ However, he does not give any explanation as to why these atoms are infinitely divisible or how they cohere together to form macroscopic bodies. In the previous chapter I argued that the most important reason Leibniz does not embrace a particulate theory of matter is that he identifies cohesion as the main stumbling block for atomism. This idea that Seventeenth-century atomism is unable to account for why bodies cohere together will accompany his progressive rejection of atomism all throughout the early period. Thus, when discussing the cause of cohesion in the *Theoria motus concreti* (1671) Leibniz declares to have always believed that anything that has been said about the various configurations of atoms by:

Cartesii Gassendique maximorum sane virorum sectatores, et quicumque in summa illud docent, ex magnitudine, figura et motu explicandam omnem in corporibus varietatem, habent me prorsus assentientem. Credidi tamen semper, quicquid de atomis varie figuratis, de vorticibus, ramentis, ramis, hamis, de uncis, globulis tantoque alio apparatu dicatur, lusui ingenii propius, a naturae simplicitate, et omnino ab experimentis remotius, aut jejunius esse, quam ut manifeste connecti cum Phaenomenis possit.²¹⁵

The barbs, hooks, globules, vortices and any other contraptions atomists used to explain the cohesion of bodies are merely a “game of the learned” (*lusui ingenii propius*): far removed from the simplicity of nature, remote from experiments, and, furthermore, too naive to be related

²¹⁴ GP IV, 27.

²¹⁵ A VI.2, 248.

clearly to phenomena themselves. Therefore, in explaining the nature of bodies, Leibniz's *Theoria motus concreti* (1671), appeals to motion rather than matter and proposes *bullae* (bubbles), not atoms, as the ultimate constituents of matter. Macroscopic bodies cohere through these bubbles, which he defines as the:

[...] seeds of things, receptacles of the aether, the basis of bodies, the cause of their consistency and the principle of both the great variety we admire between bodies and of the great impetus in their motions.²¹⁶

Conceived as bubbles, the ultimate unities of matter are not indivisible or infinitely hard, but elastic. Continuously breaking and recombining with each other, these elastic unities of matter are agitated by the internal motion of the ether, they are constantly in motion and not inert.²¹⁷

Again, these are not atoms in any classical or physical sense, for analogously to the *Dissertatio* (1666), Leibniz rejects a traditional feature atoms entailed for physical atomism: indivisibility.

The same year, in a letter to Thomasius, Leibniz puts forth ten hypotheses in an attempt to make sense of an obscure Pre-Socratic fragment. Jakob Thomasius had invited Leibniz to conjecture on Anaxagoras' paradox of the "black snow." In his explanation, Leibniz uses differently shaped atoms (fire-pyramidal; water-spherical; earth-cubical) and their interstitial *vacua* to hypothesize a theory of vision and colors.²¹⁸ In explaining the process of vision, Leibniz's appeal to atoms does not prove he adopts atomism at this time, as it becomes clear from the following letters. Rather, he is looking for a plausible, coherent explanation of an ancient paradox.

²¹⁶ A VI.2, 226.

²¹⁷ A VI.2, 229. "Sed admirando Creatoris sive artificio, sive ad vitam necessario beneficio, omnia corpora sensibilia ob aetheris circulationem per hypothesin nostram sunt Elastica; igitur omnia corpora sensibilia reflectunt aut refringunt."

²¹⁸ A II.1, 4-5.

Therefore, one can conclude that Leibniz does not defend an atomist theory, at least not in the classical sense of physical atomism, in any of his pre-Parisian writings. Explaining the cohesion of individual bodies, why one body stays the same without being dissipated under the effect of motion or through the shock imparted in collisions with other bodies, requires a different grounding. To ground the explanation of material reality or corporeal substance on the primary qualities of mechanism or the atomist explanation through hooks, barbs, etc., only gives an exclusively physical reason for their cohesiveness, not a *ratio plena*, a *ratio rationis*. The principle of bodily cohesion has to be of a different nature than the bodies themselves, i.e., there has to be a metaphysical reason for the individuation of body *in actu*, otherwise one would fall prey to either a recourse to occult qualities and miracles, or to a material redundancy that is itself unexplainable. As Leibniz states in yet another account of his intellectual formation: “In my youth I did not think I could explain anything (including cohesion) by appealing to divine will.”²¹⁹

He does not seem as positive about the vacuum either. In the letter to Thomasius from 20/30 April 1669, Leibniz acknowledges that the compatibility between Aristotle’s physics and the new natural philosophy can be proven, with the exception of the impossibility of the void and of motion in the void. When it comes to being a plenist or a vacuist, Leibniz declares his neutrality: “It seems to me that neither the void, nor the plenum are necessary and that the nature of things can be explained both ways.”²²⁰ He then lists the three parties in this debate: the

²¹⁹ Leibniz’s letter to Gerhard Maier from 17/27 July 1696, on the *Confessio Naturae* and his early concern with the problem of cohesion, A I.12, 736-737. “Ego multum de hoc argumento sum meditatus, nam intima naturae corporeae attingit. Adolescens olim credideram non posse explicari nisi ex peculiari voluntate divina, et dissertatiunculam ea de re meam a Spenero acceptam Spizelius inseruit suae cuidam *ad Reiserum Epistolae editae contra Atheismum*. Nunc tamen potius eo inclino, ut putem ex naturae legibus posse explicari, quanquam hae ipsae a Deo proficiscantur nec ex solis principiis mathematicis nascantur.”

partisans of the void (Gilbert, Gassendi, von Guericke); the plenists (Descartes, Digby, Thomas White, Gilbert Clerke, *De Plenitudine mundi*, 1660); and a third category, those who admit both possibilities (Hobbes and Boyle). Later in the letter, Leibniz claims that despite inherent difficulties, explaining the phenomena of rarefaction is possible even without postulating the void. By maintaining the alternative in this way, it seems likely that Leibniz is leaning towards the third, conciliatory position he lists, that of Boyle and Hobbes. Nonetheless, this neutral attitude towards either position could be of Hobbesian origin. Following Hobbes, early Leibniz might have distinguished between admitting the possibility of the void (a hypothetical vacuum, through God's absolute power) and considering its existence unnecessary for explaining natural phenomena (a real void that does not exist in nature).²²¹ In the same letter, he distinguishes between two ways in which discontinuity is introduced into an otherwise purely homogenous, continuous prime matter: 1) either contiguity disappears at the same time (for example: when between the parts there's a gap left empty – void) or 2) contiguity is preserved (when two things are kept in mutual contact, but are moving in different directions; for example: two spheres, one included in the other, can move in different directions and nonetheless remain contiguous, although they lose continuity).²²² Hence it follows, Leibniz continues, that if, from the beginning, creation gives rise to a discontinuous mass or a mass interrupted by voids, it equally results in forms of matter (*formas aliquas statim materiae concreatas esse*). But if mass (or primary matter) had from the start been continuous, forms must necessarily arise through motion, because the annihilation of certain parts, required to create interstitial *vacua* into matter, is “a

²²⁰ A II.1, 25.

²²¹ On Hobbes' views on the void, see Noel Malcolm 2002, *Aspects of Hobbes*, 187-191.

²²² The example of two contiguous spheres is used in the context of a critique of Descartes' principle of individuation; see *De Ipsa Natura*, 1698, A&G, 164. I look at this example in the last chapter.

supernatural thing I do not speak of.”²²³ Clearly, in the first part of this argument Leibniz objects to atomism and the void. Yet, in his notes leading up to the *Theory of Abstract Motion*, he writes:

Note well that we seem to be able to demonstrate from our principles that there is some sort of vacuum, and that the phenomena in the world cannot be saved if everything were full.²²⁴

What was Leibniz’s view on atoms and the void during the Paris years (1672-1676)? In the account of his earlier position given in the *New System*, he claims to have supported both atomism *and* the void for a long period of time. As a result, reconciling this personal testimony with the fact that neither before, nor during the Paris years did Leibniz hold a unique, definite stance about atoms and the void, becomes problematic and difficult.

In *De Summa Rerum*, Leibniz seems to claim the existence of a void, arguing that space itself is a vacuum, since there is no perfect fluid filling up all space:

If I imagine in space, instead of extension, a perfectly quiescent fluid which, when some body swims in it, is moved to fill its place, then I am simply saying that space is a vacuum. It would be matter, if the motion of a body were retarded by its motion.²²⁵

Only to jump immediately, in the next paragraph, to a denial of the existence of perfect fluids:

One must examine along what line each point is moved, in order to prove that each point is moved now along one line, now along another – granted which something absurd will follow: namely, that a continuum is composed out of minima. From this it will also

²²³ A II.1, 27. “[...] de annihilatione certarum partium ad vacuitates in materia procurandas, quia supra naturam est, non loquor.”

²²⁴ A VI.2, 185.

²²⁵ December 1675, “On Matter, Motion, Minima, and the Continuum,” A VI.3, 466; Parkinson, 12.

follow that it is impossible that there should be a perfect fluid which fills all things, i.e., it will follow that space has to be understood as a vacuum.

This passage is a clear criticism of Descartes idea of subtle matter in *Principles* part III, articles 49 and 50. In several fields, Leibniz locates Descartes' error in the belief that the real distinction between parts implies their separability. What defines an absolute fluid is its absence of cohesion, the separability of its parts, which is only suited to an abstract, passive matter. In this sense, Leibniz considers that postulating the separability of *minima* was an error common to both the atomist hypothesis of absolute firmness and the Cartesian hypothesis of absolute fluidity. Therefore, in the longest, most structured text written during his Paris stay, Leibniz denies atoms, as well as perfect fluidity:

I myself admit neither Gassendi's atoms, i.e. a body that is perfectly solid, nor Descartes' subtle matter, i.e. a body that is perfectly fluid. [...] If a perfectly fluid body is assumed, a finest division, i.e. a division into minima, cannot be denied; but even a body that is everywhere flexible, but not without a certain and everywhere unequal resistance, still has cohering parts, although these are opened up and folded together in various ways. Accordingly the division of the continuum must not be considered to be like the division of sand into grains, but like that of a sheet of paper or tunic into folds. And so although there occur some folds smaller than others in infinite in number, a body is never thereby dissolved into points or minima.²²⁶

Although this seems to be Leibniz's definitive position and is corroborated by earlier writings,²²⁷ there are texts written a few months earlier in which it looks as if he advocates some sort of atoms:

²²⁶ A VI.3, 554-555; Arthur 2001, 185.

If some atom once existed, it will always exist. For liquid matter which surrounds it and is a plenum will immediately endeavor to break it up since it disturbs its motion, as can easily be shown.

To this, he adds straightway, “[...] there necessarily exists an interspersed vacuum, which is not inconsistent with a physical plenum.”²²⁸ It appears we are again dealing with a metaphysical vacuum as opposed to an actually existent one. Still, months later, in “A Chain of Wonderful Demonstrations about the Universe” (12 December 1676), Leibniz shifts views once more and claims that the argument for the infinity of space: “[...] also proves that there is no vacuum, whether interspersed or great, since it is possible for all things to be filled.”²²⁹ Now he claims, if plenitude is granted, atoms are also proved. But atoms are also demonstrated in the absence of a plenum (sic!), “[...] from the mere consideration of the fact that everything which is flexible is divided into points.”

Conclusion

The purpose of this section was to examine the hypothesis that during his early years, Leibniz was committed to an atomist theory of matter. In a short amount of time, his thought twists and turns regarding positions on atoms and/or the void, reflecting his shifting views of substantial forms or individuation. By highlighting the discontinuities regarding this aspect of his philosophy, I do not wish to relativize its importance. His arguments and objections to atomism

²²⁷ In “On Minimum and Maximum. On Mind and Body,” Autumn 1672-Winter 1673. A VI.3, 97. “Nullum datur Minimum, sive indivisibile in spatio et corpore.” Also, as early as 1670/1671, in *De Materia Prima*, A VI.2, 280, Leibniz denies that there are any ultimate constituents of matter, physical atoms or Gassendian atoms: “Nullae sunt Atomī, seu corpora quorum partes nunquam distrahuntur.”

²²⁸ A VI.3, 473; Parkinson, 23.

²²⁹ A VI.3, 585; Parkinson, 109.

(its recourse to “perpetual miracles”) are taken up again in his mature writings, thus lending credit to the idea that this early Leibnizian anti-atomist stance had, in fact, for the first time, directed his attention towards the role of God in relation to the laws of nature. Still, whether or not he had adopted the conceptual model of physical atomism in the second half of the 1670’s, it is not until the publication of the *New System* (1695), that will Leibniz publicly discuss atoms and atomism again.

Before the discovery of “substantial atoms,” in a text written in his supposed atomist period, Leibniz presents a position on substance outstandingly similar to his complete concept theory:

In my view a substance, or, a complete being, is that which by itself involves all things, or for the perfect understanding of which the understanding of nothing else is required. A shape is not of this kind; for in order to understand from what a shape of such and such a kind has arisen, we need to have recourse to motion. Each complete being can be produced in only one way; the fact that figures can be produced in various ways is a sufficient indication that they are not complete beings.²³⁰

Either triangles or squares can be used to form the same rectangle, but at this point the method of production can only prove that shapes and figures are incomplete beings or concepts.

