Descartes among the Scholastics

History of Science and Medicine Library

VOLUME 20

Scientific and Learned Cultures and Their Institutions

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VOLUME 1

Descartes among the Scholastics

By

Roger Ariew

BRILL

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2011

Cover illustration: from 'Dispute of Queen Cristina Vasa and René Descartes' (1884), by Nils Forsberg (1842–1934), adapted by David A. Ariew.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Ariew, Roger.
Descartes among the Scholastics / by Roger Ariew.
p. cm. – (History of science and medicine library ; v. 20) (Scientific and learned cultures and their institutions ; v. 1)
Rev. ed. of: Descartes and the last Scholastics. 1999.
Includes bibliographical references (p.) and index.
ISBN 978-90-04-20724-0 (hardcover : alk. paper)
1. Descartes, René, 1596-1650. 2. Scholasticism–History–17th century. I. Ariew, Roger. Descartes and the last Scholastics. II. Title. III. Series.

B1875.A65 2011
194–dc22

2011011642

ISSN 1872-0684
ISBN 978 90 04 20724 0

For MG and DG

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ACKNOWLEDGMENTS

This research was assisted by grants and fellowships from the National Endowment for the Humanities, an independent federal agency and the National Science Foundation (grant no. DIR-9011998). None of it would have been possible without the funds these institutions made available—nor would I have been able to afford the research time at the Bibliothèque Nationale in Paris. I am also grateful to the Bibliothèque Nationale for allowing me to use its wonderful facilities and for providing me with microfiches of countless volumes. I must say, their website Gallica is an amazing, absolutely invaluable resource.

These essays were written at various times and for various audiences. Portions of the volume were read (at different stages of their composition) at many universities, workshops, and conferences. I am indebted to all these audiences for their questions and comments.

I am also grateful to various publishers for allowing me to use some of my previously printed materials. Parts of chapter 1 were published as "Descartes and Scholasticism: the Intellectual Background to Descartes' Thought," in *Cambridge Companion to Descartes*, ed. John Cottingham (Cambridge: Cambridge Univ. Press, 1992), pp. 58–90. Much of chapter 3 was published as "Ideas, in and before Descartes," *Journal of the History of Ideas* 56 (1995): 87–106, and some of chapter 4 as "The Cartesian Destiny of Form and Matter," *Early Science and Medicine* 3 (1997): 300–325, both co-authored with Marjorie Grene. Portions of chapter 6 appeared as "Theory of Comets at Paris during the Seventeenth Century," *Journal of the History of Ideas* 53 (1992): 355–372. An earlier version of chapter 9 was issued as "Damned if you do: Cartesians and Censorship, 1663–1706," *Perspectives on Science* (1994): 255–274. Portions of chapters 5, 7, 8, and 10 were initially published in French—chapter 5 as "Descartes, Basson et la scolastique renaissante," in *Descartes et la Renaissance*, ed. Emmanuel Faye and chapter 7 as "Les premières tentatives vers une scolastique cartésienne: la correspondance de Descartes et les Jésuites de La Flèche sur l'Eucharistie," in *Momenti della biografia intellettuale di Descartes nella Correspondance*, ed. Jean-Robert Armogathe and Giulia Belgioioso. A portion of chapter 8 was published as "Les *Principia* en France et les condamnations du cartésianisme," in *Descartes: Principia Philosophiae (1644–1994)*, ed. Jean-Robert Armogathe and Giulia

Belgioioso (Naples: Vivarium, 1996), pp. 625–640, and of chapter 10 was issued as "Critiques scolastiques de Descartes: le *cogito*," *Laval Théologique et Philosophique* 53, no. 3 (1997): 587–604.

Moreover, this work would not have been feasible except for the excellent conversation and good advice of many colleagues, graduate students, and colleagues-at-large (I hope that those I may have forgotten will forgive my oversight): Vlad Alexandrescu, Jean-Robert Armogathe, Peter Barker, Giulia Belgioioso, Jean-Marie and Michelle Beyssade, Constance Blackwell, Ann Blair, Lawrence Brockliss, Frederick de Buzon, Vincent Carraud, Sébastien Charles and Syliane Malinowski-Charles, John Cottingham, Edwin Curley, Anthony Desantis, Dennis Des Chene, Mordechai Feingold, Alan Gabbey, Helen Hattab, Matthew Hettche, Dana Jalobeanu, Doug Jesseph, Eric Lewis, Peter Machamer, Jean-Luc Marion, Ted McGuire, John Murdoch, Steve Nadler, Joseph Pitt, Tad Schmaltz, Jacob Schmutz, Justin Smith, Theo Verbeek, Eric Watkins, and Robert Westman.

Marjorie Grene read the entire initial manuscript of *Descartes and the Last Scholastics* and made numerous comments requiring both substantive and stylistic revisions. Susan Andriette Ariew has also read all my prose. The two of them have always been my most severe critics—something for which I am very thankful.

But the volume and its second edition owes a particular debt to two scholars and friends: the previously mentioned (and certainly not forgotten) Marjorie Grene, with whom I wrote two of the essays and discussed the history of philosophy daily for a decade and a half, and Daniel Garber, with whom I have collaborated on the investigation of seventeenth century philosophy for an even longer period. It has gotten to be so that I no longer know whether something I say was originally mine or theirs, so close are my views to theirs, so much have they influenced my thinking. Thus, I think it is fitting that this book be dedicated (and re-dedicated) to them, given that it is theirs already.

Roger Ariew
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LIST OF ILLUSTRATIONS

LIST OF ABBREVIATIONS

Works of Descartes have been identified in the notes by the following abbreviations. Unless otherwise indicated, translations are the author's.

ACS	Ariew, Roger, Cottingham, John, and Sorell, Tom, eds. and trans. 1998. *Cambridge Texts in Context: Descartes' Meditations*. Cambridge: Cambridge University Press.
AT	Descartes, René. 1964–1974. *Oeuvres de Descartes*, eds. C. Adam and Paul Tannery. 2nd. ed. Paris: Vrin.
CSM	Descartes, René. 1984–1985. *The Philosophical Writing of Descartes*, vols. I and II, trans. by John Cottingham, Robert Stoothoff, and Dugald Murdoch. Cambridge: Cambridge University Press.
CMSK	Descartes, René. 1985–1991. *The Philosophical Writing of Descartes*, vol. III, trans. by John Cottingham, Robert Stoothoff, Dugald Murdoch, and Anthony Kenny. Cambridge: Cambridge University Press.

INTRODUCTION

It has been twelve years since the publication of *Descartes and the Last Scholastics*, but I did not stop working on the themes discussed in that book during that time. My intent here is to revise that monograph, that is, to restate its theses more sharply and add considerable detail to its contents. I hope to improve each and every one of its ten chapters. In the initial work, my goal was to have each chapter reflect the preliminary essay, now the first chapter, which was then called "Descartes among the Scholastics." As I said then, the pattern of the preliminary essay is repeated throughout the volume: one moves from within Cartesian philosophy to its intellectual context in the seventeenth century, then to living philosophical debate being waged by Descartes and his contemporaries, and finally to the first reception of Cartesian philosophy, as another means (though an indirect one) with which that philosophy might be understood as it was intended. I believe I can better fulfill that promise a dozen years later.

I said then, and still believe to be true, that a philosophical system cannot be studied adequately apart from the intellectual context in which it is situated. Philosophers do not usually utter propositions in a vacuum, but accept, modify, or reject doctrines whose meaning and significance are given in a particular culture. Thus, Cartesian philosophy should be regarded, as indeed it was in Descartes' own day, as a reaction against, as well as an indebtedness to, the scholastic philosophy that still dominated the intellectual climate in early seventeenth century Europe. But it is not sufficient, when discussing Descartes' relations with scholastics, simply to enumerate and compare the various Cartesian and scholastic doctrines. To understand what set Descartes apart both from the scholastics and also from other innovators, one does have to grasp the reasons behind the various opinions but, beyond that, one has to understand the intellectual milieu in which these reasons played a role, to see what tactical measures could have been used to advance one's views or to persuade others of them. This is the common theme linking the chapters that follow.

Descartes among the Jesuits: Objections and Replies

The theme of the book is exemplified in the first chapter, in which Descartes' attitude toward scholastic philosophy, as seen through his correspondence, is contrasted with his attitude as revealed through his published works. The essay presents some background about Jesuit pedagogy and Jesuit philosophy so as to begin to understand Descartes' attempt to gain favor among those of that order. Moreover, it depicts a few skirmishes between Descartes and other scholastics (including Jesuits), to capture the flavor of such exchanges. Perhaps the most interesting lesson that can be learned by examining at Descartes' relations with scholastics is the sheer power and authority of Aristotelianism during the seventeenth century.

The essay ultimately argues that Descartes was not a good reader of texts and that the remnants of scholasticism in Descartes' mature works, such as the *Meditations*, might be deceptive for the interpreter. Descartes was taught scholastic philosophy in his youth at La Flèche, but he abandoned his study of it for about twenty years, roughly between 1620 and 1640; he picked it up again only in 1640, to arm himself against the expected objections of the Jesuits. From 1640 on, in the *Replies* to the *Objections* to the *Meditations* and in the *Principles of Philosophy*, Descartes relearned scholastic philosophy and terminology and began the process of reinterpreting his thoughts or translating his own doctrines to make them more compatible with scholasticism. One can detect Descartes' shifts in doctrine or terminology by contrasting his writings before and after 1640. I illustrate this thesis by showing some changes in these.

For the new version of the book, I have added three sections to this chapter. The first new section is "The *Meditations*, *Objections*, and *Replies*." Contextual approaches to Descartes run against a standard line of interpretation for the *Meditations* in that it is claimed that the work is a self-consistent unity whose structures can be revealed or whose elements can be shown as interconnected, but that such a totality cannot fruitfully be analyzed by historical methods. The *Meditations*, it is asserted, resembles Euclid's geometry and to understand a given geometrical system it is necessary to grasp its demonstrations and its sequences. According to Martial Gueroult, the most noted interpreter who held such an internal, non-developmental reading of the *Meditations*, interpreters who "see in Descartes only a biographical succession, and not a rational linkage … merely observe the simple chronological sequence of topics. … This is

evidently a way of doing things that is repugnant to the spirit and letter of Descartes' doctrine." Thus, it is important to show that, in constructing the *Meditations*, Descartes was responding to objections he received to the *Discourse*, that he made numerous changes to his text in the process of publishing it with *Objections* and *Replies*, and that he wanted his readers to understand that he made such changes.

The second new section deals with Descartes and Suárez on the theory of distinctions. Numerous scholars have pointed out the similarities between Descartes' theory of distinctions, from *Principles* I, articles 60–62, and that of Francisco Suárez, from *Metaphysical Disputations*, disputation 7. Descartes' theory of distinctions seems clearly important to his philosophy. The subtitle of the *Meditations* and the title of Meditation VI indicate that the aim of that work, like that of the beginning of the *Principles*, is the demonstration of the *real* distinction between mind and body, that is, a demonstration of a real, not modal distinction or distinction of reason. The thesis that the mind is a mode of the body is certainly not Descartes', though it is that of his erstwhile disciple Regius, one that Descartes explicitly rejects. I conclude, however, that Descartes' theory of distinctions is one of those deceptive scholastic bits constructed after 1640: there is no mention in Descartes of formal or modal distinction before Caterus' challenge in the *First Set of Objections*; there is no formal theory of distinction, Suárezian or otherwise, that Descartes was operating with before 1640, in the manuscript of the *Meditations*.

The third new section concerns the order of the sciences and Descartes' tree of Philosophy. We tend to think of Descartes' tree of philosophy, from the preface to the *Principles*, as a peculiarly Cartesian, anti-scholastic image. That metaphor famously states: "All of philosophy is like a tree, whose roots are Metaphysics, whose trunk is physics, and the branches coming out of this trunk are all the other sciences." I argue, instead, that the image is intended as a depiction of a scholastic-type subalternation of the sciences. The tree of philosophy can even be found used in that fashion in the late scholastic textbooks with which Descartes looked at in the 1640s. In the opening section of his *Summa*, part III (*Physica*), entitled "Arbor Physicae (Tree of Physics)," Charles François Abra de Raconis compares the whole of physics to a tree whose roots are the first principles and causes of natural body, whose bark is the accidents of natural body, whose trunk is the world, and whose branches are the heavens, the elements, and mixed bodies; De Raconis' whole book is arranged according to this image. Given this context, it would be difficult to argue for an opposition between Descartes and Aristotelians on the

classification of the sciences, to maintain that Descartes would have intended to signal this opposition with his metaphor or that late scholastics would have understood the metaphor as a rejection of their view. This change of perspective occasions some comments about the notion of order in Descartes and that of analysis and synthesis, resolution and composition, with scholastic discussions of these notions in the background.