Leibniz’s Soul Pointilism: From the Resurrection of Body to the Indestructibility of Bugs in Bugs

Early modern natural philosophy challenged hylomorphism and the basic building-blocks of Scholastic Aristotelian ontology, substantial forms, were either entirely rejected or deemed

²³⁰ A VI.3, 400; Parkinson, 115.

highly contentious notions.²³¹ In their attempt to reform this framework, early modern natural philosophers proposed several specific alternatives, from elemental mixture doctrines (as was the case for Paracelsianism), to the rediscovery of ancient, physical atomism, or to the Scotist hypothesis of a *forma corporeitatis* and *semina rerum* or *minima naturalia* doctrines.²³² My aim here is to discuss and re-contextualize what I consider to be Leibniz's own specific alternative to hylomorphism: his early doctrine of the "flower of substance."

In his 1671 text entitled *On the Resurrection of Body*, Leibniz developed the peculiar doctrine of the "flower of substance" as an attempt to solve the problem of bodily identity after the resurrection or the hypostatic union of human and divine natures in Christ.²³³ As he himself alludes to in a text from the Paris period entitled "On the Seat of the Soul" (1676), this "flower of substance" theory is a cognate of numerous similar Seventeenth-century doctrines, most of which advocated versions of the plastic power hypothesis and/or the *semina rerum* corpuscularian theory of matter, i.e. the essence of humans being contained in "seeds."²³⁴ A highly original version of the *semina rerum* theories, Leibniz's *flos substantiae* is a formative principle coextensive with the entire body, corporeal yet subtler than the common or gross matter that makes up the remainder of it. This flower of substance is present in the animal spirits, but nevertheless non-identical with them. All of a piece, this substance is indivisible, yet able to contract itself back into the "fountain of life" as an extensionless, indivisible, and indestructible

²³¹ For a detailed account of the changing views regarding hylomorphism, see Ariew (2011), chapter 4, "The Cartesian Destiny of Form and Matter and its Critics", 127-157.

²³² A comprehensive account of how different versions of Renaissance anti-Aristotelianism and the newly formed mechanical and corpuscular philosophy counteracted Scholastic thought can be found in Garber, "Physics and Foundations", chapter 2, in Park&Daston (2006).

²³³ A II.1, 183-185.

²³⁴ A VI.3, 480.

point containing the mind or soul.²³⁵ In recent years, scholars have shown an increasing interest in Leibniz's doctrine the flower of substance.²³⁶ Yet, discussions of this particular Leibnizian doctrine rarely amount to more than an incomplete story. All the accounts of Leibniz's doctrine of the flower of substance share a common feature: historically, they assume the same continuist view regarding Leibniz's philosophical development that I described in the introduction. In this case, the continuist position holds that developed throughout his early years and the Parisian period as a philosophical answer to a series of problems connected with the belief in the resurrection of the same body, the flower of substance doctrine would prefigure Leibniz's late philosophy, the *Monadology*.²³⁷

Against this continuity claim, I argue that by 1686, in his lengthy, ecumenical *Examination of the Christian Religion*, Leibniz merely rehearses some of the details of his previous doctrine of the "flower of substance", reiterating aspects he had fleshed out earlier in his writings. This time, the whole doctrine is expounded half-heartedly, with less effort being made to present it as a solid, plausible hypothesis. Consequently, the extent of Leibniz's commitment to the *flos substantiae* doctrine in 1686 is not only unclear, but problematic. By this time, mature Leibniz's metaphysics of substance takes a definite form. Finally, I will argue that the doctrine itself and some of the claims connected to it in 1669-1676 were abandoned by the time of the *Examination* (the Rabbinical *Luz* comparison, for example). And the single most significant claim in this context, the "punctual soul" hypothesis, is also left aside in Leibniz's subsequent writings, once

²³⁵ *On the Resurrection of Body*, A II.1, 184.

²³⁶ The most comprehensive treatment of Leibniz's doctrine of the flower of substance is found in Strickland 2009, "Leibniz, the 'flower of substance', and the resurrection of the same body," *Philosophical Forum*, 40(3), 391-410.

²³⁷ To give an example, Stuart Brown argues Leibniz continues to accept some of the components of the doctrine in his late years: see Brown (1998), 10-12 and Brown (1999), 279-282. More recently, Mercer (2001) and Busche (2004), 150 and 158 – also hold the same view.

he develops ideas central to his mature philosophical views, such as the unity of individual substances or the denial of any direct causality between mind or soul and body.

As follows, I re-contextualize Leibniz's doctrine of the flower of substance in the larger framework of early modern Paracelsian and *semina rerum* theories and demonstrate the way in which this theory is directly related to Seventeenth-century "chymical"²³⁸ theories about *palingenesis*. By looking at the immediate context in which this theory was issued, I explain the reasons leading to Leibniz's adoption of such an "obscure" doctrine, which in 1686 he claims to be based not on the principles of philosophers, but on the principles of contemporary "chemists."²³⁹

Sources and uses of the "flower of substance" theory

There are various possible sources for the "flower of substance doctrine", but my focus here turns to those specific sources with which Leibniz himself relates his doctrine. Thus, in his 1685/1686 *Examen Religionis Christianae*,²⁴⁰ Leibniz holds that the idea of an indestructible kernel or flower of substance can easily be extracted from the "principles of the chemists." Who were those Seventeenth-century natural philosophers or "chymists" that held similar views? In addition to connecting the doctrine with the Rabbinical religious tradition, Leibniz appeals to several other contemporary doctrines or scientific treatises and experiments. One of the given sources is Pierre Borel's collection of microscopic observations on plants and animals that

²³⁸ I use this term in accordance with Newman&Principe's (1998) use of "chymistry," as a neutral term describing the relationship between Seventeenth-century chemistry and alchemy.

²³⁹ A VI.4, 2454.

²⁴⁰ A VI.4, 2454: "[...] dici posset in unoquoque corpore esse quendam substantiae florem, cujus natura etiam ex Chymicorum placitis illustrari posset [...]."

predates Robert Hooke's *Micrographia* (1665).²⁴¹ However, Leibniz supports his flower of substance doctrine on the regeneration of plants from seeds, the idea that plants could be "chymically" resuscitated even after undergoing calcination. This regenerative capacity of plants proves that there is a seminal part able to resist fire and be preserved even in the ashes.²⁴² Promoted by Paracelsianism and some of the Paracelsians to which Leibniz directly refers to, namely Athanasius Kircher and Joseph du Chesne or Quercetanus, the interest in the experimental, human-handled "chymical resuscitation" or revival of plants and animals, a process otherwise known as "palingenesis", thrived in the Seventeenth and Eighteenth-centuries.²⁴³ The works of Jesuit natural philosopher Athanasius Kircher and French physician Joseph Du Chesne gathered several experimental recipes for *palingenesis*. Again, it would be conjectural to assume Leibniz's direct knowledge of these *experimenta*. Nonetheless, descriptions of Kircher and Du Chesne's experiments can be found in the more familiar works of another contemporary of Leibniz's: Sir Kenelm Digby. Digby replicated and described Duchesne's and Kircher's palingenetic processes in his 1661 *Discourse Concerning the Vegetation of Plants* held in front of London's Gresham College assembly. As in Leibniz's case, this ultimately led Digby to consider a parallel with the resurrection of the dead.²⁴⁴ Moreover, Robert Boyle also refers to the "chemical experiments" of Du Chesne and Kircher, in his *Some Physico-Theological Considerations About the Possibility of Resurrection* (1675), a work annotated by Leibniz: "Nor yet will I here debate what may be said in favour of this conjecture

²⁴¹ Pierre Borel (1620-1671), *De vero Telescopii Inventore... Accessit etiam Centuria observationum microscopiarum*, The Hague, 1656.

²⁴² A II.1, 185.

²⁴³ On palingenesis, see Principe 2012, 131-134.

²⁴⁴ See Digby 1661, 76-85, especially 85: for the analogy between *palingenesis* and resurrection.

from those chemical experiments by which Kircherus, a Polonian physician in Quercetanus, and others, are affirmed to have by a gentle heat been able to reproduce, in well closed vials, the perfect ideas of plants destroyed by the fire.”²⁴⁵

Identifying the religious sources for Leibniz’s doctrine of resurrection is not a simple task either. What sources, if any, could one find for the doctrine Leibniz frequently calls “the Luz of the Rabbis”? In a footnote to his letter to Arnauld from 30 April 1687, the editors of the *Akademie Ausgabe* reference a Seventeenth-century collection of homilies taken from diverse kabbalistic, aggadic, and midrashic works. A possible source for Leibniz’s views on the “small bone” or “Luz of the Rabbis” is Israel ben Benjamin of Belzec’s *Yalkut Hadash* (1648).²⁴⁶ Column 44 of *Yalkut Hadash* notes that, “on (the issue of) the small bone” (*ha-etzem ha-qatan*): “[...] from it shall begin the resurrection of the dead, as explained above at note 36. The bone will not rot and the Holy, Blessed be He, will soften it with dew and from it He shall raise up the body again at resurrection.”²⁴⁷ The belief that *Luz* (the “coccyx” bone in Aramaic) is indestructible and will form the kernel for the resurrection of the body was widespread in Talmudic literature and, moreover, accepted as an axiomatic truth by both Christian and Muslim theologians and anatomists.²⁴⁸

²⁴⁵ In Stewart 1991, 196. According to the editors of the *Akademie Ausgabe*, Leibniz’s marginalia on Boyle’s text (A VI.3, 237-241) were written right before his text “On the Seat of the Soul” (February 1676) in December 1675 or the first half of February 1676 (A VI.3, 478).

²⁴⁶ See footnote in A II.2, 190.

²⁴⁷ I thank Adrian Pirtea (Freie Universität, Berlin) for his scholarly effort in providing me with a translation of this Hebrew source. A full version of the text is available through Harvard University at: <http://babel.hathitrust.org/cgi/pt?id=hvd.hwmjic;view=1up;seq=1> <http://catalog.hathitrust.org/Record/011562741>).

²⁴⁸ For more on the ancient views on “luz”, see <http://www.jewishencyclopedia.com/articles/10200-luz>.

Between 1668 and 1671 Leibniz works with different definitions of substantial form viewed as the principle of individuation of substances and of cohesion in bodies that he will then later consecutively abandon. He also rejects both the traditional Scholastic interpretation of substantial forms and the contemporary atomist one on the count of their unnecessary multiplication.²⁴⁹ As a consequence, by 1670-1671, the term “substantial form” almost completely vanishes from Leibniz’s vocabulary and is instead replaced by the concept of mind or soul reinterpreted through the concepts of indivisible and point. In his correspondence with Thomasius (1666-1671) treated in the former chapters, Leibniz identifies space or spatiality as the main attribute of matter, so that forms have to be deduced from the passive power of this matter through spatial translation. As a result, forms are able to become some sort of points or indivisibles.

Why did Leibniz appeal to this “obscure” doctrine of the “flower of substance” in the attempt to solve the issues of individuation and cohesion, albeit in a different context? The first reference to the flower of substance doctrine in Leibniz’s work occurs in a text written during this period entitled “On the Incarnation of God, or, on the Hypostatic Union” (1669-1670). Besides muddling their explanation of the Eucharist, the Scholastics, Leibniz contends, also struggled to explain hypostatic union. He thus exposes a partial version of the flower of substance doctrine, one meant to solve the problem of explaining the union between divine and human nature in Christ. For Leibniz, the union between mind and body is amongst the cases of hypostatical union exemplified by Christ’s natures:

In the human body, it should not be thought that the soul is hypostatically united to all corpuscles in it, since they are constantly changing; the soul inheres in the very centre of

²⁴⁹ A II.1, 11.

the brain, to a certain fixed and inseparable flower of substance which is most subtly mobile in the centre of the animal spirits.²⁵⁰

Let me spell out the reasoning behind this a bit. Leibniz believes that he can offer a more adequate explanation of hypostatic union by replacing the hylomorphic model with his “flower of substance” doctrine, a version of *semina rerum* theory modeled on Paracelsian palingenetic processes. From this text, it is clear that, as early as 1669, the body and the mind supposed to individuate it are characterized by fundamentally different roles and functions. The mind or soul is immortal, while the body itself is corruptible and subject to annihilation or destruction. These two radically heterogeneous aspects Leibniz ascribes to soul and body also explain why in 1669 their union is only assignable or describable in terms of a miracle. The gradual disappearance of “substantial form” was paralleled by a reconfiguration of the way in which Leibniz conceived the relationship between two different ontological levels: the spiritual realm of minds and the physical realm of bodies.

Soon thereafter, in May 1671, Leibniz writes to Duke Johann Friedrich of Hannover and again uses his specific, quasi-atomist alternative to hylomorphism. In “On the resurrection of body” (1671), Leibniz claims that the flower of substance doctrine gives a better explanation of bodily identity problems involved in resurrection. The Scholastic view of matter plus form as the essence of each thing fails to explain how the same body can return, because substantial form is extinguished through corruption and Scholastics have assumed “that there is no return from privation to possession.”²⁵¹ As a consequence, Leibniz claims, they have been unable to understand how one and the same body can be resurrected. As I have already discussed, the Scholastic-Aristotelian *reditus* principle can be summarized as follows: whatever is deprived of

²⁵⁰ A VI.1, 553.

²⁵¹ A II.1, 183.

substantial form or its numerical identity through corruption or annihilation, cannot regain it. Here Leibniz argues that the *flos substantiae* is better equipped than substantial form to restore the numerical identity of one and the same body. After much thought, he affirms the idea that humans, “as well as animals, plants, and minerals” possess a certain *Kern der Substanz*. So subtle that it is conserved even in the burnt ashes, this nucleus or core of substance persists invariably despite the fact that its outer shell is in a perpetual flux of changes and its external organs might be destroyed.²⁵² Further on, Leibniz explains that this nucleus of substance in some way encapsulates in itself the whole body. In this way, he rejects the hypothesis that, in the case of a severed limb, for example, due to the co-extensiveness of the flower of substance with the whole body, a part of it would remain in the limb detached from the rest of the body.²⁵³ The categories of quantity, augmentation and diminution, do not operate at the level of the flower of substance. Despite its corporeal status, this nucleus of substance does not increase or decrease in size. Furthermore, if corruption or destruction of the body occurs, as for example, in the case of phantom limb pain, the flower of substance is able to contract itself back into the fountain of life: “[...] when a member is cut off or rots away, this subtler part returns to the fountain of life, to which the soul itself is implanted.”²⁵⁴ Again, despite its corporeal nature, the flower of substance, the “subtler part” to which Leibniz refers, is nevertheless all of a piece and as such exists as a single unified thing, incapable of being divided.

As Antonio-Maria Nunziante has argued,²⁵⁵ this move suggests that by 1671 bodies acquire a new ontological status for Leibniz. If every human body encloses a seed, which

²⁵² A II.1, 175.

²⁵³ A II.1, 185.

²⁵⁴ A II.1, 185.

contains, as if in vitro, its substantial core, and if this substantial nature is destined to be conserved despite the perishing of its external components, bodies themselves acquire an incorruptible nature. The most subtle reason for this new status of corporeity resides in the necessity of a “conservation” of the body, based on the soul’s memory of previous corporeal perceptions. Traces and memories are necessary for the resurrection of the body, since without them there would be no valid criterion of judgment, punishment or reward after humans are resurrected.²⁵⁶ While the external organs that form the body are corrupted or destroyed, the body’s essence or *idea corporis* is “enclosed in the incorruptible punctuality of the mind or soul.”²⁵⁷ This flower of substance contains the *forma corporeitatis* common to all material substances and precedes specific forms.

Throughout these early texts Leibniz seems to argue that both Scholastics and his contemporaries encounter various difficulties explaining the possibility of resurrection (how souls detached from bodies could keep their individuality) while he, on the other hand, provides a simpler solution. This solution amounted to claiming that in the *fons vitae*, the soul continues to possess a spatial localizability even post-mortem. Moreover qua seminal, active principle – the “flower of substance” is able to act as a salient point. Contracted into its origin when the body is entirely disintegrated, it is in a position to (re)-diffuse itself into a quantity of matter once again, reclothing the soul with its previous “material dregs” at resurrection.²⁵⁸ In the same letter to Johann Friedrich from 21 May 1671, Leibniz describes the flower of substance as the most

²⁵⁵ In Nunziante 2002, chapter 2, “La struttura co-essenziale dell'individualità organica”, 81-82.

²⁵⁶ Leibniz makes a similar point in his mature period with regards to Descartes’ views on the union between body and soul and how Cartesianism fails to give an adequate account of resurrection. See Leibniz’s letter to Malebranche from June 1679 in Robinet (1955), 118.

²⁵⁷ Nunziante 2002, 82.

²⁵⁸ A II.1, 175.

proximate instrument and vehicle of the soul, situated in the centre of the brain and constituted in a mathematical point.²⁵⁹ Through the distinction between physical point and mathematical point, the same letter identifies mind or soul with point in order to exemplify the relationship of interconnectedness between mind and body.

Conclusion: The Fate of “Pointilism” in Leibniz’s Mature Works

Once again, if there is a shift in vocabulary (disappearance of “substantial form”) and a change in concerns (resurrection, incarnation), then how is Leibniz’s flower of substance different from substantial forms? In other words, in terms of the continuist view of Leibniz’s philosophical development: what distinguishes early Leibniz’s flower of substance doctrine, on the one hand, from his re-adoption of substantial forms years later (1678), on the other?

Leibniz’s *flos substantiae* theory presents the hypothesis of a kernel or nucleus of substance that persists always and everywhere in the case of each particular substance. This kernel suffices to individuate one substance from another. Common to all substances, this kernel can in fact be interchangeably called matter or form, because, as Leibniz claims, its nature is corporeal (he identifies it with the *Luz* of the Rabbis) and its operation is modeled on “chymical” *palingenesis*. Thus, it can be indifferently called matter, insofar as it is the substrate of change, or form, insofar as it makes the substance one, indivisible thing.²⁶⁰

This “pointillism” about souls is not the only ontology of “point” Leibniz develops. In contexts quite different from proving the immortality of the soul or discussing the Christian doctrine of resurrection, his mature works also attach a central argumentative role to points seen

²⁵⁹ A II.1, 109.

²⁶⁰ Although I believe this to be an important distinction, I also think we can consider early Leibniz’s different accounts of substantial form and the flower of substance doctrine in tandem, as an expression of the same concern over how to re-identify bits of matter over time and space.

as some sort of indivisibles. Once again, these indivisibles are not atoms in a classical sense, nor Gassendian or Sennertian atoms.

Perhaps for ecumenical reasons, and again in the context of his theory of bodily resurrection, Leibniz continues to appeal to his earlier flower of substance doctrine in the 1680's. In 1686, in the *Examinatio Religionis Christianae* he acknowledges that:

[...] in each and every body there is a sort of flower of substance, the nature of which may be illustrated from the principles of the chemists, and which is preserved in the course of numerous changes and always subsists exactly as it was for each and every person at his birth.²⁶¹

While reiterating his earlier claim that one individual's flower of substance should not be confused with another's, the *Examination of Christian Religion* offers no explanation for why Leibniz would support the doctrine and lacks any mention about the location of the flower of substance or its mode of operation. The Rabbinical bone or *luz* used to illustrate the doctrine is also rejected as an unnecessary hypothesis.

What were the reasons for the dismissal of a doctrine early Leibniz held to explain difficult items of Christian doctrine such as the incarnation or resurrection? By 1686, Leibnizian metaphysics denied any direct causality between the soul and the body, rendering an intermediary seminal principle or entity like the *flos substantiae* superfluous. It seems likely that whatever the original "chymical" or theological understanding of the theory, by his middle years Leibniz rejects the notion of a *flos substantiae* and disentangles it from the related hypothesis of the punctual nature of the soul.

The problem of the nature of the soul and its subsistence resurfaces soon in Leibniz's works. In a letter sent to Antoine Arnauld from 30 April 1687, Leibniz explains the persistence

²⁶¹ See A VI.4, 2453.

of movement in the sectioned part of an insect's body through the subsistence of its soul in one of the two bodily parts. Moreover, he argues that although it is possible that the soul possesses a body composed of parts animated by separate souls, the soul or form of the whole thing is not for that reason made up of the souls or forms of the composing parts. In the case of insects being cut up, Leibniz adds, it is not necessary for the two halves to still be animated in order for them to possess some motion. Division or destruction aside, the soul of the complete insect remains in one of its parts. The soul will subsist at its destruction, alive, in this certain part, the same way it was present and alive in the beginning, for the formation and growth of this insect:

Nevertheless, although a soul can have a body made up of parts animated by other souls, the soul or form of the whole is not, as a consequence, composed of the souls or forms of its parts. It is not necessary for the two parts of an insect cut in half to remain animated, although there may be some movement in them. At very least, the soul of the whole insect will remain only on one side. And since, in the formation and growth of the insect, the soul was, from the beginning, in a certain part that was already living, after the destruction of the insect it will still remain in a certain part that is still alive, a part as small as is necessary for it to be protected from the action of someone tearing or destroying the body of that insect. Hence, we do not need to imagine, with the Jews, that there is a little bone of insurmountable hardness in which the soul takes refuge.²⁶²

The Rabbinical *luz* and, implicitly, the flower of substance doctrine are once again set aside and rejected as superfluous explanations.²⁶³ The context has now changed. By 1687, Leibniz develops an entirely different solution to what Daniel Garber has aptly called the “division-to-

²⁶² See A II.2, 190.

²⁶³ Late Leibniz even more clearly rejects his earlier doctrine of the flower of substance: “[...] and the soul is not located in certain atoms united to it or in a small, indestructible bone such as the *Luz* of the Rabbis”. See *New Essays*, A VI.6, 232-233.

dust problem:”²⁶⁴ what are the limits to the divisibility of a substance or body, if any? Whereas at the time of the *flos substantiae* theory Leibniz seemed to lean towards a solution to the problem in terms of a *semina rerum* doctrine, his answer now develops as a result of a discussion with Arnauld on the unity of individual substances. What the larger context of this debate with the French theologian entails is the object of the next chapter.

²⁶⁴ Garber, 2009, “Reforming Mechanism: Unity,” 62. I wish to underline that the source of the problem of the limits of divisibility is Aristotelian. In *De anima* 411 b20–21, Aristotle had already presented the issue of what happens to the soul of insects, worms, etc., when they are sectioned or divided: “It is a fact of observation that plants and certain insects go on living when divided into segments; this means that as each of the segments has a soul in it identical in species, though not numerically identical in the different segments, for both of the segments for a time possess the power of sensation and local movement. That this does not last is not surprising, for they no longer possess the organs necessary for self-maintenance. But, all the same, in each of the bodily parts there are present all the parts of soul, and the souls so present are homogeneous with one another and with the whole; this means that the several parts of the soul are indissoluble from one another, although the whole soul is divisible. It seems also that the principle found in plants is also a kind of soul; for this is the only principle which is common to both animals and plants; and this exists in isolation from the principle of sensation, though there is nothing which has the latter without the former.” See Ross 1931, *The Works of Aristotle*, vol. 3, translated by J.A. Smith.

CHAPTER FOUR:
TOWARDS A MORE FUNDAMENTAL ONTOLOGY: THE FATE OF
INDIVIDUATION

Introduction

The reception of Leibniz's work in the Eighteenth-century regarded the German thinker as the author of a "system" or a combination of "systems": that of the "pre-established harmony" following the discussions around the *New System* (1695), the "system of optimism" in wake of his *Theodicy* (1710), or the "system of monads", after the publication of the German and Latin translations of his *Monadology* (1720; 1721). Despite the fact that our present knowledge of the Leibnizian corpus has increased considerably since the publication of Gerhardt's Nineteenth-century *Leibniz Philosophische and Matematische Schriften*, such reductionist and syncretic pictures of a philosopher's thought continue hold sway in Leibniz studies. In his influential 1986 monograph, *The Philosophy of Leibniz*, Benson Mates echoed a similar view on Leibniz by asserting that, over his entire career, Leibniz is astonishingly consistent in terms of his main philosophical points. Specifically, Mates claims that for more than five decades, Leibniz persistently maintains the thesis that the whole entity of matter and form is what individuates substances, every property matter and form instantiate being essential to the identity of an individual. He never wavered from a Nominalist, Suárezian particularist ontology and some sort of super-essentialism for which all properties of individuals, even contingent ones, become essential to them. In this chapter I further criticize this continuist view of Leibniz's philosophy

and return to the point from which my investigation first began. Against the continuist account, I show that far from being a constant concern, Leibniz's interest in individuation seems to fade towards the end of his life. First, I will begin by making some textual observations on the topic of individuation in the Leibnizian *corpus*, which will then guide my questioning and argument.

The thematic index of the monumental *Akademie Ausgabe* detects two strands of strong frequency when it comes to the vocabulary of "individuation" in Leibniz's works. The first is found in Leibniz's early works, his 1663 (deeply Scholastic) bachelor's thesis, *Disputatio Metaphysica de Principio Individui* and in a number of his other essays, including the *De Transsubstantiatione* (1668), *Confessio philosophi* (1672), and *Meditatio de Principio Individui* (1676), as well as the *Discourse* and the correspondence with Arnauld. The second is present in the late *New Essays on Human Understanding*.²⁶⁵ Over this period of time, Leibniz's views about individuation twist and turn, over a host of disparate theses that go beyond his 1663 view of the "whole entity" (matter plus form) as the individuating principle, at times making 180 degree shifts.

In addition to exploring whether the principle of individuation is internal or external to a substance, he also questions whether it amounts to some kind of haecceity or substantial form. Yet, surprisingly enough, such deep concerns about "individual" or "individuation" are entirely absent from the final draft of Leibniz's 1714 "Monadology." It turns out Leibniz had deleted "choses" and "individus" from a previous draft of article 9,²⁶⁶ which restated the identity of indiscernibles:

²⁶⁵ A VI.6, 230; 289-290; 431.

²⁶⁶ André Robinet 1974, *Leibniz. Discourse de Métaphysique (et) Monadologie: texte définitif*, 72. The English translation is from A&G, 1989, 214.

It is also necessary that each monad be different from each other. For there are never two beings [things; individuals – both deleted] in nature that are perfectly alike, two beings in which it is not possible to discover an internal difference, that is, one founded on an intrinsic denomination.