Descartes and the Scotists

I argue that the philosophical context in France during the early 1600s was predominantly Scotist and not Thomist. That fact has been obscured in part because Etienne Gilson, the great French Cartesian commentator, wrote as if all seventeenth century textbook authors were Thomists: Gilson's *Index scolastico-cartésien* compared Descartes with Thomas Aquinas, the Coimbrans, Francisco Suárez, Franciscus Toletus, Antonius Rubius, and Eustachius a Sancto Paulo—that is, Thomas, (Iberian and Roman) Jesuits, and Eustachius, a Paris doctor. Contra Gilson, an analysis of Eustachius' works quickly shows that every doctrine one would call Scotist was held by him: the univocity of being; matter having being apart from form; space as radically relational; time as independent of motion; the plurality of forms; the theory of distinctions, including the formal distinction; individuation as *haecceity*, that is, a form; being in general as the proper object of the human intellect; etc. It is clear that Eustachius was propounding common Parisian doctrines (with others, such as Charles François d' Abra de Raconis and Scipion Dupleix), that these opinions became dominant (even with later Jesuits such as Pierre Gaultruche), and that they were often issued self-consciously as anti-Thomist—that the categories, Thomist, Scotist, were actors' categories for seventeenth century scholastics. Finally, the essay suggests ways in which this knowledge might open up interpretive paths for understanding Descartes himself.

The section in this chapter I have reworked considerably is called "What is a Thomist? What is a Scotist?" I had been dissatisfied with the section mainly because the discussion there began peremptorily by stating seven theses for which Thomas and Scotus took opposite views, but I did little to show that seventeenth century philosophers thought that Thomas and Scotus were in opposition with respect to these theses. I try to better motivate the discussion in two ways. First, I discuss Thomism,

looking at what we think is the core of Thomism (using a document on Thomism, called Twenty-Four Theses, which I append to the chapter). I then find these core Thomist doctrines in Antoine Goudin's seventeenth-century textbook, *Philosophia juxta inconcussa tutissimaque Divi Thomae dogmata* (1668). The seven theses discussed can then be recaptured in Goudin's defense of Thomism and critique of Scotism.

Ideas, before and after Descartes

The next essay, which I originally wrote with Marjorie Grene, discusses Descartes' concept of idea and the scholastic context from which it arose. It focuses on the use of the term in the writings of four seventeenth-century philosophers: Eustachius, Jean Crassot, de Raconis, and Rudolph Goclenius. It also discusses the traditional usage of the term in the philosophical corpus of seventeenth-century scholasticism (in the *Corps de Philosophie* of Théophraste Bouju, for example). The chapter concludes that Descartes drew on the current seventeenth century literary and philosophical usage of the term, as in the works of Eustachius, Goclenius, and de Raconis, that by calling on the ideas in God's mind as his source, Descartes set ideas free from their connection to sensation, and that there is precedent in the philosophical literature for Descartes' insistence on the truth of ideas.

Originally, this chapter concentrated on context and said little about the debate that followed in the second half of the seventeenth century. I have added a section on Pierre-Daniel Huet's and Jean Duhamel's critiques of Descartes on ideas, with Pierre Sylvain Régis' response, coming to the defense of Descartes. (There is obviously a major discussion among the Cartesians—Arnauld, Malebranche, *et al.*—about ideas, but I restrict myself to the scholastic critique and the Cartesian response to it.)

The Cartesian Destiny of Form and Matter and Its Critics

This chapter, also originally written with Marjorie Grene, is an examination of the allegedly enormous differences between strict hylomorphism and Cartesianism on form and matter: that for a strict hylomorphist, matter and form cannot be separated, but for a Cartesian, matter and form are really distinct; that for a strict hylomorphist, form is the principle of being and matter the principle of individuation, but for a Cartesian, the mind—a form—is the principle of individuation for persons, if

anything is. However, these breaks are not as severe as might have been thought, if seventeenth century scholasticism is taken into account. For many reasons, the late Aristotelians broke with Aristotle and accepted the reality of matter without form and form without matter, and form as the principle of individuation. In addition, the intellectual landscape of seventeenth-century philosophy was not limited to the properly scholastic; there were anti-Aristotelian options (some corpuscularian, others not) available before Descartes. Given that the gulf between the schoolmen and *novatores* like Descartes was not so great, the way was open for certain compromises: a variety of scholastic restatements of Cartesianism from more or less Cartesian positions. Thus, it can be said that some varieties of Aristotelianism in the seventeenth century prepared the ground for the acceptance of Cartesianism and the eventual attempts at their reunification.

In the revised version I reinforce the thesis of this chapter in a number of ways. First, I add to the anti-Aristotelian options available before Descartes: from the neo-Epicurean Nicholas Hill, to Francis Bacon, Galileo, and others. Second, and more importantly, I add a section on the criticism of scholastics, such as Goudin, to Descartes' position. I also discuss the objections by the atomist Cartesian, Gérauld de Cordemoy, to the original Cartesian position (and refer as well to G.W. Leibniz's criticism of Cordemoy).

Descartes, Basso, and Toletus: Three Kinds of Corpuscularians

The chapter discusses the significance of some references in Descartes' correspondence to Sebastian Basso, an early seventeenth-century atomist. Initially, in October 1629, Descartes wrote to Mersenne that he agreed with Basso about rarefaction, but disagreed with him about the ether. Then, a year later, Descartes called Basso one of the *novatores* (along with Bernardino Telesio, Tommaso Campanella, Giordano Bruno, and Lucillio Vanini) in the context of an ill-tempered letter to Isaac Beeckman concerning what anyone can teach another: Basso does not have anything to teach Descartes, any more than anyone else, unless he can convince him by his reasons. Finally, in a letter to Constantijn Huygens, we have the disavowal of Basso: he is only good for destroying Aristotle's opinion, Descartes denying that he shares this intent, claiming that he seeks only to establish something so simple and evident that everybody would agree with it. The essay compares the doctrines of Descartes and

Basso on the subject of rarefaction and the ether in order to make sense of these references; this also requires a discussion of their views on corpuscles and the void. But, above all, these doctrines are contrasted with those of the Aristotle of the scholastics at the start of the seventeenth century, Aristotelians such as Eustachius a Sancto Paulo and Scipion Dupleix, but especially Toletus and the Coimbrans, authors constantly cited by Basso, and whom Descartes remembers reading in his youth.

In the revised version of the chapter, I sharpen the discussion of scholastic *minima naturalia* theory, which forms the background for the views of Toletus, adding Daniel Sennert's arguments for such *minina*.

Scholastics and the New Astronomy on the Substance of the Heavens

The chapter considers a key seventeenth century question about the substance of the heavens: whether astronomical novelties, such as sunspots and comets, necessitate a significant change in cosmological theory. Based on what was taught during the first half of the seventeenth century, the essay details the resiliency of traditional Aristotelian cosmology against the new astronomy of Galileo and Descartes. The authors surveyed include both Catholic and Protestant textbook writers at Paris and at Jesuit and non-Jesuit colleges around Paris (Théophraste Bouju, Jacques du Chevreul, Pierre du Moulin, René de Ceriziers, Antoine Goudin, Jean Duhamel, Jacques Grandamy, *et al*.).

I add to the chapter a discussion of the three cosmological treatises by Libertus Fromondus, a correspondent of Descartes: *Saturnalitiae Coenae, Variatae Somnio, sive Peregrinatione Caelestis; De Cometa anni 1618. Dissertationes*; and *De Cometis*, Book III of his *Meteorologicorum libri*. Fromondus brings a new element to the argument, especially since he has a good criticism of Galileo's view of comets. I also expand the exposition of the cosmological views of Bouju and du Chevreul. The examples of Bouju, du Chevreul, Fromondus, and Grandamy show that thinkers at the time accepted Galileo's novel observations but did not accept the Copernican or Tychonic system. They made significant modifications to their Aristotelianism to accommodate astronomical novelties: they used Aristotelian principles they deemed more fundamental to deny Aristotelian tenets they regarded as secondary. While du Chevreul and the others could be thought as normal scientists—in this case, Aristotelians—they made changes that went well beyond what

could be described as the articulation of the Aristotelian paradigm or exemplar. These examples suggests that one can make "revolutionary" changes in theory without any corresponding changes in method or values—and, in fact, that this happens fairly frequently (all in the spirit of "normal" science).

Descartes and the Jesuits of La Flèche: The Eucharist

The chapter analyzes the exchanges between Descartes and the Jesuits of La Flèche on the mystery of the Eucharist. These exchanges are regarded as Descartes' first steps toward a Cartesian scholasticism. Contrary to the secondary literature on the subject, Descartes did not write about transubstantiation against his will—because he was forced to respond to Antoine Arnauld's questions about the Eucharist in the *Fourth Set of Objections* (1641)—or merely to flatter the Jesuits. Descartes himself freely raised these issues as early as 1630 and considered his explanation of the mystery of the Eucharist to be an excellent result of his philosophy (well before his exchange with Arnauld). For Descartes (as for others) there are two different aspects of the mystery that required explanation: (i) how, without using the scholastic doctrine of real accidents, the bread after transubstantiation might still look like bread to us (discussed in *Replies IV*), and (ii) how Christ may be really present in the consecrated bread (discussed in the *Letters to Mesland*). The essay also demonstrates (what has not been previously noticed) that the Cartesian answer to the question of real presence is the standard seventeenth century scholastic (Scotist, not Thomist) view.

A new section beginning with the reception, by Robert Desgabets, of Descartes' view concerning aspect (ii) indicates the controversial nature of the Cartesian account. Aspect (ii) occurs only in some letters with Denis Mesland. By 1667, Claude Clerselier published Descartes' correspondence in three volumes, but Clerselier consciously left the Mesland letters out of his collection. They were not published until the nineteenth century. On the other hand, when G.W. Leibniz wrote a treatise on transubstantiation (in 1668) as an attempt to reconcile Catholics and Protestants on various theological issues, the view he developed, independently, had strong affinities with those of Descartes. A discussion of Leibniz's treatise and his principle of individuation from 1668 provides another perspective of Descartes' views on transubstantiation, that is, about his principle of individuation.

Condemnations of Cartesianism: The Extension and Unity of the Universe

The condemnations of Cartesianism by the authorities of Louvain are discussed next. In 1662, just a year before Descartes' works were placed on the *Index of Prohibited Books*, five propositions from Descartes' *Principles* were prohibited at Louvain; specifically censured were Descartes' definition of substance in general, his rejection of substantial forms or real accidents, his doctrine that extension is the essential attribute of substance, his claim that the universe is indefinitely extended, and his rejection of multiple universes. The essay concentrates on the last two prohibited propositions and investigates the scholastic background to those issues regarding the universe, that is, whether it is finite or infinite, single or plural.

A background issue from the first version of this chapter is treated more fully: to what extent was Descartes aware of previous condemnations? In particular, how well did he know the condemnations of 1277? Although scholars assume that such knowledge is widespread, one can show that the condemnations of 1277 were mostly unknown in the seventeenth century. Such considerations require one to be cautious when citing a previous condemnation as a reason for holding or rejecting any particular doctrine.

Cartesians, Gassendists, and Censorship

Two events in late seventeenth century philosophy are then considered: (i) the condemnation of Cartesianism by the church, the throne, and the university; and (ii) the non-condemnation of Gassendism by the same powers. What is striking about the two events is that both Cartesians and Gassendists accepted the same proposition deemed heretical: extension as the principal attribute of matter. Thus, what was sufficient to condemn Cartesianism was not sufficient to condemn Gassendism. As a result, it seems clear that to understand what is involved in condemnation one has to pay close attention to the intellectual and/or social context and to rhetorical strategy, not just to the propositions condemned. In this case, some of the central propositions of corpuscularianism and the mechanical philosophy are involved.

I add a section on the attempts by Cartesians to mitigate the situation by making themselves look more like Gassendists. One can find

Cartesio-Gassendists, such as Walter Charleton, and Cartesians who, for various reasons, leaned toward Gassendi-like fallibilism and empiricism (Jacques du Roure, Bernard Lamy and François Bayle, for example).

The Cogito *in the Seventeenth Century*

Instead of asking logico-linguistic questions about Descartes' *cogito* the essay examines the critiques it received by seventeenth-century philosophers, in part for what they can tell us about these philosophers, and in part for what they can reveal about Descartes and the *cogito* itself. The essay reviews briefly the well-known critiques of the *cogito* published with the *Meditations*, as *Objections* (together with Descartes' *Replies)*—those of Hobbes and Gassendi, of the anonymous objectors of the *Sixth Objections*, and of the Jesuit Pierre Bourdin—and then examines the exchanges among Pierre-Daniel Huet, Pierre-Sylvain Régis, and Jean Duhamel. I argue that the seventeenth-century critiques of the *cogito* (especially those of Huet, Duhamel and the inquisitors of the College of Angers) are very similar: the *cogito* is rejected as a principle of knowledge, or as science, properly speaking, because such a principle, according to the *Posterior Analytics*, must be a "commensurate universal," a proposition whose predicate belongs essentially to every instance of its subject. The *cogito*, thus, does not fit the scholastic model for pure scientific knowledge at all. It is neither universal nor necessary, but singular and contingent. Moreover, it is not a principle, but an argument, and even a defective one; either it is dependent upon an unspecified major premise or it begs the question. And if it is an argument, it cannot be a principle of knowledge: an argument cannot itself be a principle. The rejection of the cogito in these critics is also linked with their prior rejection of Cartesian doubt.

I add, to the revised version of this chapter, a large preliminary section dealing with the *cogito* in the seventeenth century before Descartes. The arguments by Descartes' correspondent Jean de Silhon and the Jesuit Antoine Sirmond, published in 1634–1635, cast significant light on Descartes' *cogito* and the general Augustinian atmosphere in the seventeenth century; I think it allows us to understand better what is Descartes' contribution to the argument and how to interpret the subsequent criticisms of Descartes.

All of the above essays treat Descartes' physics and metaphysics in relation to the late scholastics during the seventeenth century (before

and after Descates). The seventeenth-century collegiate course on Physics (or science of natural things) would have covered a variety of topics, from the order of the sciences to the materials of Aristotle's *Physics*, that is, principles (matter and form), causation (including exemplar causation), infinity, place, time, void, and motion; to the *De caelo*, *De generatione et corruptione*, and *Meterologica*, that is, the substance of the heavens, the elements—levity and gravity—meteors, comets, and other meteorological phenomena; to the *De anima*, that is, various souls, the senses (including internal and common senses), and other faculties of the soul—imagination, memory, appetition, understanding, will, memory. The course on Metaphysics (or supernatural science) would have begun with such topics as the object or subject of metaphysics, principles of metaphysics (being, existence and essence, cause and principle, archetypes or ideas), and transcendentals (unity, quantity, principle of individuation, truth and falsity, good and evil). It would have continued with mixed metaphysical-theological topics, such as whether man is created with knowledge, immortality of soul, metempsychosis, and whether the separated soul retains its faculties. In the attempt to illuminate Cartesian philosophy by examining its context, analyzing some debates, and surveying some controversies, I hope to have touched upon many, if not most, of these topics and themes shared by Cartesian and late scholastic philosophy.

The essays included here are not offered as close examinations of Descartes' philosophy; they are merely intended as initial steps toward such an examination. Again, before asking what philosophers hold and why, we need to familiarize ourselves with the philosophical options open to them and the language used to express such options. We need to understand the meaning those terms had in that particular culture, the significance of various philosophical views for the culture, and so on. We cannot simply assume that these things are the same for any culture as they are for us. Thus, in the search for clues toward a more adequate understanding of any particular philosophy, we are bound to investigate its context, both in its social and intellectual dimensions, the interplay of ideas between it and its competitors, and its immediate reception. Despite the vast number of essays presented as close examinations of Descartes' philosophy, that task, I suggest, has not been sufficiently accomplished as yet.

CHAPTER ONE

DESCARTES AND THE LAST SCHOLASTICS: OBJECTIONS AND REPLIES

For most readers of Descartes, the topic of Descartes' relations with the scholastics brings to mind his disparaging comments about the philosophy he was taught: "in my college days I discovered that nothing can be imagined which is too strange or incredible to have been said by some philosopher."[1] Descartes, in the *Discourse on Method*, seemed to find little worthwhile in his education, including his schooling in scholastic philosophy and the sciences; at best, "philosophy gives us the means of speaking plausibly about any subject and of winning the admiration of the less learned," and "jurisprudence, medicine, and other sciences bring honors and riches to those who cultivate them";[2] but "there is still no point in [philosophy] which is not disputed and hence doubtful" and, "as for the other sciences, insofar as they borrow their principles from philosophy . . . nothing solid could have been built upon such shaky foundations."[3]

Obviously, the Descartes of the *Discourse* represented himself as dissatisfied with school learning in general. When reading his correspondence, however, one can catch a glimpse of a different Descartes. In 1638, approximately a year after the publication of the *Discourse*, Descartes wrote a letter responding to a request for his opinion about adequate schooling for the correspondent's son. In the letter, Descartes attempted to dissuade the correspondent from sending his son to school in Holland. According to Descartes, "there is no place on earth where philosophy is better taught than at La Flèche," the Jesuit institution in which he studied. Descartes gave four reasons for preferring La Flèche. First, he asserted, "philosophy is taught very poorly here [in Holland]; professors teach only one hour a day, for approximately half the year, without

[1] AT VI, 16: CSM I, 118. The statement is ambiguous, of course, between Descartes having been taught the Ciceronian phrase and having come to realize the matter himself. The pronouncements of the *Discourse* are formulae that echo standard skeptical assertions; for the literary background to the *Discourse*, see Gilson, *Discours de la méthode texte et commentaire*.

[2] AT VI, 6: CSM I, 113.

[3] AT VI, 8–9: CSM I, 115.

ever dictating any writings, nor completing their courses in a determinate time." Second, Descartes advised, "it would be too great a change for someone, when first leaving home, to study in another country, with a different language, mode of living, and religion"; La Flèche was not far from the correspondent's home, and "there are so many young people there from all parts of France, and they form such a varied mixture that, by conversing with them, one learns almost as much as if one traveled far." Descartes then praised as a beneficial innovation the "equality that the Jesuits maintain among themselves, treating in almost the same fashion the highest born and the least." Most importantly, Descartes asserted that although, in his opinion, "it is not as if everything taught in philosophy is as true as the Gospels, nevertheless, because philosophy is the key to the other sciences," he believes that "it is extremely useful to have studied the whole philosophy curriculum, in the manner it is taught in Jesuit institutions before undertaking to raise one's mind above pedantry, in order to make oneself wise in the right kind [of philosophy]."[4]

Of course, preferring La Flèche to a Dutch educational institution is not the same as giving an unqualified endorsement to La Flèche. On the other hand, some of Descartes' pronouncements, especially his last assertion, do seem inconsistent with those of the *Discourse*. How can the Descartes of the *Discourse* recommend learning scholastic philosophy as preparatory to the sciences and to his own philosophy? Is not the study of scholastic philosophy antithetical to the Cartesian project to cleanse oneself of the effects of years of dependence on the senses? Would not the study of scholastic philosophy merely reinforce those bad habits? Still, Descartes' advice in his letter seems open and frank, and Descartes' first three assertions in the letter correlate very well with what one can discover to have been the case in seventeenth-century Jesuit education.

Descartes was right in suggesting that students would have been taught more philosophy, and would have been taught it more rigorously at La Flèche than at a Dutch college or university. The philosophy curriculum at La Flèche is fairly well-known, and the daily routine of its students well-documented.[5] At La Flèche, as in other Jesuit colleges of the time,[6] the curriculum in philosophy would have lasted three years (the final three

[4] AT II, 378.

[5] For more information concerning La Flèche and its curriculum, consult Rochemonteix 1899; a popular exposition of the same material can be found in Sirven 1987.

[6] For other colleges, as well as for general Jesuit educational theory, see: Wallace 1984; *Monumenta Paedagogica Societatis Jesu* 1901; Dainville 1987; and Brockliss 1981 and 1987.

years of a student's education, from about the age of fifteen on). It would have consisted of lectures, twice a day in sessions lasting two hours each, from a set curriculum based primarily on Aristotle and Thomas Aquinas. During Descartes' time, the first year was devoted to logic and ethics, consisting of commentaries and questions based on Porphyry's *Isagoge* and Aristotle's *Categories*, *On Interpretation*, *Prior Analytics*, *Topics*, *Posterior Analytics*, and *Nicomachean Ethics*. The second year was devoted to physics and metaphysics, based primarily on Aristotle's *Physics, De Caelo, On Generation and Corruption* Book I, and *Metaphysics* Books 1, 2, and 11.[7] The third year of philosophy was a year of mathematics, consisting of arithmetic, geometry, music, and astronomy, including such topics as fractions, proportions, elementary figures, techniques for the measurement of distances and heights, trigonometry, gnomics, geography and hydrography, chronology, and optics.[8] Students would have been expected to study their professors' lectures thoroughly. Their daily routine would have included a number of hours of required study time. They would have had to show their work to a prefect daily and to repeat materials from their lectures to a *repetitor*; their learning would have been tested in weekly and monthly oral disputations in front of their professors and peers.

Descartes was not exaggerating when he asserted that the student population of La Flèche was diverse, geographically and otherwise. La Flèche accepted boys from all corners of France and from all walks of life. During Descartes' days, its boarders numbered approximately one hundred, and it taught, in addition, about twelve hundred external, or day, students. Moreover, the equality of treatment practiced by the Jesuits, and referred to by Descartes, does appear to be an innovation in the context of seventeenth-century France; it is verifiable by available documents. The sons of the most humble families lived in the same rooms as those of the most exalted. When arriving at La Flèche, one checked one's sword in the armory. "Without a sword, a gentleman forgot his

[7] Later, the second year became the year of physics and mathematics, with the third year being devoted to metaphysics. The three-year Jesuit collegiate curriculum was a year longer than the typical ones, such as those found in the colleges of the University of Paris, which usually consisted of a year of ethics and logic and a second year of physics and metaphysics.

[8] See, for example, Gaultruche 1656, a good exemplar for what would have been taught in mathematics at La Flèche, given that Gaultruche was a Jesuit who taught mathematics at La Flèche and Caens.

birth; there would be no distinction between nobility, bourgeois, etc."[9] There is even the case of Jean Tarin, one of Descartes' contemporaries, born in Anjou in 1586, who came to La Flèche "in poverty, with feet bare, and nothing but an undershirt and a bag of nuts and bread"; true, he was first a kitchen assistant and sweeper of classrooms for about four years, but then he became lackey to the young Comte de Barrant, who gave him the means and leisure to study. In 1616 he became professor of grammar at the Collège Harcourt, Paris, and in 1625, he became its rector.[10]

One can only conclude that the attitude toward scholastic education in philosophy displayed by Descartes in some of his correspondence more nearly represents his own views on the matter; at the very least, the letter to the anonymous correspondent about his son's education should provide one with a something of a corrective for interpreting Descartes' more negative views about scholastic education, from the *Discourse*.[11]

Descartes' Request for Objections: The Letters to Noël

Another letter written by Descartes about the time of the publication of the *Discourse* also casts doubt upon the reliability of any literal reading of that work. During June 1637 Descartes wrote to one of his old teachers, sending him a copy of the newly published *Discourse*. As Descartes put it, he sent the volume as a fruit that belongs to his teacher, *whose first seeds were sown in his mind by him*, just as he also owed to those of his teacher's order the little knowledge he had of letters.[12]

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[9] Rochemonteix 1899, vol. II, p. 27.

[10] Rochemonteix 1899, pp. 25–27. Similarly, Marin Mersenne, Descartes' principal correspondent, was one of the students of humble origins who studied at La Flèche and played a role in the intellectual life of the seventeenth century. For Mersenne's intellectual biography, see Lenoble 1943 or Dear 1988.

[11] As already indicated, it is difficult to reconcile Descartes' enthusiasm for La Flèche with his attitude on scholastic education in the *Discourse*. Of course, Descartes is merely stressing the academic rigor of the teaching, the discipline, and the social ethos of La Flèche; on the face of it this is quite compatible with the *Discourse* thesis that the subjects taught there were not much use. But why should one recommend a more rigorous school over a less rigorous one when what is taught more rigorously is of little use? This question becomes more pressing when one realizes that, as early as 1634, Regius (Chair of Medicine, and from 6 September 1638 on, extraordinary Professor at Utrecht) was already giving private lessons, loosely based on Cartesian philosophy and physics, having been taught the matter by Reneri, Descartes' friend and earliest supporter in the Netherlands. It is one thing to recommend La Flèche as the best of a sorry lot, but another to recommend it over Utrecht, where one might be taught some Cartesian philosophy.

[12] AT I, 383.