Even earlier, in the *New Essays*, Leibniz's appeal to the problem of individuation seems more of a concession made to Locke's discussion of identity in the *Essay* (1689), to the point that he almost claims that admitting the existence of two perfectly similar and indistinguishable individuals would altogether preclude a principle of individuation.²⁶⁷ Given Leibniz's extensively documented concern for the topic of individuation, from his youth to the aftermath of the *Discourse*, what are the reasons for its near dismissal or disappearance from his late major works such as the *New Essays*, the *Monadology*, the *Principles of Nature and Grace* or even the correspondence with Clarke? With this question in mind, my goal here is two-fold. In order to fully grasp the significance of this change with respect to Leibniz's views about substance and individuation, we need to 1) turn to the intellectual context of the Seventeenth-century and the living philosophical debate between Leibniz and his contemporaries (Descartes and Gérauld de Cordemoy) and 2) trace the fate of some of the early and middle period Leibnizian views on substance and the individual in his late works.

Thus, in the first section, I claim that the *New System*, published towards the end of Leibniz's middle period (1695), marks an important landmark in his philosophical evolution, one that has to do with a deep terminological and ontological shift in Leibniz's metaphysics of substance. There Leibniz elaborates on the concept of "simple substance", the future synonym of "monad"²⁶⁸: no longer are substances characterized in terms related to individuation

²⁶⁷ A VI.6, 230.

(completeness, predicative complexity, etc.), but in terms of simplicity. The language of “individuation” is abandoned in favor of a language of “simplicity” and “unity” and it looks like the focus changes from what makes substances “individual” to what makes them “simple” (and truly “one”). I show that this shift was influenced by a confrontation on two levels: 1) a first, direct confrontation with Cartesian physics through the critique of Descartes’ notion of extension and his principle of individuation through shared motion 2) a second confrontation, with Cartesianism *per se*, apparent in Leibniz’s critique of Gérauld de Cordemoy’s quasi-metaphysical atomism and its attempt at improving Descartes’ individuating principle. Last, but not least, I argue that this double confrontation ultimately led Leibniz to the formulation of a more fundamental ontology, in terms of the “metaphysical atomism” of his *Monadology* (1714).

Finally, in the last section, I analyze the different treatment Leibniz applies to some of his early and mature views about individuation in his later works: most notably, the principle of the identity of indiscernibles and the more general issue of the internality or externality of the individuating principle. Can individual accidents function as a principle of individuation for Leibniz? My initial chapter shows that Leibniz expressed one such view very early, in the *Confessio philosophi* of 1672-1673, in which he radically departed from the common Scholastic, internal individuating principle and identified haecceity as the principle of individuation consisting in the external spatio-temporal circumstances. I claim that despite its “apparent singularity”,²⁶⁹ early Leibniz’s adoption of an idiosyncratic, external (and thus non-Scholastic) principle of individuation, defined in terms of time and space, can neither be passed over, nor

²⁶⁸ The term “monad” appears in Leibniz’s correspondence soon after: letter to Fardella 3/13 September 1696; but also earlier, in the letter to L’Hôpital from 22 July 1695, where it is used as a synonym for “true unity.”

²⁶⁹ Giving an otherwise elegant and thorough account of individuation across Leibniz’s work, Garber 2009, does not approach this text. See page 60, n. 22.

merely relegated to an isolated episode. What happens to these relational, spatio-temporal criteria of individuation? I illustrate how this relational aspect of individuation is re-worked from the *Discourse* to the late works, being initially internalized in Leibniz's theory of complete concepts and then entirely rejected once the problem of individuation itself becomes secondary. In the same way, the complete concept theory of the *Discourse* itself seems to become secondary for Leibniz. Examining his thought on individuation after the *Discourse on Metaphysics* will not only help establish why Leibniz' interest in the topic seems to fade away, but it will also shed light on some of the reasons for which the argument for individuation based on the predicate-in-notion principle and complete concepts becomes overshadowed in his later works.

Seventeenth-century Views on Individuation: Leibniz's Critique of Descartes and Cordemoy

Several historical aspects have to be fleshed out when discussing some of the most prominent Seventeenth-century philosophical views on individuation.

First, despite the prominence of controversies over individuation during the Middle Ages, the medieval influence on similar early modern debates cannot be overestimated. One cannot ignore that early modern philosophers like Descartes or Leibniz had a partial and almost always, second-hand knowledge of the philosophers and theologians of the Thirteenth and Fourteenth-centuries such as Thomas Aquinas, Duns Scotus, or William of Ockham.²⁷⁰ While being a matter of intense controversy from Boethius to the end of the Middle Ages, the medieval problem of individuation – what explains the individuality of an individual – seems to have lost much of its

²⁷⁰ Ariew 2012, "Descartes and Leibniz as Readers of Suárez: Theory of Distinctions and Principle of Individuation."; and Courtine 1990, *Suárez et le système de la métaphysique*, "Métaphysique scolaire et pensée moderne".

vigor in the early modern period. Yet, despite this lack of prominence given to discussions of individuation in Seventeenth-century philosophy, interest in the topic was revived by a powerful and multifaceted renewal of either Aristotelianism, or Thomism and Scotism. Only by turning to these Late Scholastic strands of thought, we can fully grasp the significance of the question for Descartes and Leibniz – to those authors that were commonly called the *neo-scholastici*, the liberal Jesuit (and mostly Spanish) Scholastics of the Counter-Reformation. Each discussion of individuation and its related issues has to go through an examination of the *status quaestionis* for this Second Scholastics. Thus, one should note that, in the philosophical context of the early Seventeenth-century, Late Scholastics were divided between Thomistic and Scotistic views on the principle of individuation, that is, between *materia signata*, a designated portion of matter, and an individuating form or soul as the principle of individuation.²⁷¹ Still, the majority of early modern textbook authors argued against the Thomist position of quantified matter as the principle of individuation and instead opted for the Scotist line claiming an ultimate specific difference (hecceity) or individual form for each substance. It is this shift from matter to form that became highly influential in Seventeenth-century philosophy, a position mature Leibniz adopted at the time of the *Discourse on Metaphysics* (1686) after arduous attempts of re-conceptualizing Scotus' *haecceitas*, and, certainly, a view Descartes could come up with when needed, if the delicate political issue in question asked for it.²⁷²

Secondly, even though Late Scholasticism helped shape the early modern approach to individuation, with Descartes and Leibniz the story became much more complex than the well-documented Late Scholastic influences let transpire. With the establishment of the new

²⁷¹ Ariew 2011, Chapter 4, 134-135. My work here builds upon Ariew 2009, 95-115.

²⁷² In his private correspondence with Jesuit Denis Mesland, on the Eucharist: see A&T, *Oeuvres de Descartes*, vol. 4.

mechanical philosophy, the relevance of metaphysical theses on the individuation of substances or physical bodies is judged upon and depends on the construction of a physical science or natural philosophy. While there is still much contention amongst scholars as to what would be a standard view of mechanical philosophy,²⁷³ Descartes and mature Leibniz were both staunch advocates of this new paradigm, embodied in the idea that every property of substance must be explained through its primary qualities: size, figure, and motion. Furthermore, despite unabated claims to the contrary from the Seventeenth century onwards (in Descartes' case), or in present scholarship for Leibniz, both Cartesian and Leibnizian physics are consistently anti-atomist. It is doubtful whether from the perspective of classical, "physical atomism" or even the "chymical", qualitative one contemporary to Descartes and Leibniz, the problem of individuation arises at all. If it does, it is unclear whether it solves any problems or just muddles the issue.²⁷⁴ One could assume, with a corpuscularian like Locke, that the mere existence of an infinity of atoms is the "principle of individuation." But absolutely hard atoms distinguished from one another by interstitial voids cannot be properly called "individuals" precisely on account of their being conceived as multiplicities of perfectly similar or indiscernible simple entities.²⁷⁵ On the other hand, a look at the chymical atomism typical of the works of Daniel Sennert raises a somewhat similar issue concerning individuation. Endowing atoms with qualities and making them

²⁷³ For two different views of Seventeenth-century mechanical philosophy, see Clericuzio 2000, 1-7, and Anstey, 2000, 1-4.

²⁷⁴ A similar point is made by Sophie Roux with respect to classical atomism and its views on the distinction of bodies/ substances and variety in matter: in "Descartes atomiste?", 265-266, in *Atomismo e continuo nel XVII secolo*, 211-273. Given the atomists' adoption of two such opposed principles as absolute firmness combined with a non-resisting medium (interstitial *vacua*) there is no *a priori* difficulty in explaining intermediary qualities.

²⁷⁵ Leibniz, *New Essays*, A VI.6, 230.

substantial form-encasing *minima*, like Sennert does, would lead to an unnecessary multiplication of substantial forms rivaled only by Scholastic hylomorphism at its peak.²⁷⁶

Scholastic substantial forms were one of the philosophical *idées reçues* that were met with fierce opposition in the Seventeenth-century.²⁷⁷ Surely, there were a few “co-religionaries” of form²⁷⁸ (such as Sennert or Leibniz himself), but for major early modern philosophers, Descartes being the most categorical, substantial forms had to be rejected on account of their incoherence or superfluity. The most noteworthy consequence of almost entirely eliminating Scholastic substantial forms like Descartes did, or almost endlessly reinterpreting them like Leibniz, was that substantial unity and individuation became impending problems for both metaphysics and natural philosophy.

In defining the nature of corporeal substances, the basic furniture of the world, Descartes had to find a middle ground between two alternatives: one the one hand, the inheritance of Aristotelianism in Late Scholasticism, on the other hand, the theories of those contemporary *novatores* such as Sennert and Basso. Thus, by eliminating all substantial forms besides the human rational soul, Descartes had changed the role substantial form had in defining the essence of substances. The two different roles matter and form played in defining substances for hylomorphism fused together in the notion of extension: extension defines the essence of a substance while also constituting its matter. Since extension takes up an essential role in defining both the formal and the material aspect of substances, what makes those substances

²⁷⁶ Leibniz, A II.1, 22.

²⁷⁷ Des Chene, *Physiologia* 1996, 53-54.

²⁷⁸ I borrow this term from Newman, “Structure and Essence in Sennert’s Corpuscular Theory”, 148: “[...] Sennert’s exalted view of form as the direct gift of a Creator God, having been passed on since the beginning of time and remaining responsible for the activity of matter, clearly committed him *ab initio* to a sort of theistic hylomorphism. His was a ‘religion of form.’ ”

individual, given that traditionally, their individuation was ascribed to either matter, form, or the compound of the two?

Descartes seems to have held a couple of positions on individuation throughout his career. In the case of informed matter, he held a view very similar to the Seventeenth-century Scholastics with which he was familiar. Thus, with respect to the human body he accepted a Scotist view. For the human body, the principle of individuation is the only substantial form of the Scholastics he did not abolish, the human rational soul. In the case of non-informed matter or extended things, his view was that motion individuates bodies.

Descartes developed the first position on the principle of individuation in an attempt to philosophically explain the Catholic theory of transubstantiation. Seventeenth-century controversies on the Eucharist frequently hit upon the problem of explaining what exactly individuates either substances (Jesus Christ's body, the Eucharistic species of wine and bread) or their accidents.²⁷⁹ In a letter to Mesland from 9 February 1645, Descartes gives a different account of individuation, one holding for both animate and inanimate bodies, as well as for the human body. With respect to the latter, its identity through changes is preserved due to its union with a soul. Bodies, Descartes claims, "[...] are numerically the same (*eadem numero*), only because they are informed by the same soul."²⁸⁰ He illustrates this through the example of humans naturally converting (or "transubstantiating") other matter by incorporating it or making it a part of their bodies, bodies that are themselves informed by a soul. Descartes similarly explains transubstantiation as the soul of Christ supernaturally informing the matter of the host upon consecration.²⁸¹ But as Roger Ariew has carefully argued through an analysis of the early

²⁷⁹ In fact, this seems to have been an authentic Gordian knot for both Descartes and Leibniz.

²⁸⁰ A&T IV, 167.

Cartesian reception, the first option, Descartes' "two-tiered" principle of individuation, was only available to a private circle until the publication of Descartes' correspondence with Mesland in 1811.²⁸²

Superficially, this lack of any traditional discussion of the topic of individuation in the works Descartes published during his lifetime might look like a dismissal of the problem altogether. Yet when Descartes does officially address the issue of individuation in articles 23 and 25 of the *Principles of Philosophy* Part II, he gives a "physical" principle of individuation. Article 23 holds that: "[...] all the variety in matter, or all the diversity of its forms, depends on motion."²⁸³ It is then article 25, "What motion is, properly speaking," that claims bodies are individuated through their shared motion:

Not looking to popular usage, but to the truth of the matter, let us consider what should be understood by motion according to the truth of the thing; we may say, in order to attribute a determinate nature to it, that it is the transference of one part of matter or one body from the vicinity of those bodies that are in immediate contact with it, and which are regarded as at rest, into the vicinity of others. By one body or by one part of matter I understand everything transported together, although it may be composed of many parts which in themselves have other motions.²⁸⁴

Of course, in the second part of the *Principia Philosophiae*, matter is identified with quantity, quantity with substance, and substance with extension. Moreover, taken generally, as the essence of substance, extension constitutes the nature of all bodies; yet if we consider extension as a

²⁸¹ A&T IV, 168-169.

²⁸² Ariew 2011, 153.

²⁸³ Ariew 2000, 261.