Now, it is true that Descartes sent copies of the *Discourse* to a great number of people: close friends, the nobility, various intellectuals, Jesuits, and others.[13] It is also true that Descartes indicated in the letter that he had not kept in touch with his old teachers after he left La Flèche: "I am sure that you would not have retained the names of all the students you had twenty-three or twenty-four years ago, when you taught philosophy at La Flèche, and that I am one of those who have been erased from your memory."[14] Moreover, the attempt to promote his works by making them the focus of discussion was already part of Descartes' strategy. When, in 1641, Descartes published his *Meditations on First Philosophy*, he did so with a series of *Objections* and *Replies* to the work. He had hoped to do the same thing with the earlier *Discourse*. In Part VI of the *Discourse*, Descartes announced:

> I would be very happy if people examined my writings and, so that they might have more of an opportunity to do this, I ask all who have objections to make to take the trouble and send them to my publisher and, being advised about them by the publisher, I shall try to publish my reply at the same time as the objections; by this means, seeing both of them together the readers will more easily judge the truth of the matter.[15]

Thus, the letter Descartes wrote to his old teacher should be read from this perspective; the letter was part and parcel of Descartes' strategy to promote discussions of his views. And, of course, Descartes did request objections from his teacher and from others of his order in the letter: "If, taking the trouble to read this book or have it read by those of your [order] who have the most leisure, and noticing errors in it, which no doubt are numerous, you would do me the favor of telling me of them, and thus of continuing to teach me, I would be extremely grateful."[16] Still, it is curious to see the Descartes of the *Discourse* being so obsequious and sending his work to his teachers "as the fruit belonging to them, whose seed they sowed."

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[13] See, for example, the letter of 14 June 1637 to Huygens or to Wilhem: AT I, 387, in which Descartes indicates that, of the three copies of the *Discourse* enclosed, one is for the recipient of the letter, another for the Cardinal de Richelieu, and the third for the King himself.

[14] AT I, 383. This sentence enables one to guess that the recipient of the letter is the Père Etienne Noël, Descartes' *repetitor* in philosophy, especially since Noël was rector of La Flèche in 1637. See Rodis-Lewis 1987, p. 190 n; see also Rodis-Lewis, "Descartes aurait-il eu un professeur nominaliste?" and "Quelques Questions disputées sur la jeunesse de Descartes", in 1985, pp. 165–181.

[15] AT VI, 75; CSM I, 149.

[16] AT I, 383.

We do not have a response from Descartes' teacher, but we can infer what he said, given that we have a second letter from Descartes to him, written in October 1637. Descartes thanked his correspondent for having remembered him and for giving his promise to have the book examined and objections forwarded. He pressed his correspondent to append his own objections, saying that there are no objections whose authority would be greater, and none he desires more.[17] Descartes added that no one would seem to have more interest in examining his book than the Jesuits, since he did not see how anyone could continue to teach the subjects treated, such as meteorology, as do most of the Jesuit Colleges, without either refuting what he had written or following it. At the end of the letter, however, he seemed to recognize the reason why the Jesuits might not willingly take up his philosophy; he attempted to reply to the difficulty:

> Since I know that the principal reason which requires those of your order most carefully to reject all sorts of *novelties* in matters of philosophy is the fear they have that these reasons would also cause some changes in theology, I want particularly to indicate that there is nothing to worry from this quarter about these things, and that I am able to thank God for the fact that the opinions which have seemed to me most true in physics, when considering natural causes, have always been those which agree best of all with the mysteries of religion.[18]

It was clear to Descartes that a stumbling block to friendly relations with the Jesuits would have been their distaste of novelty, because of their desire to safeguard theology, and that they would have rightly seen him as offering novelties. As in previous instances, Descartes seemed to understand his own situation fairly well; he seemed to have a clear grasp of Jesuit educational practices and objectives during the seventeenth century.

Jesuit Pedagogy in the Sixteenth and Seventeenth Centuries

During Descartes' lifetime, from his childhood at La Flèche to the 1640s, great changes in pedagogy were taking place. The Jesuits, following the example of the University of Paris, had reorganized their curricula.[19] They had undertaken extraordinary discussions and exchanged position

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[17] AT I, 454–456.
[18] AT I, 455–456: CSMK 75; emphasis supplied.
[19] See Douarche 1888; see also Brockliss 1987.

papers, all of which ultimately led to their *ratio studiorum*. As part of the self-consciousness about teaching, textbooks, both Jesuit and non-Jesuit, had undergone significant changes. Having decided to standardize their curricula, the Jesuits set out to write texts that reflected their curricular decisions. Early Jesuit textbooks presented Aristotle's texts in a most scholarly fashion; they were modeled after the great commentaries on Aristotle's works, each volume treating a specific Aristotelian text (the *Physics*, *de Anima*, *de Caelo*, etc.), but presenting both the Greek text and Latin translations, together with Latin paraphrases (*explanationes*), leading to *quaestiones*, the treatment of standard problems relevant to particular texts, further subdivided into articles. Later Jesuit textbooks did the same, but deleted the Greek version of Aristotle's text. The textbooks of University of Paris professors deleted even Aristotle's Latin text: they simply strung together *quaestiones* in the order in which the text would have been presented, but did so for all Aristotelian sciences within the framework of the whole course of philosophy—Ethics and Logic, Physics and Metaphysics—in a single volume. The same held for popular contemporary presentations of the same materials in the French language.

But the contents of the textbooks were also a focus of discussion. There was a renaissance in Thomistic philosophy during the second half of the sixteenth century. For the duration of the Council of Trent (1545–1563), Thomas' *Summa Theologiae* was placed next to the Bible, on the same table, to help the council in its deliberations, so that it might derive appropriate answers. In 1567 Pope Pius V proclaimed Saint Thomas Aquinas Doctor of the Church and commissioned a master edition of his works (accomplished in Rome, 1570–1571). Saint Ignatius of Loyola, founder of the Jesuits, advised the Jesuits to follow the doctrines of Saint Thomas in theology and those of Aristotle in philosophy: "In theology there should be lectures on the Old and New Testaments and on the scholastic doctrine of Saint Thomas. … In logic, natural and moral philosophy, and metaphysics, the doctrine of Aristotle should be followed, as also in the other liberal arts."[20] Naturally, it would have been difficult to follow Saint Thomas in theology without also accepting much of his philosophy; and to follow Saint Thomas in philosophy would have required one to follow Aristotle as well. Thus, Loyola's advice often resulted in the Jesuits' offering a Thomist reading of Aristotelian doctrines. Ultimately, the advice was made formal in the Jesuits' *ratio*

[20] Loyola 1970, 220–221. See also Hellyer 1996.

studiorum of 1586: "In logic, natural philosophy, ethics, and metaphysics, Aristotle's doctrine is to be followed."[21] The flavor of the advice can be captured through a memorandum from Francisco Borgia, the third General of the Jesuits (1564–1572), to the Superiors of the Order, written just after the end of the Council of Trent and imbued with the spirit of the Council and Saint Ignatius of Loyola's advice. I quote the memorandum in full:

> *That Which Must Be Held in Theology and in Philosophy*
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> Let no one defend or teach anything opposed, detracting, or unfavorable to the faith, either in philosophy or in theology. Let no one defend anything against the axioms received by the philosophers, such as: there are only four kinds of causes;[22] there are only four elements;[23] there are only three principles of natural things;[24] fire is hot and dry; air is humid and hot.[25]

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[21] Rochemonteix 1899, p. 8 n.

[22] The four kinds of causes, as given in Aristotle's *Physics* II, chs. 3–10, are formal, material, efficient, and final; all four would be involved in a complete explanation of a change. For example, in the Aristotelian account of the reproduction of man, the material cause is the matter supplied by the mother, the formal cause is the specific form of man (that is, rational animal), the efficient cause is supplied by the father, and the final cause is the end toward which the process is directed.

[23] Aristotle discusses the four elements in *De Caelo* III and IV. The elements, that is, earth, water, air, and fire, are characterized by pairs of the contraries, hot and cold, moist and dry (*On Generation and Corruption* I); in Aristotle's theory of motion, the elements move naturally in a rectilinear motion, the first two elements having a natural downward motion, toward the center of the universe, whereas the second two have a natural upward motion, toward the periphery of the sublunar region. This creates a distinction between the sublunar world of the elements and the supralunar world of the heavens, whose ether moves naturally in a circular motion.

[24] The three principles of natural things are form, matter, and privation, discussed by Aristotle in Book I of the *Physics*. The form of a thing is its actuality, whereas the matter is its potentiality; privation is what the thing is not. For example, in a change from water being cold to being hot, heat is the form that the thing lacks, but it is water, the matter or subject, that gains the form and becomes hot (cold itself or the bare matter does not change). Change is the gaining or losing of forms; but some forms are essential and cannot be lost (for example, man cannot lose the form, rational animal, and remain man). Thus, a form is accidental when it confers a new quality to a substance already formed—heat, for example. On the other hand, a substantial form confers being; there is generation of a new being when a substantial form unites with matter, and real destruction when one separates from matter.

[25] These "axioms" are sufficient to banish Stoic, Epicurean, and atomist philosophies. Epicureans and atomists account for change by the substitution or rearrangement of basic particles, or atoms, not by the replacement of forms in a matter capable of accepting various forms. Moreover, for an Epicurean or an atomist, the particles themselves would be more basic than the elements, and an insistence on four elements would go against Stoic cosmology.

Let no one defend anything against the most common opinion of the philosophers and theologians, for example, that natural agents act at a distance without a medium.[26]

Let no one defend any opinion contrary to common opinion without consulting the Superior or Prefect.

Let no one introduce any new opinion in philosophy or theology without consulting the Superior or Prefect.

Opinions That [Jesuits] Must Sustain, Teach, and Hold as True

Concerning God. God's power is infinite in intensity; He is a free agent according to the true philosophy. His Providence extends to all created beings in general, to each in particular, and to all human things; he knows all things present, past and future, according to the true philosophy.

Concerning Angels. Angels are truly placed in categories and are not pure act, according to the true philosophy. They are in place and move locally from place to place, so that one should not hold that they are not in place and do not move, so also that their substance is present in some manner in one place and then in another.

Concerning Man. The intellective soul is truly the substantial form of the body, according to Aristotle and the true philosophy. The intellective soul is not numerically one in all men, but there is a distinct and proper soul in each man, according to Aristotle and the true philosophy.[27] The intellective soul is immortal, according to Aristotle and the true philosophy. There are not several souls in man, intellective, sensitive, and vegetative souls, and neither are there two kinds of souls in animals, sensitive and vegetative souls, according to Aristotle and the true philosophy.[28] The soul, whether in man or in animals, is not in fuzz or in hair. Sensitive and vegetative powers in man and animals do not have their subject in prime matter. Humors are, in some manner, part of man and animals. The whole being of composite substance is not solely in form, but in form and matter.

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[26] This "common notion" is sufficient to reject the philosophy of non-Thomist scholastics, such as Ockhamists. In his *Commentary on the Sentences* II, quaest. 18, Ockham accepts an account of magnetism as action at a distance, without the intervention of a medium, instead of accepting a medium as necessary for propagating a magnetic quality.

[27] The target of this opinion is the Averroist doctrine of the numerical unity of intellective soul, that is, the doctrine denying the existence of individual souls and asserting that there is just one intellective soul.

[28] The target of this opinion seems to be the Augustinian and Franciscan doctrine of the plurality of substantial forms. John Duns Scotus and William of Ockham held the thesis that man is a composite of forms (rational, sensitive, etc.), a thesis previously rejected by Thomas Aquinas, who argued that there is just one form or soul in man (the rational soul), which performs the functions that the other souls perform in lower beings.

> *Varia*. The predicables are five in number. Divine essence does not have a single subsistence common to three persons, but only three personal subsistences. Sin is a formal evil and a privation, not something positive. We are not causes of our own predestination.
>
> Let all professors conform to these prescriptions; let them say nothing against the propositions here announced, either in public or in private; under no pretext, not even that of piety or truth, should they teach anything other than that these texts are established and defined. This is not just an admonition, but a teaching that we impose.[29]

Given the above, one might wonder whether Descartes' attempt to gain acceptance of his philosophy by the Jesuits was a quixotic endeavor. Descartes did try to indicate that his doctrines were not dangerous to the faith; but the Jesuits defined danger to the faith as any novelty in either theology or in philosophy, especially as it concerned the axioms and common opinions of scholasticism. And Descartes would not have fared very well in this respect. He rejected the four causes, arguing that final causes are not appropriate for natural philosophy.[30] He set aside the four elements and held that there was only one kind of matter, and that all its varieties could be explained as modifications of extensions.[31] Moreover, Descartes did not accept the three Aristotelian principles of matter, form, and privation. Except for rational beings who have minds, Descartes discarded the doctrine of substantial forms.[32] Finally, though Descartes might have agreed that fire is hot and dry, and air is humid and hot, it would have been as phenomenological descriptions, and not as representing any basic reality; such statements would have been inconsistent with Descartes' mechanical philosophy, which required some kind of corpuscularianism, as well as the rejection of final causes and substantial forms (except for man's body as informed by a soul).

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[29] Bibliothèque Nationale, mss. fond Latin, n. 10989, fol. 87, in Rochemonteix 1899, vol. IV, pp. 4 n–6 n.

[30] See Meditation IV: AT VII, 55, and elsewhere.

[31] Rule IV: AT X, 442, for example. If one wanted to draw Descartes closer to Aristotle (as does Le Bossu, in 1981 [1674], pp. 286–287) one could say that Descartes accepts three out of Aristotle's four elements, that is, fire, air, and earth. (See, for example, *Le Monde*: AT XI, 25.) But that would be to disregard the important difference that Aristotle's elements are differentiated *qualitatively*, whereas there is only a *quantitative* difference among Descartes' elements. See also chapter 4.

[32] See *Principles* IV, art. 198, and elsewhere; Descartes does say (in a letter to Regius, AT III, 491–492) that he does not reject substantial forms overtly, that he merely asserts they are not needed; the context of the assertion is an interesting letter in which Descartes counsels Regius to abstain from public disputes and from advancing novel opinions (that one ought to retain the old opinions in name, giving only new reasons).

On the other hand, Descartes would have agreed with the common opinion that natural agents do not act at a distance without a medium.[33] Interestingly, he could accept all the theological and philosophical opinions concerning God, angels, and man that Jesuits were required to sustain and defend, including the thesis that God's power is infinite in intensity,[34] that he is a free agent,[35] that the intellective soul in man is the substantial form of the body,[36] that the intellective soul is not numerically one in all men and that there is only one soul in man,[37] and that sin is a privation, not something positive.[38] The only notable exception was Descartes' denial of animal souls, both sensitive and vegetative.[39] Perhaps Descartes might have thought that his orthodoxy with respect to theological matters would have led to the acceptance of his philosophical novelties, once they were seen to harmonize with Catholic theological doctrines.

Perhaps also, during Descartes' time, there was a slightly more liberal interpretation given to Loyola's advice to follow Thomas. The traditional difficulty with the advice was that there were many divergent authorities. Not all Jesuits agreed that it was a good thing for the Society to choose a single authority, or that Saint Thomas was always the best author to uphold. With the succession of Claudio Acquaviva as the fifth General of the Jesuits (1581–1615), these issues took on a new vigor. The period was, of course, the one in which the Society reorganized its curriculum.[40] In the meanwhile, Acquaviva summarized the points that had to

[33] Descartes is a mechanist and his world is a plenum. For the impossibility of void, see AT IV, 329.

[34] Meditation III, AT VII, 45–50 (AT IX, 32–40).

[35] AT I, 152 and elsewhere.

[36] For the doctrine that the numerical unity of a body does not depend upon its matter but its form, which is the soul, see the letter to Mesland, AT IV, 346: CSMK 278. See also chapter 7.

[37] AT III, 369–371: CSMK 182.

[38] AT VII, 54: CSM II 38.

[39] AT III, 369–372; AT VI, 56–59.

[40] The institutional setting of early modern French education was fairly complex; the dominant players at the time were the dozen or so secular Catholic colleges of the University of Paris, together with seculars in about a dozen major cities, and those of the three principal teaching orders: the Jesuits, the Oratorians, and the Doctrinaires. There were others who taught philosophy, of course, that is, a handful of Franciscans, Dominicans, Benedictines, Josephites, and the like, plus a few Protestants. But the largest group of colleges was clearly that of the Society of Jesus, which indeed became a very powerful force in early modern French education.

be "observed provisionally with the greatest exactness and most perfect faithfulness":

> No doubt we do not judge that, in the teaching of scholastic theology we must prohibit the opinion of other authors when they are more probable and more commonly received than those of Saint Thomas. Yet because his authority, his doctrine, is so sure and most generally approved, the recommendations of our Constitutions require us to follow him *ordinarily*. That is why all his opinions whatever they may be … can be defended and should not be abandoned except after lengthy examination and for serious reasons.

This interpretation of Loyola's advice drew a fine line between following Thomas' opinions *ordinarily* and abandoning them for extraordinary reasons, after lengthy examination. Surely, Descartes would have thought that he had abandoned Thomas' opinions only for serious reasons, after lengthy examination. Descartes' task would have been to demonstrate his reasons and seriousness. But Aquaviva's memorandum continued: "One should have as the primary goal in teaching to strengthen the faith and to develop piety. Therefore, no one shall teach anything not in conformity with the Church and received traditions, or that can diminish the vigor of the faith or the ardor of a solid piety." Aquaviva's intent was clear. The primary goal in teaching is the maintenance of the faith, and nothing should be allowed to interfere with it. All teaching must conform to the faith; and since the received traditions are known to conform to the faith, they should be taught and novelties are to be avoided. The memorandum continued:

> Let us try, even when there is nothing to fear for faith and piety, to avoid having anyone suspect us of wanting to create something new or teaching a new doctrine. Therefore no one shall defend any opinion that goes against the axioms received in philosophy or in theology, or against that which the majority of competent men would judge is the common sentiment of the theological schools.
>
> Let no one adopt new opinions in the questions already treated by other authors; similarly, let no one introduce new questions in the matters related in some way to religion or having some importance, without first consulting the Prefect of studies or the Superior.[41]

The prohibition against holding or teaching new doctrines, against adopting new opinions, and even against introducing new questions in

[41] Bibliothèque Nationale, mss. fonds latins, n. 10989, in Rochemonteix 1899, vol. IV, pp. 11 n–12 n.

order not to diminish faith in any way would surely have made it difficult, if not impossible, for Descartes to have had his views accepted. Descartes' opinions went against many of the axioms received in philosophy. It would have been too optimistic an assessment to think that he might have gained acceptance with a majority of competent men in the theological schools.

Acquaviva's advice, like Borgia's before him, blurred the lines between theology and philosophy; the requirement to follow Thomas in theology carried with it the advice to follow the axioms and the common sentiment of the theological schools—which is to say, Thomist-inspired axioms and sentiment. However, the reasons why Jesuits followed Thomist theology (and Thomist interpretations of Aristotelian philosophy) and avoided novelties in theology and in philosophy were not dogmatic, but prudential. As conservative as the Jesuit practices seem, there was always the possibility that new doctrines might come to be accepted, especially those that did not seem to threaten the faith, those that appeared distant from theological matters. It is almost paradoxical that an order so outwardly conservative about philosophy and theology, with a pedagogy that rejects novelty, would have been able to produce novel works in meteorology, magnetic theory, geology, and mathematics.[42] With the Jesuits, one comes to expect rigid adherence to official positions, with respect to doctrines considered dangerous to piety, combined with some tolerance of doctrines considered non-threatening.

Just such a strange a mix of conservative and progressive views can often be seen; to give just one example from among many, I wish to point briefly to the public defense of some theses in physics from 1642, by Jean Tournemine, a student at La Flèche.[43] In the section about the world and the heavens we are told: "the stars and firmament are not moved by an internal principle, but by intelligences."[44] On the other hand, we are also told: "Apostolic authority teaches us that there are three heavens. The first is that of the planets, whose substance is fluid, as shown by astronomical observations; the second is the firmament, a solid body as its name indicates; and the third is the empyrean, in which the stars are specifically distinct from the heavens." This odd theory of the heavens breaks from

[42] Cf. Heilbron 1979.

[43] Joannes Tournemyne (La Flèche, 1642), as edited in Rochemonteix 1899, vol. IV, pp. 365–368.

[44] This appears to be the rejection of some elements of scholastic physics that could have led to the principle of inertia, such as the fourteenth-century doctrines of a circular impetus for the heavens. Cf. Oresme 1968 and Albert of Saxony 1567.

the Aristotelian-Ptolemaic account of the heavens, fashionable in the seventeenth century, itself a modification of the Aristotelian system of homocentric spheres, adding Ptolemaic three-dimensional epicycles and eccentrics.[45] It is clearly at odds with Aristotelian principles about the heavens; the hypothesis of a fluid first heaven (and the theory as a whole) appears more suitable for the Tychonic scheme.[46]

Concerning the elements, it is asserted that "from the definition of element, it is obvious that four are to be posited, that is, earth, water, air, and fire, neither more nor less" and "heat, cold, wetness, and dryness are primary active qualities." These are extremely rigid assertions about the scholastic doctrine that seemed most under fire in the seventeenth century (especially the statement that the definition of element requires exactly four elements).[47] We are also told, as expected, that "the system of Copernicus on the daily rotation of the earth and its revolution around its own center, which is the immobile sun, is false and foolhardy"; but we are told: "none of the popular experiments are sufficient to assail it." Depending upon the reference to "popular experiments," this last admission seems to indicate the acceptance of the relativity of motion.[48]

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[45] As depicted, for example, in Eustachius a Sancto Paulo 1629, Part 3, p. 96. It is interesting to note that "Apostolic authority" is invoked for the theory. Cf. Bellarmine's *Louvain Lectures* (1984).

[46] The opposition between fluid and solid indicates that the thesis is not a version of the homocentric spheres made fluid. See Grant 1987. The reason why this theory of the heavens seems to be Tychonic is that solidity is attributed to the firmament, or the outermost heavenly body, containing the fluid universe of the planets. Fluidity is attributed to the world of the planets because of "astronomical observations." This seems to allude to the kind of observations of comets and novas that Tycho de Brahe used to argue against the solidity of planetary heavenly spheres. The Tychonic system, in which the earth was the center of the universe, with the planets revolving around the sun as their center, was a compromise between the old Aristotelian-Ptolemaic system and the heliocentric Copernican system; it did not require a new physics for the motion of the earth. It did require, however, a fluid planetary heaven, since the paths of some planets intersected. (See chapter 6.) Descartes discusses astronomical systems, including Tycho's in *Principles* III 16–19, 38–41.

[47] See Reif 1969.

[48] It is difficult to tell what exactly the student argued in his thesis. But there were many "popular experiments" at the time claiming to refute Copernican astronomy; for example, cannon balls fired the same distance east and west were used as evidence against the rotation of the earth required by the Copemican system. According to modern principles of physics, these results cannot be counted against the rotation of the earth, so that the student's admission that "popular experiments" cannot defeat Copernicanism is interesting. During the same period, defenders of Copernicanism, such as Gassendi and Mersenne, used similar experiments in defense of Copernicanism: a stone falling from the mast of a moving ship falls parallel to the mast (Gassendi 1642), reported by Mersenne

The La Flèche theses demonstrate clearly the results of the palpable tension between the intellectual vigor of the new Order of the Jesuits setting up a whole new educational system and the attempt to reject novelty.

Early Objections and Replies: The Morin Correspondence

Descartes' request for objections and his sending out copies did not bear much fruit. Early on, Descartes was uncertain whether he would receive a favorable reaction from the Jesuits. He wrote to Huygens:

> As for my book, I do not know what opinion the worldly people will have of it; as for the people of the schools, I understand that they are keeping quiet, and that, displeased with not finding anything in it to grasp in order to exercise their arguments, they are content in saying that, if what is contained in it were true, all their philosophy would have to be false.[49]

But he was hopeful; in the same letter he wrote:

> I have just received a letter from one of the Jesuits at La Flèche, in which I find as much approbation as I would desire from anyone. Thus far he does not find difficulty with anything I wanted to explain, but only with what I did not want to write; as a result, he takes the occasion to request my physics and my metaphysics with great insistence. And since I understand the communication and union that exists among those of that order, the testimony of one of them alone is enough to allow me to hope that I will have them all on my side.[50]

Ultimately, Descartes received a number of responses; among them was one from Libertus Fromondus, an anti-atomist, one from Plempius, a student of Fromondus, and a third from Jean Baptiste Morin, the progressive Aristotelian.[51] Fromondus treated Descartes as an atomist and sent him

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(in his 1644). It should also be pointed out that calling the Copernican system "false and foolhardy" is less harsh than calling it "foolish and absurd in philosophy and formally heretical," as did the Church in 1616. See below for Descartes' reaction to the Church's condemnation of Galileo's heliocentrism in 1633.

[49] AT II, 48.

[50] AT II, 50.