²⁸⁴ Ariew 2000, 262.

mode, then it regards the determinate extension of one particular body, *this* book you are holding right now. Following the real distinction between the soul as a thinking substance and the body as an extended substance, Descartes held that the notion of extension is the main attribute through which we can know the body:

But although any one attribute is sufficient to give us a knowledge of substance, there is always one principal property of substance which constitutes its nature and essence, and to which all other properties are referred. Thus extension in length, breadth, and depth constitutes the nature of corporeal substance; and thought constitutes the nature of thinking substance. For all else that may be attributed to body presupposes extension, and is but a mode of an extended thing; as everything that we find in mind is but so many diverse forms of thinking.²⁸⁵

As an ontological consequence, extension constitutes the substance of bodies. Moreover, epistemologically speaking, everything can be explained in terms of size, shape, and motion. Several difficulties persist. First of all, what accounts for the distinction between different parts of extension and is there genuine unity in bodies, since they are all made up of the same fundamental stuff? Furthermore if motion introduces diversity in an otherwise uninformed, indeterminate extension, why do some individual bodies change shape in interaction with each other? As recent commentators have argued,²⁸⁶ the principle of individuation for extended things Descartes used in his physics encounters several difficulties, both “static” and “dynamic”. Due to the circularity or juxtaposition between the definition of “body” or “part” and “motion,”

²⁸⁵ See Descartes, *Principles* I, article 53; in Ariew 2000, 244-245

²⁸⁶ See Garber 1992, *Descartes' Metaphysical Physics*, 1992, 175-176; and Des Chene 1996, *Physiologia*, 367-377. For Des Chene the “static” aspect concerns the potential parts of a body and the “dynamic” aspect its actual parts.

Descartes' principle seems incapable of explaining the distinction between bodies in close proximity, whether these bodies are moving or are at rest.

This difficulty at the core of Descartes' physics is duly noted by some of the first Cartesians. Cartesian Atomist Gérald de Cordemoy (1626-1684) notes the implications of Descartes' definition of the essence of substance as extension for the physical individuation of bodies: if infinite, continuous extension constitutes the essence of substances,²⁸⁷ then there would be no room for the differentiation of things from one another or for their separation. He believes the errors of physics have arisen from an initial confusion of inadequately defining and distinguishing between the notions of body and matter. Thus, Cordemoy's theory of matter is quite the opposite from that of Descartes. Bodies are extended substances and matter is an "assemblage of bodies:"

It is known that there are bodies and that the number of bodies is almost infinite. It is also known that there is matter, but it seems that we do not have adequate definitions of the two, and from that have arisen almost all the errors in physics. [...] Bodies are extended substances. [...] each body is one and the same substance, it cannot be divided and its shape cannot change: this is called *impenetrability*. [...] Matter is an assemblage of bodies. Each body, being a component of this assemblage is what we strictly call *a part of matter*. Several of these bodies together, separate from the other, is what we strictly call *a portion of matter*. [...] one body cannot be divided, because it does not have parts; but since matter is an assemblage of bodies, it can be divided in as many parts as there are bodies.²⁸⁸

²⁸⁷ Regarding extension as material substance, the determination Descartes gives to extension as substance is, in a sense, vague: extension is the stuff things are made of, but not their principle of existence.

Extended substance endowed with shape, body cannot lose its figure – otherwise it would stop being one substance. Cordemoy uses the distinction between matter as an assemblage of bodies and body as part of matter to ground the indivisibility of bodies. He also rejects Descartes' indefinite divisibility of matter because it does not seem different from the infinite divisibility of matter.²⁸⁹ Using these new definitions and distinctions to construct a parallel critique of Descartes' notion of infinite divisibility and of his concept of substance, Cordemoy identifies a stumbling-block at the core of Descartes' principle of individuation through motion:

I notice another disadvantage about the position of those who claim that matter itself is an extended substance: they cannot conceive of one body separately, without assuming motion, in such a way that according to their doctrine, one cannot conceive of a body at rest between other bodies. For supposing that this body touches the other bodies, this doctrine teaches that it should be the same body with them. However, it seems to me that we possess a clear and natural idea of a body that is perfectly at rest between other bodies that are not moving and that what I say about each body is absolutely compatible with this idea.²⁹⁰

In Descartes' plenist physics, motion is the only thing diversifying matter. Since the number of bodies is almost infinite, either everything is moving, or it is impossible to explain that there are bodies at rest. For Cordemoy this last option seems utterly inconceivable, since he claims we have a perfectly clear and distinct idea of a non-moving body among other bodies. Therefore a different principle of individuation is needed, one that would not transform motion in a uniquely

²⁸⁸ See *Six Discours sur La Distinction et l'Union du Corps et de l'Ame*, 1666. I used the 4th edition, 1704, 7.

²⁸⁹ Cordemoy 1704, 9. Here Cordemoy seems to disregard that for Descartes extension is infinitely divisible, but this divisibility only affects certain parts of matter.

²⁹⁰ Cordemoy 1704, 9.

individualizing process. His solution is to redefine body as “one and the same substance,” indivisible, incapable of losing its shape, impenetrable, i.e., an atom.²⁹¹ Through Cordemoy’s atomist drift, Descartes’ physics found a renovator capable of reforming its definitions of body and matter by stressing the need for “atomic” unity in order to account for individuation. In this way, body becomes a synonym of unity.

We have to keep in mind that Descartes was not the only Seventeenth-century philosopher to have argued for a “physical” principle of individuation based on shared motion. Article 25 of the *Principia Secunda Pars* found an immediate reception in Spinoza’s works. In a discussion of physical topics that occurs between *Ethics* IIP13 and IIP14 Spinoza explained the existence, persistence, and difference of an individual as a function of what he calls a “ratio of motion and rest” (*ratio motus et quietis*). Bodies, we find out at Lemma 1 of 13 “[...] are distinguished from one another in respect of motion-and-rest, quickness and slowness, and not in respect of substance” and the proof to lemma 3 of the same proposition merely repeats: “Bodies are individual things which are distinguished from one another in respect of motion-and-rest.” Nevertheless, leaving aside Spinoza’s direct endorsement of Descartes’ position with respect to “physical” individuation, Descartes’ position in the *Principles of Philosophy* still encountered strongly dissenting voices throughout the Seventeenth-century.

I now turn my attention to what I believe to be the strongest of these critical voices, since it represented a direct, negative reception that already underlined the difficulties related to both the static aspect of Cartesian individuation and the dynamic one. How did Leibniz see himself as developing, defending, extending, or correcting Descartes’ philosophy with respect to individuation? In what remains of this section I will show how Leibniz uses Cordemoy’s own

²⁹¹ Cordemoy seems to be the only Seventeenth-century atomist who never actually uses the term “atom.” In my search throughout his works I have failed to encounter a single occurrence of the word.

strategy addressing the issue of what individuates bodies at rest against Cordemoy's own Cartesian atomism.²⁹² Finally, I contend that Leibniz did not just push the critique of Cartesian physics even further by objecting to both Cartesian individuation and Cordemoy's attempted reform, but more importantly, he also took a decisive step towards the "metaphysical atomism" of his late years.

In *Chapter I*, I analyzed Leibniz's account of individuation in *De transsubstantiatione* (1668). In this theological context, young Leibniz defended a similar Scotist position on individuation to the one Descartes had revealed to Mesland: substances are individualized through the substantial form viewed as an active principle directly enacting a divine idea. More specifically, he asserts that bodies are not substances apart from a concurring mind because a substance is a being that "has a principle of action within itself" and "actiones sunt suppositorum." Substance is union with a mind and bodies that lack reason are substances through a union with the universal mind or God. Transsubstantiation thus involves the mind of Christ taking on the accidents (bread and wine) in the sacraments, substituting its special concourse for the general concourse of the divine mind. Thus the transubstantiated accidents would have numerically the same substantial form as Christ's body. Since they would not be changed in any respect apart from the substantial form of the concurrent mind, they would retain and realize their accidents.²⁹³

Now, it looks as if though in 1668 Leibniz is simply extending Descartes' view with respect to the individuation of the human body to all animate and inanimate bodies. Despite the striking similarities between the two positions, there is no textual proof that would allow us to

²⁹² I will address Leibniz's critique of the dynamic aspect of Cartesian individuation from *Principia* II, art. 25 in his later works (*De Ipsa natura* 1698) in the last section.

²⁹³ Loemker, 115-119.

argue for a direct influence of Descartes' letter on Leibniz's views (once again, Descartes' letters to Mesland were only published in the Nineteenth-century). This leads to a necessary inquest as to what was young Leibniz's knowledge of the published Cartesian corpus before the Paris period (1672-1676). In a letter sent to Simon Foucher in 1675, Leibniz admitted how little he had read of Descartes in comparison to other seventeenth century *novatores*:

I admit that I have not yet been able to read all his writings with all the care I had intended to bring to them, and my friends know, as it happened, I read almost all the new philosophers before reading him.²⁹⁴

This shows that passages like the one in *Theoria motus abstracti* (1670-1671), in which Leibniz rejects the indefinite division of the continuum, saying that “[...] the indefinite of Descartes is not in the thing but in the thinker”,²⁹⁵ should not be taken as indicating an in-depth knowledge of Descartes' *Principia Philosophiae* or the Cartesian corpus. One can also argue that the little knowledge Leibniz might have had of the Cartesian texts before going to Paris mainly concerned problems of general physics in Descartes' *Meteors* (1637). The earliest evidence of Leibniz's acquaintance with Cartesian “meteorology” is found in the correspondence with his mentor, Jakob Thomasius. In a letter written on 16/26 February 1666, Leibniz discussed the question raised by Thomasius as to why Anaxagoras spoke of the possibility of black snow. He discusses this paradox by using a corpuscular hypothesis based on Descartes “three elements” theory from the first *Discours* of the *Meteors*.²⁹⁶ Further proof can be found in a text dated August-September 1669 entitled *De rationibus motus*, a preliminary note to the same *Theoria motus abstracti*. Here

²⁹⁴ A&G, 2.

²⁹⁵ A VI.2, 264; Loemker, 139.

²⁹⁶ A II.1, 4.

Leibniz assimilates Descartes' explanation of the solidity and cohesion of bodies in the first discourse of *Les Météores*²⁹⁷ with a Gassendian, atomist position:

Est etiam contra ipsum Cartesium qui cohaesionum corporum ex ramositate subtilissimarum partium explicat, cum tamen corporum in statu primo et naturali consideratorum nulla sit ramositas, nulla cohaesio, nulla talis continuitatis.²⁹⁸

Thus, Descartes' conception of the firmness of mixed bodies would be identical with the "hooked" and "crooked" atoms of the ancients,²⁹⁹ a cohesion relying on the "ramified" structure of the most subtle parts of bodies. This conflation is surprising. If around 1669-1671, Leibniz had possessed a direct and detailed knowledge of Descartes' *Principles*, he would have known about the latter's classical proof against atomism from part two, article 20.³⁰⁰

In his early period Leibniz already held a notion of individuality comparable to Descartes' yet much broader and remarkably original; what remains in question are Leibniz's mature views and their relation with the one principle of individuation Descartes did make "public." There is textual support for Leibniz's acquaintance with Descartes' *Principles* in some *marginalia* Leibniz wrote the Fall of 1675.³⁰¹ Although some of the scattered notes do resound, *in nuce*, with

²⁹⁷ For Descartes' explanation of cohesion and the three-elements theory, see Beyssade&Kambouchner, 285. I have to note an important difference between Descartes' corpuscles in his theory of three elements and atoms: atomism conceives of the main constituents of matter, particles, as primitive elements endowed with absolute firmness. Descartes' corpuscles are derivative, they do not even possess any individuality, since individuality for Descartes consists in the unity of movement and the support of motion is indifferent (Principles II, 25).

²⁹⁸ A VI.2, 161.

²⁹⁹ For a similar critique of the atomist doctrine of the cohesion of bodies in *Confessio Naturae contra Atheistas* (1669), see Loemker, 112.

³⁰⁰ Miller&Miller 1982, 48-49: [...]it is not possible for any atoms, or parts of matter which are by their own nature indivisible, to exist. The reason is that if there were any such things, they would necessarily have to be extended, no matter how tiny they are imagined to be. We can, therefore, still conceive of each of them being divided into two or more smaller ones, and thus we know that they are divisible."

the criticism of Cartesian physics in the *Discourse on Metaphysics*,³⁰² they neither specifically mention the incriminating article (25), nor refer to articles 54 to 63 in which Descartes explains his theory of matter and the cohesion of bodies.³⁰³

In a text from a few months later entitled *Meditatio de Principio Individui* (1 April 1676), Leibniz illustrates his more mature view on individuation beyond Descartes' thesis of individuation through motion. There Leibniz gives the example of either two rectangles or two triangles coming together to produce two indistinguishable squares. He considers this a situation in which two different causes produce an effect that is so perfectly similar that not even an omniscient observer could distinguish one square from the other. Leibniz introduces the principle according to which the entire effect is equivalent to its full cause, "in such a way that whoever understands some effect perfectly will also arrive at the knowledge of its cause." This principle of equivalence between cause and effect leads Leibniz to claim that:

[...] if we admit that two different things always differ in themselves in some respect as well, it follows that there is present in any matter something which retains the effect of what precedes it, namely a mind.³⁰⁴

According to this important principle, matter is individuated or differentiated not through motion, but by its relation to a mind capable of preserving the memory or traces of its

³⁰¹ Arthur 2001, 23-31.