[51] Descartes was asked by Mersenne whether foreigners formulated better objections than the French. Descartes replied that he did not count any of those received as French other than Morin's objections. He referred to a dispute with Petit, which he dismissed, saying that he did not take Petit seriously but simply mocked him in return. (For more on the exchange between Descartes and Petit, see Jean-Luc Marion, "The Place of the *Objections* in the Development of Cartesian Metaphysics," in Ariew and Grene 1995, pp. 7–20.) Descartes then listed the objections of the foreigners: Fromondus from

a tract against Epicureans and atomists that he had written earlier; but he did not respond to Descartes' reply. Descartes wrote to Huygens concerning the exchange: "As for Fromondus, the small disagreement we had is not worth your knowing about … In any case, this dispute between us was more like a game of chess; we remained good friends."[52] The correspondence with Plempius was lengthier, with many letters debating biological matters, such as the theory of the circulation of the blood, going back and forth.[53] A most interesting exchange occurred between Descartes and Jean Baptiste Morin, who wrote to Descartes on 22 February 1638, with some comments on astronomy and Descartes' theory of light.

In these letters, Morin engaged Descartes in some provocative metaphilosophical issues. First, Morin complained that Descartes, whose mind was used to the most subtle and lofty speculations of mathematics, closed himself off and barricaded himself in his own terms and manners of speaking, in such a way that he seemed at first almost impregnable.[54] He then stated,

> However, I do not know what to expect from you, for some have led me to believe that, if I used the terms of the schools, even a little, you would instantly judge me more worthy of disdain than of reply. But, reading your discourse, I do not judge you the enemy of the schools, as you are depicted … The schools seem only to have failed in that they were more occupied by speculation in the search for terms needed to treat things, than in the inquiry into the very truth of things by good experiments; thus they are poor in the latter and rich in the former. That is why I am like you in this respect; I seek the truth of things only in nature and do not place my trust in the schools, which I use only for their terms.[55]

Descartes' answer is intriguing. First, he assured Morin that he did not try to close off and barricade himself in obscure terms as a defensive move, and that if he did make use of mathematical demonstrations, it is because they taught him to discover the truth, instead of disguising it.[56] He then stated,

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Louvain, Plempius, an anonymous Jesuit from Louvain, and someone from the Hague. AT II, 191–192: CSMK 105.

[52] AT II, 49. The correspondence between Descartes and Fromondus as well as that between Descartes and Morin is discussed by Garber in 1988.

[53] The correspondence between Descartes and Plempius is discussed in Grene 1995; it was not always a pleasant exchange.

[54] AT I, 40.

[55] AT I, 541.

[56] AT II, 200–201; CSMK 108.

> As for my disdain for the schools that you've been told about, it can only have been imagined by people who know neither my habits nor my dispositions. And though, in my essays, I made little use of terms known only by the learned, that is not to say that I disapprove of them, but only that I wanted to make myself understood also by others.[57]

Later on, in the same letter, defending himself against one of Morin's objections, Descartes accepted some scholastic distinctions; trying to impress Morin with his knowledge of scholastic terminology, he peppered his letter with such terms: "I freely use here the terms of the schools in order that you do not judge that I disdain them."[58] He insisted on responding to Morin *in forma*; he threw in some terms and phrases from scholastic disputations, such as *distinguo, concedo totum, nego consequentiam*, and he even suggested that he was taking the term "infinite" *syncategorematice* "so that the schools would have nothing to object to in this matter."[59]

There is an amusing reply to Descartes' letter, as a marginal comment to a letter from Mersenne to Descartes:

> You so reassured and enriched us by the excellent replies you made to Mr. Morin and me, that I assure you, instead of the 38 sols of postage on the package, seeing what it contained, I would have willingly given 38 ecus. We read the reply together; and Mr. Morin found your style so beautiful that I advise you never to change it. For your analogies and your curiosities satisfy more than what all others produce … Moreover, you succeeded very well, in the reply to Mr. Morin, by showing that you do not disdain, or at least, you are not ignorant of Aristotle's philosophy. That is what contributed toward the increase in esteem Mr. Morin testifies as having for you. It is also what I assure those who, deceived by the clarity and precision of your style—which you can lower to make yourself understood by the common man—believe that you do not understand scholastic philosophy at all; I let them know that you understand scholastic philosophy just as well as the masters who teach it and who seem most proud of their own ability.[60]

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[57] AT II, 201–202.

[58] AT II, 205.

[59] AT II, 205–207. *In forma* means in logical form; *distinguo, concedo totum*, and *nego consequentiam* mean "I distinguish," "I concede totally," and "I deny the consequence," respectively. "Taking the term 'infinite' syncategorematically" alludes to medieval refinements of Aristotle's doctrine on potential infinity (versus actual infinity) from *Physics* III, chap. 4–8. For more on infinity as a syncategorematic term, see chapter 8.

[60] AT II, 287. It is difficult to believe that Mersenne was being straightforward in his marginal comment—that he believed Descartes to understand scholastic philosophy as well as the masters who teach it. Mersenne himself can be said to understand scholastic philosophy very well, as his writings demonstrate, and to have kept up with the various

> The greater esteem Morin felt for Descartes did not prevent him from sending a second letter, in the style of Descartes' response, still objecting about the uses of terms, etc. Descartes responded to the letter, but with less enthusiasm. Morin wrote a third letter, but Descartes stopped the correspondence there. Descartes wrote to Mersenne, "I will not reply to Mr. Morin, since he does not want me to. Also, there is nothing in his last letter that gives me the occasion to reply with something useful; between us, it seems to me that his thoughts are now farther from mine than they were at the beginning, so that we will never come to any agreement."[61]

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disputes. On the other hand, as we shall see, even Descartes was aware of his own shortcomings in this respect, that is, aware that he has not read scholastic philosophy for the last fifteen years or so.

[61] 15 November 1638, AT II, 437. There may be a bit of bad faith in Descartes' relations with Morin which the following event may demonstrate. Mersenne sent Descartes Morin's book *Quod Deus Sit* asking him for his opinion about its argument for the existence of God, which is set out *in more geometrico*, with definitions, axioms, and theorems. Descartes responded to Mersenne in a typical fashion:

> I have read through Mr. Morin's booklet. Its chief defect is that he treats of the infinite everywhere as if his mind was above it and he could comprehend its properties. That is a common fault with nearly everyone. I have tried with care to avoid it, for I have never treated the infinite except to submit myself to it, and not in the least to determine what it is and what it is not.

Descartes then he added some specific criticisms:

> in his sixteenth theorem, where he begins to try to prove that God exists, he bases his reasoning on the fact that he claims to have refuted the motion of the earth, and on the fact that heaven rotates around it, which he has by no means proved. . . . And thus all that he says right up to the end is far removed from the geometrical evidence and certitude that he would seem to be promising at the beginning.
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> (AT II, 294)

It is true that Morin tries to prove the existence of God in his 16th theorem. Morin's argument goes as follows: a finite being exists; hence, an infinite being exists from which the finite being derives its existence; it cannot be said that there was once an infinite being from which the finite thing derives its existence, but that it no longer exists; such a being would have been circumscribed by limits to its duration, and hence not infinite, which is a contradiction. It is true as well that in his 15th theorem Morin tries to refute the motion of the earth based on the fact that heaven rotates around it. This argument goes like this: the terrestrial globe is finite and the machinery of the universe moves in a circle; hence the machinery is finite, for otherwise it would occupy infinite space and would have to cross this space in finite time, which is impossible. But if one looks at all carefully, Morin's proof for the existence of God is independent of his rejection of the motion of the earth. Theorem 16 requires theorem 14, "Every finite thing derives its existence from an infinite Being," and definition 5, "An infinite being is whatever is circumscribed by no limits in its being." Theorem 14 requires a bunch of earlier definitions, axioms, and theorems, but certainly not the later theorem 15. Descartes and Morin might be in agreement that the order of proof in geometric demonstration requires, that, quoting Descartes, "the items which are put forward first must be known entirely without the aid of what comes later; and the remaining items must be arranged in such a way that their demonstration

The episodes of anticipated objections and replies to the *Discourse* seem to have failed: when Fromondus bothered to respond, it was not to start a dialogue. Worse yet, when a dialogue was started, as in the case of Morin, it did not result in any meeting of minds. How could Descartes have expected to succeed in winning over the more conservative members of the intellectual community, including those with a specific intellectual agenda, such as the Jesuits, when he could not convince someone like Morin of his views? Morin, a renowned optical theorist, astrologer to the king, and professor of mathematics at the Collège de France, at least styled himself a progressive thinker: "I am like you," he said to Descartes, "in that I seek the truth of things in nature and do not place my trust in the schools, which I use only for their terms." It is true that Morin was anti-atomist and anti-heliocentrist, as were the conservatives, but he was a mathematician, not a theologian or faculty member of a Jesuit College, and at least he was willing to entertain a debate. The exchanges with Fromondus and Morin could not have pleased a philosopher who held that when someone has the truth he could not fail to convince his opponents.[62] This process of objections and replies, however, convinced Descartes to write the *Meditations*. As he says in that work's *Preface to the Reader*, he received "two objections" to Part IV of the *Discourse* that "were worth noting."[63] The *Meditations* was an attempt to answer these two objections.

The Meditations, Objections *and* Replies

Descartes did not publish just six Meditations; he presented his work to a select group of scholars before official publication so that their comments and his replies would be issued in a single volume. Thus the edition of 1641 was not the *Meditations* alone but a compendium: introductory essays that set the new text in relation to questions already raised about the *Discourse on Method* four years earlier, the six Meditations themselves, and then the objections of other scholars, together with Descartes' replies to those objections.

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depends solely on what has gone before." But while Descartes projects his own criterion on Morin, here he is clearly also applying an even more stringent criterion for Morin, that what has gone before must relate to what comes later.

[62] *Regulae*, Rule II: AT X, 363; CSM I, 11.

[63] AT VII, 7.

The chief person who managed the circulation of the text of the *Meditations* to most of its critics was Descartes' correspondent Mersenne, a member of the Catholic order of Minims, who from his cell in the convent of the Minims in Paris served as the center and informal coordinator of a wide and diverse intellectual circle. Descartes was in constant correspondence with his monastic friend from his retreat in the Netherlands. However, it was the *Meditations* plus the *First Set of Objections and Replies* that Mersenne received for further circulation. To start the ball rolling, Descartes asked his friends Jan Albert Bannius and Augustinus Alstenius Bloemaert to write some objections; they, in turn, asked the Dutch priest Caterus (Johannes de Kater) to do so. Caterus' *First Set of Objections*, together with Descartes' *Replies* and the manuscript of the *Meditations* were sent to France to be printed, Descartes leaving Mersenne to organize the rest, telling him that he would be "glad if people make as many objections as possible and the strongest they can find."[64] Five more sets of objections were obtained, making six altogether in the first edition; a seventh set followed in the second edition of 1642.[65]

As we have said, Descartes prefaced his *Meditations* with introductory essays: the *Letter of Dedication* to the Doctors of the Sorbonne, *Preface to the Reader*, and *Synopsis of the Meditations*. A passage from the *Preface to the Reader* can illuminate the setting for the *Meditations*. Descartes refers to the two issues of God and the human soul from the title of the

[64] AT III, 297.

[65] The objectors are as follows: 1. Caterus, with remarks addressed by him to his friends Bannius and Bloemart, to be conveyed to Descartes. 2. "Theologians and philosophers," described in the French edition of 1647 as "collected by Mersenne." 3. Thomas Hobbes, described in 1647 as "a famous English philosopher." 4. Antoine Arnauld, a theology doctorate student at the Sorbonne, whose objections were addressed to Mersenne as intermediary. 5. Pierre Gassendi, philosopher and historian. Descartes became very angry with Gassendi when the latter published *Disquisitio Metaphysica*, a separate edition with rejoinders; so, for the 1647 French edition of the *Meditations*, Descartes asked his translator Clerselier to omit Gassendi's objections and to substitute instead a letter produced by his friends, in which he would answer a selection of Gassendi's strongest arguments. 6. A group described in 1647 as "various theologians and philosophers," once more collected by Mersenne, together with an appendix containing the arguments of "a group of philosophers and geometers." 7. The Jesuit mathematician Pierre Bourdin. Descartes received Bourdin's voluminous packet of objections in January 1642, when his Dutch publisher Elsevier was already printing the second edition of the *Meditations*. So Descartes had them printed in the second edition, with his replies interspersed within the objections. Since the printer was slow to complete the volume Descartes also added a long letter to the provincial of the Jesuits in the Île de France, Father Jacques Dinet, in which he complained of Bourdin's methods and suggested that the Jesuit Order should dissociate itself from him.