³⁰² Arthur 2001, 25-26; 29. At articles 4 and 11 Leibniz notes that "there is a certain quality besides extension that cannot be taken away from body, namely, impenetrability [...]"; at article 36 he states the conservation of the same quantity of endeavor, impetus, or action (and not motion), while a final note marked "N.B." claims "motion should be ascribed to a certain finite thing rather than to the rest of the universe."

³⁰³ This textual *lacuna* is the starting point for Frédéric de Buzon's article, "Repos ou mouvement conspirant: Leibniz et les articles 54-55 de la partie II des Principia Philosophiae", in *Revue d'histoire des sciences* 2005, 58(1), 105-122.

³⁰⁴ A VI. 3, 491; Parkinson 1992, 51-53.

production. Therefore, the principle of individuation has to be internal to a thing. I return to Leibniz's important discovery from the Paris period because the example of two perfectly similar geometrical figures produced by different causes is repeated as late as 1685 in Leibniz's *Notes on Cordemoy's Treatise On the Distinction between Body and Mind*.³⁰⁵ This time the example is used in a critical argument against Cordemoy's atomist solution to Descartes' principle of individuation. Although he appreciates Cordemoy's criticism of the static aspect of Cartesian individuation, Leibniz uses the same strategy the latter employed in criticizing Descartes against Cordemoy himself:

These are difficulties for Cordemoy himself: let us suppose two triangular atoms come into contact and compose a perfect square, and that they rest next to each other in this way, and let there be another corporeal substance or atom, a square one equal to the other two. I ask, in what respect do these two extended things differ? Certainly no difference can be conceived in them as they are now, unless we suppose something in bodies besides extension; rather they are distinguished solely by memory of their former condition and there is nothing of this kind in bodies.³⁰⁶

In Leibniz's opinion, even though he rejected the indefinite division of body and the Cartesian identification between space and extension, Cordemoy's Cartesian atomism is still unable to solve the inadequacies of Descartes' theory of matter. He believes that although the French atomist had addressed a pertinent objection to the Cartesian individuation of bodies, he had not gone far enough in his solution. The step Cordemoy takes in resolving the inherent difficulties of

³⁰⁵ The geometrical example itself, the two triangles or squares composing a parallelogram, is used by Leibniz as early as 1671, albeit in a different context and without the same ontological implications: *Summa hypotheseos physicae novae*, A VI.2, 327-328.

³⁰⁶ A VI.4, 1799; Arthur 2001, 279.

Descartes' physics, his atomist drift, is only a half-step towards metaphysical atomism, towards solving the problem of the unity and individuality of bodies.

The notion of individuation Leibniz marshals in the *Discourse on Metaphysics*, written immediately following his notes on Cordemoy, is intended as a direct criticism not only of Descartes' and Spinoza's views on individuation through motion. Leibniz also explicitly attacks Cartesian physics (articles XVII and XVIII)³⁰⁷ by introducing the problem of the substantiality of bodies that are not the human body. At first, this problem remains ambiguous since it is not particularly clear how Leibniz's discussion of substantial forms fits in with his theory of complete individual concepts. But Leibniz does add in an earlier draft "that if bodies are substances, it is not possible that their nature consists only in size, shape, and motion, but that something else is needed", which seems to imply that the substantiality of bodies relies on their possessing an internal principle of unity or identity, in other words, a substantial form conceived on the model of the rational soul. The critique of Descartes' theory of matter and its consequent principle of individuation takes place in two steps. First, articles XII and XVIII deny that the nature of body would consist or can be conceived uniquely in terms of extension: an analysis of the modes of extension must show their imaginary character relative to our perceptions. The relative aspect of motion and its incapacity of accurately individuating bodies are expressed through a consideration of what "motion contains precisely and formally." Given that it is impossible to univocally attribute a subject of movement in changes of situation or place, motion is not entirely real. These are all claims Leibniz made prior to the *Discourse* about the relative

³⁰⁷ Article 17: *An Example of a Subordinate Maxim or Law of Nature; in Which It Is Shown, against the Cartesians and Many Others, That God Always Conserves the Same Force but Not the Same Quantity of Motion*; Article 18: *The Distinction between Force and Quantity of Motion Is Important, among Other Reasons, for Judging That One Must Have Recourse to Metaphysical Considerations Distinct from Extension in Order to Explain the Phenomena of Bodies*; in A&G, 49-51.

character of motion and extension or the fact that “[...] there are no precise shapes in the nature of things, and consequently no precise motions.”³⁰⁸

**“Astounding things which have not come into the mind of any Scholastic” or Cartesian:
The Individual in Leibniz’ Late Philosophy (1686-1714)**

In order to better evaluate the shift from a metaphysics of individual substances to one of formal atoms or simple substances, let me return to the “forgotten” *Discourse* illustrating Leibniz’s mature view about individuation. In his recent Leibniz monograph, Daniel Garber notes how:

[...] while the claim that individual substances have complete individual concepts is one of the enduring theses of Leibniz’s philosophy [...], the argument for it from the complete individual concept seems to drop out of his repertoire rather quickly, by the early or mid-1690s. When Leibniz first publishes his philosophical thoughts on body and substance in 1695 in the “*Système nouveau*” and in the “*Specimen dynamicum*,” the argument of ‘*Discours*’ § 8 from the Predicate-in-Notion principle and the Complete Individual Concept seem to play no role in any of the arguments.³⁰⁹

In paragraph 8 of the *Discourse on Metaphysics*, Leibniz appeals to an explanation of individual substance in order to distinguish the actions of God from those of creatures. From the beginning, the logical and ontological requirements a subject has to meet in order to be recognized as an individual substance are disseminated through a search for a general principle of individuation, one that would hold for all created substances. In 1686, his conception of individuation marks the revival of the Aristotelian concept of primary substance through the reinterpretation of the

³⁰⁸ *Wonders Concerning the Nature of Corporeal Substances* 1683; in Arthur 2001, 263.

³⁰⁹ See Garber 2009, 198-199.

Thomistic angelic principle of individuation as *species infima*. The individual for Leibniz corresponds to the Scholastic last species he had declined to discuss in his 1663 *Disputatio*. No longer individuated by the totality of matter plus form belonging to the complete entity of a given being, substances are instead individuated by the multitude of accidents befalling an individual. The principle of individuation also entails the identity of indiscernibles. Each individual is, in itself, its own last species – not an exemplar of a specific essence, but a unique one with all its accidents. Leibniz’ main original claim is that a complete concept corresponds to this individual essence or last species.

In the *Discourse*, God chooses the perfect world, one made up of individuals with actions and passions (DM § 8). Since God created subjects, individuals like Alexander, Darius, or Porus, he also sees their individual notion or haecceity. In their individual notion or haecceity God sees “[...] the basis and reason for all the predicates that can be said truly of him, for example, that he vanquished Darius and Porus; he even knows a priori (and not by experience) whether he died a natural death or whether he was poisoned, something we can know only through history” (DM § 8). From this concept of an individual notion, Leibniz derives a couple of “notable paradoxes.” First, that “[...] every substance is like a complete world and like a mirror of God or of the whole universe” (DM § 9) and, secondly, that there can be no such thing as two perfectly similar individuals, given that two substances cannot differ only in number. He also claims that his view is: “[...] what Saint Thomas asserts on this point about angels or intelligences (that here every individual is a lowest species [quod ibi omne individuum sit species infima]) is true of all substances” (DM § 9).³¹⁰ Against claims of continuity with regard to Leibniz’s views on substance and the individual, I proved how the position on individuation in the *Discourse* was actually a combination of two traditional and one original concept: Thomas’ *species infima*, a

³¹⁰ A&G, 41-42.

Scotist haecceity, and the complete concept view of substance. I also showed that the views represented by Leibniz's three concepts were all rejected in 1663, either explicitly or implicitly. Moreover, less than ten years later after the *Disputatio Metaphysica de Principio Individui*, in the *Confessio philosophi* (1672-1673) Leibniz radically breaks with Scholasticism by adopting an external principle of individuation. To illustrate these "[...] astounding things, which, I believe, have not come into the mind of any Scholastic even in a dream," Leibniz uses the case of two perfectly similar and indistinguishable eggs. How would one mark the difference between them? Leibniz responds:

At least they differ in this: that one is this one, the other, that one, that is, they differ in haecceity, or because they are one thing and another thing, i.e., because they differ numerically. But what do we mean when we count, that is, when we say this (for to count is to repeat this). What is this? What is it to determine something? What is it except the perception of time and place, i.e., of motion either, on the one hand, of a given thing in relation to us or to a thing already determined, or, on the other hand, of our own movement (e.g., the motion of our hand or the finger by which we point), or the motion of some already determined thing, like a stick, in order to point to a given thing? There you have it, what may amaze you, the principle of individuation, outside the thing itself. For between these eggs no difference can be assigned either by an angel or, I have the audacity to say, by God (given the hypothesis of the greatest similarity possible) other than that at the present time this one is at place A, and that one is at place B.³¹¹

I wish to underscore that these seemingly disparate notions can be found together elsewhere in Leibniz's writings in the 1680s. First offering a detailed account of the complete concept theory,

³¹¹ Sleight 2005, 103.

and then connecting it with both the principle of individuation and the notion of a *species infima*, Leibniz argues in the *Notationes Generales* (Summer 1683-1685?) that singular things are ultimate species. There can never be two singular things similar in every respect and the principle of individuation is always a specific difference. He adds that this is what Saint Thomas said of intelligences, but applied to all individuals. He again considers the example of two eggs and asserts that one should be able to say of one egg something that cannot be said of the other; otherwise, they could be substituted for each other and there would be no reason not to say that we are dealing with one and the same thing:

Hinc porro sequitur Singularia esse revera species infimas, neque umquam dari posse duo singularia per omnia similia et proinde principium individuationis semper esse differentiam aliquam Specificam, quod S. Thomas ajebat de intelligentiis, sed idem est verum de individuis quibuscunque [. . .] exempli causa duo ova, necesse est enim aliqua de uno dici posse quæ de altero dici non possint, alioqui substitui sibi mutuo possint, nec ratio erit cur ita non potius dicantur esse unum et idem.³¹²

There is a clear difference between this text and the *Confessio*. By this time Leibniz had established a relational theory of space and the example of two perfectly similar eggs is now relegated to the status of a logical impossibility. Without any qualitative difference between them the eggs would be not two, but one and the same egg. Now the question is what happened with the “perceptions of time and space” from the *Confessio* in Leibniz’s mature works? Did spatio-temporal criteria become insufficient for individuation in the 1680’s? Yes and no.

The account of complete individual concepts in the *Discourse* proposes that the complete concept of Peter or John “[...] contains the entire sequence of ordinary and extraordinary graces and all the rest of these events with their circumstances” (art. 31) and that the concept of an

³¹² A VI.4, 553.

individual substance also “[...] contains all its events with all their circumstances.”³¹³ Despite its vagueness, I find this notion of “circumstances” to be very similar to what Leibniz had in mind in the *Confessio philosophi*, text in which he notes that souls “[...] are also subjected from the beginning to these circumstances of time and place (from which the entire series of life, death, and salvation, or damnation arises).”³¹⁴ Similar claims found in texts contemporary to the *Discourse* can help clarify the relation between the aforesaid “circumstances” and complete concepts. In July 1686, Leibniz writes to Arnauld that “[...] the concepts of individual substances, which are complete and suffice to distinguish them completely [...] enclose contingent truths or truths of fact, and individual circumstances of time and place, etc. [...]”³¹⁵ and a few years later he claims there are both “intelligible” and “perceptual” differences between substances, defining individuals as *haecceities*: “[...] where there is space and time.”³¹⁶ Notice the significant change around the time of the *Discourse* with regard to the *Confessio*: things are no longer individuated extrinsically, by means of time and space alone. In the *Discourse*, Leibniz adopts an internal principle of individuation in accordance to which complete concepts individuate the substances corresponding to them, *because* circumstances of place and time as external individuating criteria are now internalized and contained in their concepts. Take the case of Adam, for example. All posterity is implicit in the first man’s concept: all its events and all its circumstances. Since “[...] the concept of an individual substance includes all its events and all its denominations, even those which are commonly call extrinsic,”³¹⁷ those which

³¹³ A&G, 63.

³¹⁴ Sleigh 2005, 105.

³¹⁵ Loemker, 332.

³¹⁶ In a text from 1688-1689?, *De divisione praedicati*, see A VI.4, 927.

pertain to it in virtue of the principle of individuation being also the principle of *conjunctio rerum generalem*.³¹⁸ One can therefore point to various instances in which Leibniz, at the time of the *Discourse on Metaphysics*, internalizes the spatio-temporal individuating criteria of the *Confession of a philosopher*.

If the *Confessio* and the *Discourse* showed Leibniz championing revised Scholastic notions about individuation (*haecceitas*, *species infima*) and including the idiosyncratic external principle of individuation in his mature complete concept theory, his late works will not be as positive about these Scholastic remnants or the status given to spatio-temporal circumstances and complete concepts. Putting a negative twist on the “notable paradox” that two things cannot be perfectly similar, the late Leibniz will say:

The vulgar philosophers were mistaken when they believed that there are two things different in number alone, or only because they are two, and from this error have arisen their perplexities about what they called the *principle of individuation*.³¹⁹

One can see this almost dismissive attitude at work in Leibniz’s answer to the issue of individuation in the confrontation with Locke and the revival of the problematic of individuality and singularity in the *New Essays*. Leibniz echoes a passage in which the principle of individuation is said to be something of concern merely in the schools, “[...] where they torment themselves so much in seeking to understand what it is.” In his response he asserts:

The *principle of individuation* for individuals reduces to the principle of distinction. [...] If two individuals were perfectly similar and equal and (in a word) *indistinguishable* in themselves, there would be no principle of individuation.³²⁰

³¹⁷ Loemker, 337.

³¹⁸ Grua I, 337.

³¹⁹ *Fifth Paper* to Samuel Clarke, 1715: in GP VII, 395; A&G, 334.

What caused this shift in Leibniz's thought and why does the problem of individuation seem to have lost its central role in his late works? My answer is that the middle-years doctrine of individual substance is only preserved to a certain extent in his late works, since the concept of simple substance (or monad) Leibniz began to develop in the *New System* partially modified the foundations of his metaphysics of substance.

The first step in this direction is taken immediately after the *Discourse* in his correspondence with Arnauld. In continuity with the discussion of substantial forms based on articles X-XIII of the *Discourse*, the second part of Leibniz's correspondence with Arnauld shifts focus from a concern with the doctrine of individual substance and its complete notion, to problems relating to the "physical" individuation of corporeal substances and their unity.³²¹ Now, it might well have been Leibniz's increasing awareness of the Spinozist and necessitarian implications of his complete concept theory³²² that drove him to drop the argument from *Discourse* 8, but the fact is, when Leibniz makes public his *New System of Nature and the Communication of Substances* (1695) he first references the epistolary exchange with Arnauld, while the *Discourse* seems completely forgotten. This omission of the *Discourse on Metaphysics* and the reference to the correspondence with the French theologian is not a mere coincidence.

Writing to Arnauld in 30 April 1687, Leibniz claims that multitude cannot have its reality from points, as if points composed the physical or mathematical continuum. Ontological reality is given only by authentic, true unities, unities he characterizes as formal atoms, thus

³²⁰ GP V, 214.

³²¹ For a detailed discussion of what this shift meant, see Fichant 2004, "L'invention métaphysique", 81-113.

³²² Garber 2009, 199.

rehabilitating the substantial forms he had rejected in the 1670's.³²³ In 1695, in the *New System of Nature and Communication of Substances*, Leibniz returns to this idea of true unities adding important corrections. The announcement of the rehabilitation of substantial forms made to Arnauld is revised by putting forward an account of unities, points, and atoms. This time, the reality of multitudes (bodies, composites, corporeal substances) is given by the true unities, which Leibniz is careful in distinguishing not just from points in general, but from mathematical points in particular.³²⁴ When considering real unities one must necessarily appeal to animated, real points or atoms of substance, for substantial atoms contain something formal or active in order to be able to account for a complete being. Michel Fichant has persuasively argued that by 1695 Leibniz's search for the unity necessary in accounting for multiplicity follows the model of the Euclidean constitution of integer numbers.³²⁵ Leibniz looks for the arithmetical unity of true substantial unities or real unities. True substantial unities because, as opposed to numerical unity, they are completely devoid of parts, while the number one for example, is always divisible into fractions. These Leibnizian indivisibles are thought of "etymologically" as atoms: neither the atoms of Democritean or Epicurean atomism, which have a contradictory concept since matter is infinitely divisible, nor the atoms of Gassendi, which are not mathematical points and possess parts, but the atoms of substance or, as Leibniz calls them, formal atoms. The absence of parts is also the main characteristic of Euclidean geometrical points, different from physical, atomic points.³²⁶ Therefore, substances are not characterized as anything proximate to exact, physical, or

³²³ GP II, 85.

³²⁴ A&G, 142.

³²⁵ Fichant 2004, 108-109.

³²⁶ In this sense, it is interesting to note that both Aristotle and Euclid define point and unity in a similar way: "unity is that which is indivisible according to quantity." (Aristotle, *Analytica Posteriora*, A2,

mathematical points, as was the case for the point-like nature of the flower of substance.

Substances are real, geometrical points, i.e. metaphysical points.

Moreover, this meditation on true unity and the atoms of substance in the *New System* (1695) becomes the context for Leibniz's development of a discussion of unity in the late correspondence with Jesuit Bartholomew des Bosses. Continuing the direction of the *New System*, Leibniz's 11 March 1706 letter to Des Bosses starts by discussing the distinction between formal unity and material unity:

Numbers, unities, and fractions have the nature of relations. And to that extent they can in some way be called "beings." A fraction of a unity is no less one being than the unity itself. And it should not be thought that a formal unity is an aggregate of fractions, for its notion is simple, applicable to both divisibles and indivisibles, and there is no such thing as a fraction of indivisibles. Yet a material unity, that is, one actually effected (but considered in general), is, according to mathematicians, composed of two halves when their subject is able to contain them, just as $\frac{1}{2} + \frac{1}{2} = 1$, or, for example, the value of a groschen is an aggregate of the values of two halfgroschen. However, I was speaking of substances. A fraction of an animal, or a half-animal, therefore, is not one being per se, since this can be understood only of the body of the animal, which is not one being per se but an aggregate, and has an arithmetical unity and not a metaphysical unity.³²⁷

The first type of unity characterizes substances. The fraction of an animal or the half of an animal Leibniz had in mind while, for instance, giving the example of a sectioned insect earlier

72a2); point is "that which lacks parts" (Euclid, *Elements*, Definition I); but according to Plato, the Euclidean definition of point also refers to unity, since unity is similarly defined as not possessing parts (*The Sophist*, 245a; *The Republic*, 526a).

³²⁷ Look&Rutherford 2007, 30-38; the text here is translated at 31.

on in the correspondence with Arnauld, is not a real unity or being through itself. The sectioned part of an insect can only be understood through the body of an animal, that is, as an aggregate possessing arithmetical unity – not the metaphysical unity of an atom of substance. The case and point made in Leibniz’s letter regards the incorruptibility and indestructibility of the soul *and* the animal. At the time of the correspondence with Des Bosses, Leibniz had already set up the hierarchical system composed of soul, animal, and organic body predating the simple substances of the *Monadology*. In this context, the hypothesis of a point-like soul central to his earlier “flower of substance” theory bears a limited relevance. It functions as a tool for explaining the indestructibility of those simpler, lower machines of nature that end up composing, as “bugs in bugs,”³²⁸ – superior monadic aggregates. Thus, Leibniz argues, animated machines and machines of nature in general are indestructible. Each sensitive soul or animal soul is localizable in its body, like a “point” in a drop of water – a point that subsists in a part of this drop when it reduces or divides its volume. This way, at death, the soul stays where it was, in a part of the body as reduced as it may be. There is an infinity of organs enfolded into each other in the body of an animal and the lower souls and animals cannot be destroyed, although they can be diminished or concealed so that their life does not appear to us.

Since there is no mention of complete concepts in the *New System*, the text marks an important landmark in Leibniz’s philosophical evolution, one that has to do with a terminological as well an ontological shift regarding his views about substance and individuation. For the first time, Leibniz elaborates the concept of “simple substance”, the future synonym of “monad.”³²⁹ No longer are substances characterized in terms related to individuation, such as completeness or

³²⁸ Garber 2009, 387.

³²⁹ The term “monad” appears in Leibniz’s correspondence soon after: letter to Fardella 3/13 September 1696; earlier, in the letter to L’Hôpital from 22 July 1695, Leibniz uses it as an equivalent for “true unity.”

predicative complexity, but in terms connected to unity and simplicity. The language of “individuation” is abandoned in favor of a language of “simplicity” and “unity” and the focus changes from what makes substances “individual” to what makes them “simple” (and truly “one”). This might explain why there are few traces of the conceptual predication theory that previously grounded the individuality of substances in both the *Monadology* and the *Principles of nature and Grace*. What about the principle of the identity of indiscernibles and spatio-temporal circumstances as extrinsic denominations?

Both these issues reappear in a text written right after the *New System*, marking Leibniz’s first use of the term “monad” in his published writings. Albeit indirectly, in *On Nature Itself* (1698), Leibniz once again addresses the question of individuation, in the context of delivering his sharpest critique of Descartes’ only official principle of individuation, from article 25, the second part of the *Principles of Philosophy*. Focusing on the dynamic aspect of Descartes’ conception of individuation, this critique claims that Cartesian bodies in motion would be just as indistinguishable or hard to individuate as contiguous bodies at rest. Leibniz pushes Cordemoy’s critique even further and notes how, given the perfect uniformity of matter in a Cartesian plenum, extension and motion alone are not sufficient to individuate bodies:

For if no portion of matter whatsoever were to differ from equal and congruent portions of matter [...], if one momentary state were to differ from another in virtue of the transposition of equal and interchangeable portions of matter that agree in every way, then [...] it obviously follows that in the corporeal world there can be no way of distinguishing different momentary states from one another.³³⁰

Consequently, there must be intrinsic differences among bodies besides those resulting from motion, since motion with all it involves (shape, spatial situation or temporal duration) only

³³⁰ A&G, 164.

bestows an extrinsic denomination on those bodies. Leibniz critiques the dynamic aspect of Descartes' conception of individuation because, he claims, Cartesian bodies in motion would be as indistinguishable or hard to individuate as contiguous bodies at rest. He notes that, under the Cartesian assumption of a perfectly homogenous extended matter, "[...] one cannot in any way distinguish one place from another, or one bit of matter from another bit of matter in the same place." Furthermore, appealing to shape or impenetrability like Cordemoy does, is also insufficient:

For in a mass that is perfectly homogeneous, undivided, and full, no shape, that is, no boundary or distinction between its different parts arises, unless through motion itself. But if motion contains no mark for distinguishing things from one another, then it likewise bestows no mark with respect to shape. And since everything substituted for something prior would be perfectly equivalent, no observer, not even an omniscient one, would detect even the slightest indication of change. And thus, everything would be just as if there were no change or discrimination in bodies, nor could we ever explain the different appearances we sense.³³¹

It looks as if, around the 1700s, "the perception of time and place, of motion" from the *Confessio* is no longer sufficient as a principle of distinction or individuation for bodies. But in general, around this time, spatial and temporal differences are devaluated as adequate criteria of individuation and discernability. Even the ever present example of the two perfectly similar eggs will be depreciated or reworked, regressing to the limited and confused character of our perceptions. As Leibniz remarks in the same argument of *De Ipsa Natura*, since motion "contains no mark for distinguishing things from one another," if we were to imagine two perfectly similar and concentric spheres, one enclosed in the other without any gaps and

³³¹ A&G, 164.

revolving around its axis or being at rest, “not even an angel could find any difference between its states at different times,” between motion and rest. Indiscernability is a constant aspect of human condition since “we lack both a gap and a criterion of distinction” and Leibniz goes on to formulate his “new and most important axiom” that “nowhere are there two things perfectly alike.” He further adds that “[...] there are neither corpuscles of maximal hardness, nor a fluid of maximal thinness, nor a subtle matter universally diffused, nor ultimate elements which certain people call by the names 'primary' and 'secondary,’” such theoretical concepts being alien to the true order and nature of things.

Both Garber³³² and Des Chene³³³ have analyzed the argument from *De Ipsa Natura* extensively. Here I call attention to different aspects of Leibniz’s critique of the Cartesian position on both body and what individuates bodies in the world. At the end of his analysis, Garber concludes that:

[...] it would seem, motion can be used to individuate bodies *only* if there is some way of re-identifying bits of material substance across time, and this can only happen, Leibniz argues, if there is something in body over and above extension.

Even though I agree that continuity through time is much more central to Leibniz’s metaphysical concerns than to Descartes’,³³⁴ I wish to underscore the temporal aspect of his critique of Cartesian individuation one more time. This temporal aspect once again leads back to the “important principle” stated in the *Meditatio* of 1676. Leibniz’s critique of extension is deeply concerned with temporality because extension is regarded not as a constituent element of things, but the diffusion, extending of one thing. He is convinced there is a central difficulty in

³³² Garber 1992, 179-181.

³³³ Des Chene 1996, 374-377.

³³⁴ Garber 1992, 266-273.

Descartes, in conceiving of the relationship between substance (to which extension is an attribute) and duration (which is but a mode). Extension cannot account for the true nature of substance since it is temporally bound to the present and merely sequential. Instead, it only reflects a precise moment in the successive state of things, a sequence in the development of phenomena. Therefore, it cannot account for all present and future states or developments of a substance, like a mind, soul, or simple substance would. This is where the need for the internalization of spatio-temporal individuating accidents (*Confessio philosophi*) and something of a mind-like nature, endowed with memory and a history, emerges. This temporal aspect of substances will be fulfilled by the concept of force: derivative force both *is* and expresses the present state of a substance.