Meditations, which he discusses, in the *Letter of Dedication* to the Doctors of the Sorbonne, as "two issues that are chief among those that are to be demonstrated with the aid of philosophy rather than theology"; he says:

> I have already touched briefly on the issues of God and the human mind in my *Discourse on Method* [...]. The intent there was not to provide a precise treatment of them, but only to offer a sample and to learn from the opinion of readers how these issues should be treated in the future. For they seemed to me to be so important that I judged they ought to be dealt with more than once.

Descartes then refers to his offer, at the end of Discourse VI, to respond to criticisms. This is where he asserts that there were only two objections worth noting; he then replies briefly to them "before undertaking a more precise examination of them."[66] Thus the *Discourse* does not just provide an early version of the *Meditations*; it constitutes the setting for the work and it provokes two preliminary objections that must be answered initially and then more fully in the *Meditations*. As Jean-Luc Marion asserts, "contrary to a widespread legend, Descartes is neither here nor elsewhere anything like a solitary, or even autistic, thinker, soliloquizing, in the manner perhaps of a Spinoza."[67] Marion details the steps taken by Descartes (between 1637 and 1640) to answer the two objections made by Pierre Petit to the metaphysical portion of the *Discourse*, objections the *Meditations* attempts to answer more fully. Marion concludes that "not only would it be illegitimate to read the *Meditations* in abstraction from the *Objections and Replies*, with which they intentionally form an organic whole, but it would also be wholly illegitimate to read them otherwise than as replies to the objections evoked by the *Discourse*."[68]

Marion is right to insist that we should think of Part IV, the metaphysical portion of the *Discourse*, and the *Meditations* as forming a "responsorial schema" of objections and replies. Even the first sentence of the *Meditations* sends the reader back to another time, outside the frame of the *Meditations*: "Several years have now passed since I first realized how numerous were the false opinions that in my youth I had taken to be true, and thus how doubtful were all those I had subsequently built on them." The first series of thoughts from Meditation I is set in a historical, autobiographical past, Descartes having realized that he had to "raze

[66] AT VII, 7.
[67] Marion 1995, pp. 10–11.
[68] Marion 1995, p. 20.

everything to the ground and begin again from the original foundations," if he wanted to establish anything firm and lasting in the sciences. As Descartes asserts, he waited until he reached a point in his life that was so timely that no more suitable time for undertaking these plans of action would come to pass. But if the first sentence of the *Meditations* sends us to the *Discourse*, the *Discourse* itself, like the *Meditations*, also sends us outside itself. The first sentence of the metaphysical portion of the *Discourse* states "I do not know whether I ought to tell you about the first meditations I engaged in there; for they are so metaphysical and so out of the ordinary that perhaps they will not be to everyone's liking."[69] The "there" referred to by Descartes is The Netherlands, to which Descartes moved in 1628 or 1629; so in 1637, Descartes tells us: "it is exactly eight years ago that this desire"—that is, the desire to begin to reject totally the opinions that had once been able to slip into his head and to seek the true method for arriving at the knowledge of everything of which his mind would be capable[70]—made him resolve to "take my leave of all those places where I might have acquaintances, and to retire here," to the Netherlands.[71] But Descartes places the origin of that desire further back about nine years from 1628, to the famous stove-heated room in 1619, in Germany, near Ulm: "Nevertheless, those nine years slipped by before I had as yet taken any stand regarding the difficulties commonly debated among learned men, or had begun to seek the foundations of any philosophy that was more certain than the commonly accepted one."[72]

Thus the project of the *Meditations* began with a resolve to examine all the truths for the knowledge of which human reason suffices,[73] which, according to Descartes, he carried out nine years later, circa 1629, having spent the first nine months of his stay in the Netherlands working on metaphysics:

> Now I am of the opinion that all those to whom God has given the use of this reason are obliged to use it chiefly to try to know him and to know themselves. It is in this way that I have tried to begin my studies [...]. The first nine months I was in this country I worked at nothing else, and I believe you have already heard me say that I had planned to put something

[69] AT VI, 31.
[70] AT VI, 17.
[71] AT VI, 30–31.
[72] AT VI, 30.
[73] What in Rule 8 is called "the most noble example of all," a task that should be undertaken at least once in his life by anyone who is in all seriousness eager to attain excellence of mind (AT X, 395).

> of this in writing. But I do not consider it appropriate to do so until I have first seen how my physics will be received.[74]

We know little about Descartes' lost "small metaphysical treatise," other than that it was written in Latin, unfinished, and that it concerned the existence of God and that of our souls.[75] Descartes at the time also worked simultaneously on his physics (*Le Monde*) and optics (*Dioptrique*). All of this changed after the condemnation of Galileo in 1633. Although Descartes thought of including some of the older material in a new Latin edition of the *Discourse*,[76] he seems to have started seriously to think of a new presentation of his metaphysics only in 1639.[77] Thus began in earnest the *Meditations*, together with new rounds of *Objections* and *Replies*.

So far, we have been developing the view that the introductory essays to the *Meditations* and *Objections* and *Replies* allow us to see the development in Descartes' thought. We should, however, consider whether this is the best way to approach Descartes' text. A standard line of interpretation for Descartes' *Meditations* treats the work as an attempt to construct a self-consistent unity, a geometrical whole whose structures can be revealed or whose elements can be shown as interconnected, a totality, however, that cannot fruitfully be analyzed by psychological or historical methods. The *Meditations*, it is asserted, resembles Euclid's geometry and to understand a given geometrical system it is necessary to grasp its demonstrations and its sequences. According to Martial Gueroult, interpreters who "see in Descartes only a biographical succession, and not a rational linkage [...] merely observe the simple chronological sequence of topics. [...] This is evidently a way of doing things that is repugnant to the spirit and letter of Descartes' doctrine."[78] Gueroult is probably the most noted interpreter who held such an internal, non-developmental reading of the *Meditations*, though many commentators in the Anglo-American tradition might appropriately be thought to accept this kind of

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[74] AT I, 143–144.

[75] "Perhaps I may one day complete a little *Treatise on Metaphysics*, which I have begun when in Friesland, in which I set out principally to prove *the existence of God and of our souls* when they are separate from the body, from which their immortality follows" (AT I, 182).

[76] AT I, 350.

[77] *To Mersenne*, November 13, 1639, AT II, 622; see also *To Mersenne*, March 11, 1640, AT III, 35–36, July 1640, 102–103, and *To Huygens*, July 30, 1640, AT III, 126.

[78] Gueroult 1984–1985, vol. 1, p. xx. For the order of topics being contrary to Descartes' intention, Gueroult cites a letter to Mersenne (AT III, 266–267) in which Descartes asserts "to proceed by topics is only good for those whose reasons are all unconnected; [...] it is impossible to construct good proofs in this way."

approach in general. Gueroult treats Descartes' doctrine as "a single bloc of certainty, without any cracks, in which everything is arranged such that no truth can be taken away without the whole collapsing."[79] To support this interpretation, he cites various passages from Descartes' corpus: one from a 1642 letter to Mersenne, "I see that it is easy to make mistakes about the things I have written, for truth being indivisible, the least thing that is taken away from it or added to it, falsifies it";[80] another from the *Seventh Set of Objections and Replies*: "for truth consists in what is indivisible";[81] and a third from an earlier letter to the Jesuit Vatier, "All my opinions are joined together in such a way and so strongly dependent on one another that one could not appropriate any for oneself without knowing all of them."[82] For Gueroult, Descartes is "a thinker of granite," a "powerful, solid, and geometrical monument, like a Vauban fortress."[83]

Gueroult's view does have textual support; it seems to be an integral part of Cartesian rhetoric. In fact, there is yet one more passage in which Descartes asserts that his views are so interdependent that they cannot be separated or changed. Early on, when he was finishing his treatise *Le Monde*, he found out that the censors of Rome had condemned Galileo because of his defense of the motion of the earth, an opinion deemed false and inconsistent with the sacred scriptures.[84] Descartes says to Mersenne in a 1634 letter:

> Now I shall tell you that all the things I explained in my treatise, which included that opinion about the motion of the earth, were so completely dependent on one another, that the knowledge that one of them is false is sufficient for the recognition that all the arguments I made use of are worthless.

This presents Descartes with a dilemma: he cannot give up the motion of the earth without abandoning his whole system, but the motion of the earth, which he thinks has been supported by "very certain and very evident demonstrations," has been prohibited by the Church; he

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[79] Gueroult 1984–1985, vol. I, p. 5.
[80] AT III, 544.
[81] AT VII, 548.
[82] AT I, 562.
[83] Gueroult 1984–1985, vol. I, p. xx.
[84] One can distinguish between the motion of the earth (as false and foolish in philosophy) and immobility of the sun (as formally heretical), but it would not be necessary in this context, since Descartes does not make use of such a distinction and the Church declaring the proposition false is sufficient to cause a serious problem for Descartes.

hesitates: "I know very well that it could be said that everything the Inquisitors of Rome have decided is not for all that automatically an article of faith, and that it is first necessary for the Council to pass on it." But he decides: "I am not so much in love with my own opinions as to want to make use of such exceptions, in order to have the means of maintaining them. [. . .] I would not for anything in the world maintain them against the authority of the church."[85] So he stops the publication of *Le Monde*.[86] But this does not prevent him, later on, from publishing the *Principles of Philosophy—Le Monde* having been taught to speak Latin, as he says[87]—which contains a discussion of the heretical proposition. In fact, Descartes has no problem ultimately keeping most of his system together with the *negation* of the condemned proposition; he decides that "strictly speaking the earth does not move, any more than the planets"[88] and "no motion should be attributed to the earth even if motion is taken in the loose sense, in accordance with ordinary usage."[89]

So, although Descartes does at times claim the complete dependence of his principles on each other such that none of them can be changed without the whole set collapsing, it is also obvious that he did make such changes (even to principles he claimed could not be changed). In fact, it is even clear that Descartes at times understood that he was making changes to his doctrine and at times wanted others to know that he was doing so. Descartes' project itself seems to belie the treatment of the system as a single bloc of certainty: Why bother with other people's objections if they had no real possibility of altering the doctrine objected to? Were the objections not going to be taken seriously by Descartes?

Descartes was keenly aware of the difficulty. After receiving Arnauld's objections to the *Meditations*, he wrote to Mersenne on March 18, 1641,

> I am sending you at last my reply to Arnauld's objections, and I ask you to change the following things in my metaphysics, thus letting it be known in this way that I have deferred to his judgment, and so that others, seeing how ready I am to follow his advice, may tell me more frankly what reasons they have for disagreeing with me, if they have any, and may be less stubborn in wanting to oppose me without reason.[90]

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[85] AT I, 285.
[86] For more on *Le Monde* and its historical context, see Gaukroger 1995, chap. 7.
[87] *To Huygens*, January 31, 1642, AT III, 782.
[88] *Principles* III, art. 28.
[89] *Principles* III, art. 29.
[90] AT III, 334.

Descartes then proceeded to list six separate corrections, which he insisted should be put between brackets "so that it can be seen that they have been added."[91] The requested corrections were indeed accomplished, though, despite Descartes' request, they were not inserted between brackets.

The intended bracketed changes by Descartes were minor, but were in effect *corrections* to the *Meditations* and intended to be displayed as such. Other changes were not so minor; some of them were acknowledged as changes and others not. One does not have to delve too deeply into the *Meditations*, *Objections* and *Replies* to understand that some central Cartesian doctrines, such as God as "positive" cause of himself (*causa sui*)[92] and God's free creation of the eternal truths, do not occur explicitly in the *Meditations*, but are to be found in the *Objections* and *Replies*. In his article, "Méditer, Objecter, Répondre," Jean-Marie Beyssade enumerates many additions, corrections, and changes to the doctrine of the *Meditations* brought about by the *Replies* to the *Objections*.[93] As additions, Beyssade lists what he calls "fragments of theology," such as the pages on the Eucharist in the *Fourth Replies*, and "fragments of philosophy," such as the developments concerning God's freedom and the creation of the eternal truths in the *Sixth Replies*. He mentions as well the doctrine of God as self-cause in the *First Replies* to Caterus and quotes a passage about it in which Descartes himself announces that he is adding something new:

> In fact, I will also add here something I have not put in writing before, namely, that it is not even a secondary cause at which one arrives, but certainly that cause in which there is enough power to conserve something existing outside it and *a fortiori* conserves itself by its power, and thus is derived from itself.[94]

While additions are frequent, corrections are more rare. Other than those from the March 18, 1641 letter referred to above, Beyssade cites

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[91] AT III, 335.

[92] The terminology is standard and comes from Caterus. God as cause of himself is usually taken negatively, meaning "not from another," and not positively, meaning giving existence to himself (AT VII, 95). Descartes seems to reply that he considers God as efficient cause of himself taken positively: "When these people say that something is 'derived from itself,' they are in the habit of understanding only that it has no cause. [. . .] But there is another rendering, a positive one, which has been sought from the truth of things and from which alone my argument proceeds" (AT VII, 109–110).