Secondly, it is unquestionable that Leibniz's critical arguments against motion and shape in Cartesian physics are meant to cut through the core of both Descartes and his followers' conceptions of body and substance. I ended last section with a text from 1683 entitled *Wonders Concerning the Nature of Corporeal Substances*, in which Leibniz holds that "there are no precise shapes in bodies, and as a consequence no precise motions."³³⁵ Similar claims can be found throughout Leibniz's works from the early 1680's onwards.³³⁶ In a 1687 letter to Arnauld, Leibniz states that:

[...] shape itself, which is of the essence of finite extended mass, is never exact and specific in nature, because of the actual division *ad infinitum* of the parts of matter. There is never a shape without inequalities, not a straight line without curves intermingled, nor a curve of a certain finite nature unmixed with some other, [...], with the result that

³³⁵ Arthur 2001, 263.

³³⁶ G II, 77; A&G, 80: "And indeed it can be said that because of the actual subdivision of the parts, there is no definite and precise shape in bodies. As a result, bodies would doubtless only be imaginary and apparent, if there were only matter and its modifications."

shape, far from being constitutive of bodies, is not even a wholly real and specific quality outside of thought, and one will never be able to fix upon a certain precise surface in a body as one might be able to do if there were atoms.³³⁷

Here Leibniz seems to reject another Cartesian mode of extension as being unreal. Yet, whereas the passage to which I referred earlier directly attacked Descartes' view of matter, in this case Leibniz is clearly addressing Cordemoy's atoms. The entire foundation of the Cartesian's argument for atomism was built on the premise that there *are* actually precise shapes in bodies or atoms: this is what endows them with impenetrability, and consequently unity. Furthermore, as we recall, in article 53 of *Principia* I, Descartes asserted that everything in bodies can be explained through their main attributes: size, shape, and motion. The modes of bodies are also interdependent: shape derives from motion, in the same way that movement depends on determinate bodies existing. By arguing there are no precise shapes in nature, Leibniz delivers a devastating blow to Cartesian metaphysics and its aftermath, leaving open the possibility that other modes of extension are also unreal.

I began this section with a different question in mind, what was the aftermath of Leibniz's own, idiosyncratic principle of individuation from 1672-1673 and how did this influence his mature conception of individuation? Other corollaries of the complete concept theory are also rejected in Leibniz's late works, including the principle according to which every extrinsic denomination or relational property (i.e. space, time) has its foundation in an intrinsic determination.³³⁸ Once again, the consequence is that spatial and temporal differences are

³³⁷ GP II, 119; Mason 1985, 152.

³³⁸ In 1695, he will also relegate the notion of *species infima* to geometry and deny any possibility of equating "last species" with the singular beings corresponding to each complete concept. Since the human mind cannot explain the notion of individual, there are no *infimae species* amongst complete entities: only incomplete entities like the circle are "lowest species" (Grua I, 354, *marginalia* to Twisse's *Scientia*

relegated to the status of improper criteria of individuation and discernability. One can see the last of these assumptions at work in Leibniz's answer to the issue of individuation in his confrontation with Locke and the revival of the problematic of individuality and singularity in the *New Essays*. Leibniz echoes a passage in which the principle of individuation is said to be something of concern merely in the schools, "where they torment themselves so much in seeking to understand what it is." The much inquired after principle of individuation, Locke claims in the 2nd Book of the *Essay*, consists in existence itself, determining "beings of any sort to a particular time and place incommunicable to two beings of the same kind."³³⁹ It is impossible for two things of the same species to exist in the same time at the same place. Therefore, the identity of a thing – it being the same – simply refers to the thing being *at this* place and *at this* time. Now, this Lockean position resembles Leibniz's own "astounding" principle of individuation in the *Confession of a Philosopher* so closely that, in his response, Leibniz adopts the completely opposite view from the *Discourse* and rejects the external, spatio-temporal individuating criteria he had formerly internalized in complete concepts:

In addition to the difference of time or of place there must always be an internal principle of distinction, and even though there can be many things of the same kind, it is still the case that none of them are ever perfectly similar. Thus, although time and place (i. e. the relations to what lies outside) do distinguish for us things which we could not easily tell apart by reference to themselves alone, things are nevertheless distinguishable in themselves. So time and place do not constitute the core of identity and diversity, despite the fact that diversity in time or place brings with it differences in the states that

media) – a claim that in itself relapses to the Scholastic *individuum est ineffabile* informed by the Aristotelian tradition of the *Analytics*.

³³⁹ See Locke, *Essay*, Book II, Ch. XVII, "Of Identity and Diversity."

are impressed upon a thing, and thus goes hand in hand with diversity of things. To which it can be added that it is by means of things that we must distinguish one time or place from another, rather than vice versa; for times and places are in themselves perfectly alike, and in any case they are not substances or complete realities.³⁴⁰

Extrinsic denominations such as time and space are merely relational – abstract and uniform things similar to mathematical entities. Different times and different places can only be distinguished *by and through* things or substances. In comparison to earlier texts such as the *Notationes Generales*, the *New Essays* claim that the difference between human souls is not a specific difference. If an individual substance, soul or body, were to differ from another, the ground for this distinction must rely on the intrinsic properties of substances. In a word:

The principle of individuation for individuals reduces to the principle of distinction I just mentioned. [...] If two individuals were perfectly similar and equal and (in a word) indistinguishable in themselves, there would be no principle of individuation.³⁴¹

This time, if one were to admit indiscernability as a real possibility, there would be no need for a principle of individuation. But no existing thing is perfectly similar to another, for there is always an internal quality distinguishing them. Individuals can neither be discriminated through abstract concepts such as existence, nor would extensional criteria (space and time) suffice for what distinguishes each individual in itself. Here there is no complete notion that would entail the principle of the identity of indiscernibles, but Leibniz still maintains that the principle of individuation has to be internal to a thing. As a result of Leibniz's critique of Cartesian metaphysics and atomism, the spatio-temporal criteria are relegated to a status of insufficiency as

³⁴⁰ A VI.6, 230.

³⁴¹ GP V, 214.

individuating properties and one can see the full significance of the absent reference to individuation that started off this chapter in a text contemporary to Leibniz's *Monadology*.

In his *Fifth Paper* to Clarke, Leibniz once again shifts from his earlier position on indiscernability in the *Notationes*. While denying the existence of such *indiscernabilia* as two perfectly similar drops of water, or two eggs, or leaves, he does not deny that they are at least theoretically possible. If two perfectly indiscernible things did exist, they would be two and not one and the same thing – although this is contrary to divine wisdom and violates the principle of sufficient reason. Furthermore, Leibniz puts a negative twist on the “notable paradox” that two things cannot be perfectly similar to each other and concludes that:

The vulgar philosophers were mistaken when they believed that there are two things different in number alone, or only because they are two, and from this error have arisen their perplexities about what they called the principle of individuation.³⁴²

³⁴² GP VII, 395; A&G 334.

CONCLUSION

I have briefly traced Leibniz's complex and evolving views on individuation and atomism from pre-1686 to his late works. I do not believe Leibniz has a "system," a well-established set of metaphysical doctrines until his middle-years. He frames hypotheses, flirts with atomism, and at times embraces positions on individuation as distinct and idiosyncratic as possible. Regarding individuation, I can say without equivocation that the only constancy during these years is Leibniz's willingness to change his mind completely about a host of issues, as he works through various problems of disparate provenance and adjusts his thinking accordingly, using one result in one domain against another in another domain and then reversing himself, repeating the process. Although Late scholasticism had provided a number of resources for dispelling concerns about the principle of individuation, much of the metaphysics of the scholastics was rejected during the Seventeenth-century. Descartes' elimination of scholastic substantial forms or their almost constant reinterpretation in Leibniz's philosophy had the noteworthy consequence of making substantial unity and individuation become impending problems for both metaphysics as well as physics. Thus, leaving aside previous influences, early modern philosophers had to either amend scholastic hylomorphism in order to match their new systems or propose a range of innovative alternatives that would bypass the inherent stumbling blocks of an Aristotelian ontology, likely *via* atomism or materialism. Leibniz, I claim, offers a complex response to this set of problems and his solution changes a number of times throughout his career, involving a unique combination or reinterpretation of components from the history of philosophical thinking

about individuation, unity, or simplicity. In each chapter I try to reconstruct these concerns as minutely as possible, by examining the discontinuities and modifications he makes to his views, as he tackles issues about body, motion, and substantial form within diverse philosophical, physical, metaphysical, and theological contexts.

In the first chapter, my genetic story starts with an examination of Leibniz's first thought on individuation. I prove that by the end of his middle period, Leibniz weaves together three traditionally distinct and conflicting strategies about individuation. For the first strategy, he reinterprets the Thomist principle of individuation of specifically different angelic beings to hold for all substances. The second strategy is that of the Scotists. Leibniz transforms haecceities into qualitative internal properties, even though before he had made them into external space-time circumstances (*Confessio philosophi* 1672-1673). The final strategy, Leibniz's own twist, is the individuation of substances through their complete notions or concepts: the multitude of accidents befalling individuals. The extrinsic, spatio-temporal aspect of individuation is now internalized in Leibniz's doctrine of complete concepts. I complete the full circle in the last chapter by showing how a couple of relational aspects of individuation such as indiscernibility and time-space circumstances were constantly re-worked at the time of the *Discourse* and beyond, first internalized in Leibniz's theory of complete concepts and then dismissed in his late texts, once the problem of individuation itself became secondary. Albeit in different forms, those "astounding things which have not come into the mind of any Scholastic or Cartesian" were still on Leibniz' mind as he developed a metaphysics denying indiscernibles that would eventually modify his theory of substance. Things which have not come into the mind of any Cartesian, because in the same chapter, I show how Cordemoy's criticism of the static aspect of Descartes' official principle of individuation is developed by Leibniz in a criticism of both Cordemoy and

Cartesianism itself. Furthermore, this reception and Leibniz's own attempts at a principle of individuation all develop in a context in which Descartes' "two-tiered" principle of individuation was unknown. The inherent difficulties of the only-known Cartesian individuation principle have managed to originate two of the most interesting and original Seventeenth-century philosophical doctrines: a quasi-metaphysical atomism in the work of Cordemoy and a metaphysical atomism in Leibniz. And through Cordemoy's original version of a corpuscular theory of matter, I reconnect with the atomism Leibniz himself is supposed to have toyed with during his early years. It is here, I believe, that atomism and individuation interlace for Leibniz. He is able to recognize that the explanation of cohesion for both microscopical and macroscopical bodies is one of the great stumbling blocks for atomism and at the same time dismiss the Cartesian individuation in terms of the composite motion of the parts of bodies. If physical bodies are individuated as a specific aggregate of material particles, the problem faced is cohesion (atomism). If, on the other hand, bodies are individuated by a sized, shaped portion of extended matter in motion (Cartesianism), distinction and (in)discernibility must be taken into account.

In Chapter II, I disentangle the strands of atomism and individuation through an analysis of Leibniz formative stance against atomism in the *Confessio Naturae contra Atheistas* (1669) and his changing views about substantial forms in the correspondence with Jakob Thomasius. I prove that he adopted an Aristotelian position against the atomist explanation of bodily cohesion, rejected contemporary *minima naturalia* doctrines on account of their views of substantial forms, and conclude by reconfiguring his idiosyncratic accounts of form from 1668-1671. In continuity with these conclusions, in the next chapter, I tackle secondary literature's claims of a Leibnizian commitment to atomism between 1666 and 1676 from several angles: 1) Leibniz did not deem any of the "atomist" workshop drafts in *De Summa Rerum* worth publishing; 2) based on several

accounts of his intellectual formation, it is difficult to identify texts in which he supported both atomism *and* the void; 3) there is a continuity between early Leibniz's anti-atomist objections and mature arguments against atomism (including his claim that atomism results from a misguided over-reliance on imagination), 4) through an analysis of his early reception of Gassendi, it appears the French atomist is nothing more than a handy influence. Finally, in the last section of this chapter, I discuss early Leibniz's doctrine of the "flower of substance" as a specific alternative to Scholastic hylomorphism and properly re-contextualize it in relationship to Seventeenth-century "chymistry" and *semina rerum* theories (Athanasius Kircher, Joseph Du Chesne, and Kenelm Digby's views about *palingenesis*). Against continuity claims (Leibniz's *flos substantiae* as proto-monad), I uncover how this doctrine together with its related hypotheses ("punctual soul," "Luz of the Rabbis") was actually abandoned once Leibniz developed a clearly defined ontology, based on the unity of (simple) substances.

Finally, after all these trials and testing (internal/external principle of individuation, complete concepts, "bubbles," "flowers of substance," etc.), Leibniz elaborates the concept of "simple substance," the future synonym of "monad," and the problem of individuation as well as the problem of cohesion of his early and middle years (1663-1686) become secondary. Leibniz has to come up with some notion of unity and/or simplicity over the unity and simplicity of Cordemoy's semi-metaphysical atomism. By ultimately switching from a metaphysics of individual substances to simple substances, formal atoms, or monads, Leibniz aims at giving a foundational account of being and constructing a more fundamental ontology that would encompass what he perceived as constitutive flaws inherent in the philosophical doctrines of his atomist or Cartesian contemporaries.

Thus, I hope to at least have partially achieved my initial goal of illuminating underrepresented views on individuals and atoms throughout Leibniz's works, therefore offering a clearer understanding of his philosophy as a whole. I firmly believe that more can be done and my aim for the future is to expand this study into a book project that would thematically redefine and chronologically extend the scope of my doctoral research.

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