[93] Beyssade 1994, pp. 21–38.

[94] AT VII, 111. Beyssade 1994, pp. 33–34.

an interesting case of successive corrections, within the *Objections and Replies*, concerning the doctrine of God as self-cause.[95] In the *Fourth Set of Objections*, Arnauld apparently criticized some formulations of the *First Set of Replies*, which Descartes had appended to the *Meditations* with Caterus' *Objections* before having Mersenne distribute the set to others for further objections. A March 4, 1641 letter to Mersenne shows Descartes asking Mersenne to correct a text of the *First Set of Replies*, which he indicates was already corrected on the initial copy: "I must also ask you to correct these words, which come in my reply to the penultimate objection made by the theologian [Caterus]";[96] he then tells Mersenne which text to suppress and which to substitute. And he adds:

> but please correct it in all the copies in such a way that none will be able to read or decipher the words [...]. For many people are more curious to read and examine words that have been erased than any others, so as to see how the author thinks he has gone wrong, and to discover there some grounds for objections, attacking him in the place which he himself judged to be the weakest.[97]

Descartes speculates that the obvious erasure is why Arnauld paid so much attention to the question of God as self-cause:

> I remember that my first draft of this passage was too crude; but in the later version I amended and refined it to such an extent that, had he merely read the corrections, without stopping to read the words that were crossed through, he would perhaps have found nothing at all to say. For I do believe that everything is in fact quite in order. You yourself, when you read the passage the first time, wrote to me saying that you found it crudely expressed, but at the other end of the letter you remarked that after reading a second time you found nothing to object to. I attribute this to your having paid attention, on your first reading, to the words that are only lightly crossed through there, whereas on the second reading you took note only of the corrected version.[98]

Thus Mersenne dutifully corrected for a second time a passage Descartes corrected once before, but this time in such a way that the act of correction would not be so obvious.[99]

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[95] Beyssade 1994, pp. 34–36.
[96] AT III, 329.
[97] AT III, 330.
[98] AT III, 330–331.
[99] For more on the development of the concept of self-cause, see Marion 1994, pp. 305–334.

Beyssade relates a couple of other interesting items in the broader category of changes.[100] He refers to the synthetic exposition of the *Meditations* in the *Second Replies* as a substantial change from its canonical analytic exposition.[101] But he also mentions the ontological argument Descartes provides for Caterus in the *First Replies*. The question can be raised whether this ontological argument is the same as the one given in the Fifth Meditation. Descartes understands that he introduced a change but explains the matter thus: "All of these points are readily apparent to one who pays careful attention, and they differ from what I have previously written only in the manner of their explanation, which I have deliberately altered so that I might suit a wide variety of minds"[102]

There are plenty of other changes (some of which are detailed below) that operate subtly through the *Meditations* to the *Replies* and ultimately to the *Principles*. All in all, Descartes' bloc of certainty looks more like a sedimentary rock, a geological stratum with cracks and fissures, able to be read in historical terms.[103]

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[100] Beyssade, "Méditer, Objecter, Répondre," p. 36.

[101] At the end of the *Second Set of Objections*, Mersenne asked Descartes to set out the argument of the *Meditations* in geometrical fashion (AT VII, 28). Descartes responded that he had already done so, drawing a distinction between the order and the mode of demonstration, in the geometrical style of writing, and then further distinguishing the mode of demonstration into one that proceeds by way of analysis and the other synthesis (AT VII, 155–156). Thus according to Descartes, the *Meditations* was written as an analytical exposition, but could be produced as a synthetic exposition, which is what Descartes begins to provides in the Appendix to the *Second Set of Replies* (AT VII, 160–171).

[102] AT VII, 120.

[103] There is a temptation to treat Gueroult's internal methodology at the level of a historiography. But Gueroult is clear that his method is intended to be subordinate to developmental approaches. As he puts it,

> Historians have two techniques at their disposal for this [discovering the enigma proposed to them by the work of the great geniuses]: textual criticism itself and analysis of structures. For Descartes' philosophy, textual criticism (problem of sources, variations, evolutions, etc.) has been amply practiced: the remarkable work of Gilson, Gouhier, Laporte, and others are known by all. On the other hand, the analysis of structures has been little attempted. (1984–1985, vol. I, p. xviii)

So Gueroult proposes for himself the work of discovering the structures of the *Meditations*, what he also calls the laying bare of the architectonic elements. As we have said, he finds support for this endeavor in Descartes' own writings; it is not as if his method is imported into the texts, but it is derived from them in the same manner those who favor developmental approaches derive their evidence. Thus, Gueroult, using "textual criticism," discovers that "analysis of structures" is needed in this case at this time. He concludes: "it seems that once the requirements of historical critique are satisfied, the better method is truly the analysis of structure of the work" (1984–1985, vol. I, p. xix). There can be no genuine conflict between developmental views and Gueroult's laying

The Bourdin Affair and the Eustachius Project

Descartes' relations with the Jesuits took a new turn in 1640. On 30 June and 1 July, a Professor at Clermont, the Jesuit college in Paris, held a public disputation in which his student, a young noble named Charles Potier (who later became a Cartesian), defended some theses; among the theses were three articles concerning Descartes' theory of subtle matter,[104] reflection, and refraction. The professor, Father Bourdin, composed a preface to the thesis, called a *velitatio* (skirmish), which he delivered himself. Mersenne attended the disputation and defended Descartes. He apparently chastised Bourdin for having attacked Descartes publicly without having sent Descartes his objections; Mersenne then forwarded Descartes the *velitatio*, together with the three articles concerning Descartes' doctrines, as if they came from Bourdin himself.[105]

Descartes wrote to Mersenne on 22 July 1640, thanking him for the affection Mersenne showed for him "in the dispute against the theses of the Jesuits." He told Mersenne that he had written to the rector of Clermont College requesting that they address to him their objections against what he had written, "for he does not want to have any dealings with any one of them in particular, except insofar as it would be attested to by the order as a whole."[106] And he complained that the *velitatio* Mersenne sent him was "written with the intent to obscure rather than to

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bare of the architectonics of the *Meditations*; of course, we can always disagree with any of Gueroult's results, including his internal method.

[104] Descartes' world is a plenum of subtle matter (ether, or first matter) whose action is used by Descartes to explain such diverse phenomena as gravitation and light. In the theses, Bourdin is complaining about Descartes' use of subtle matter for the propagation of light in *Optics* I, pp. 5–7, "as a blind man can sense the bodies around him using his cane" (AT VI 84: CSM I 153).

[105] Baillet 1991, II, 73. Bourdin was professor of humanities at La Flèche (1618–1623), of rhetoric (1633), and mathematics (1634). He was sent to Paris, to the Collège de Clermont (later known as the Collège Louis-le-Grand) in 1635. By 1640, when Bourdin debated with Descartes, he had already published three books, *Prima geometriae elementa*, following Euclid (Bourdin 1639), *Geometria, nova methodo* (Bourdin 1640), and *Le cours de mathématique* (Bourdin 1661, first published circa 1631); he would shortly be publishing his fourth, *L'introduction à la mathématique* (Bourdin 1643). Bourdin's mathematics, like most Jesuit mathematics, can be characterized by its practical bent. This is made clear by Bourdin's *Cours de mathématique*, which contains materials on fortifications, terrain, military architecture, and sections on cosmography and the use of a terrestrial globe; it is also supported by the subject of his two posthumous publications: *L'architecture militaire ou l'art de fortifier les places regulières et irregulières* and *Le dessein ou la perspective militaire* (Bourdin 1655_a and $1655_{b)}$. See Ariew 1995.

[106] AT III 94.

illuminate the truth."[107] At the same time, Descartes wrote to Huygens, telling him, "I believe that I will go to war with the Jesuits; for their mathematician of Paris has publicly refuted my *Dioptrics* in his theses—about which I have written to his Superior, in order to engage the whole order in this dispute."[108]

The Bourdin affair degenerated, Descartes consistently referring to Bourdin's objections as *cavillations*.[109] The period of this dispute was a particularly difficult one for Descartes, since it was the time of his publication of the *Meditations*, his work on "First Philosophy," or metaphysics, which he had only sketched in the *Discourse*, and which was certain to lead him into greater controversies, given that its content was yet closer to theology than was that of the *Discourse* and its appended *Essays* on physical and mathematical topics. The summer of 1640 was also the time when Mersenne was sending out Descartes' *Meditations* to the intellectuals of the seventeenth-century, requesting objections that would be published with the *Meditations*. Descartes even expected a set of objections from Bourdin himself.[110] One has to remember that this enterprise would be crucial for Descartes if he expected to win his war against the Jesuits. The whole affair should be put into the context of the general failure of the requested objections and replies to the *Discourse*, the unsuccessful correspondence with Morin, and the subsequent open hostilities with the Jesuits.

On 30 September 1640, Descartes wrote to Mersenne: "the cavils of Father Bourdin have resolved me to arm myself from now on, as much as I can, with the authority of others, since the truth is so little appreciated alone." In this context he told Mersenne that he will not travel that winter, since he is "expecting the objections of the Jesuits in 4 or 5 months," and he believes that he "must put himself in the proper posture to await them."[111] He then made an unusual request and an interesting revelation:

> As a result, I feel like reading some of their philosophy—something I have not done in twenty years—in order to see whether it now seems to me

[107] AT III, 94. In another letter, Descartes tells Mersenne that he is shocked by the *velitatio* of Bourdin, for he does not have a single objection to anything Descartes has written, but rather attacks doctrines Descartes does not hold. AT III, 127–128.

[108] AT III, 103; CSMK 151.

[109] That is, "quibbles" or "cavils." See AT III, 163, 184, 250, for example.

[110] Bourdin wrote the *Seventh Objections*, which were not received by Descartes in time for the first printing of the *Meditations and Objections and Replies*, but were included in the second printing.

[111] AT III, 184–185.

> better than I once thought. Toward that end, I beg of you to send me the names of authors who have written textbooks in philosophy and who have the most following among the Jesuits, and whether there are new ones from twenty years ago; I remember only the Coimbrans, Toletus, and Rubius. I would also like to know whether there is someone who has written a summary of all of scholastic philosophy and who has a following, for this would spare me the time to read all their heavy tomes. It seems to me that there was a Chartreux or a Feuillant who had accomplished this, but I do not remember his name.[112]

The scholastics Descartes remembered, the Coimbrans, Toletus, and Rubius, were all Jesuit textbook authors Descartes probably read at La Flèche. The Coimbrans (the Conimbricenses), were professors at the Colegio das Artes, Coimbra (Portugal), who published a series of encyclopedic commentaries on Aristotle's works between 1592 and 1598. The most noted of the Coimbrans was Petrus de Fonseca, who contributed to the *Ratio studiorum* and who published separately his own commentaries on the *Metaphysics* and the *De Anima*.[113] Franciscus Toletus was a professor at the Collegio Romano (1562–1569) who published numerous commentaries on Aristotle's works, including an important *Logic* (1572), *Physics* (1575), and *De Anima* (1575).[114] And Antonius Rubius taught philosophy in Mexico; he published commentaries on Aristotle's *Logic*, the *Logica mexicana* (1603), *Physics* (1605), *De Caelo* (1615), and *De Anima* (1611).[115]

We do not have Mersenne's reply, but presumably, he identified Eustachius a Sancto Paulo as the Feuillant that Descartes remembered having written a summary of all of scholastic philosophy in one volume, since in Descartes' next letter to Mersenne Descartes wrote: "I have purchased the *Philosophy* of Brother Eustachius a Sancto Paulo, which seems to me to be the best book ever written on this matter; I would like to know whether the author still lives."[116] Eustachius a Sancto Paulo (Asseline) entered the Feuillants, a Cistercian Order, in 1605, and was professor of theology at the Sorbonne. He published the *Summa philosophica quadripartita de rebus dialecticis, moralibus, physicis, et metaphysicis* in 1609. It was published again and again throughout the first half of the century, until 1648.[117]

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[112] AT III, 185; CSMK 154.
[113] See C.H. Lohr 1975 and 1976. See also Schmitt and Skinner 1987, pp. 814, 818.
[114] See Lohr 1982 and Schmitt and Skinner 1987, p. 838.
[115] See Lohr 1980.
[116] AT III, 232.
[117] See Lohr 1976.

We should make no mistake about the sense of Descartes' praise of Eustachius' *Summa* as "the best book ever written on this matter." In the same letter, Descartes says about the philosophy of the schools, "As for scholastic philosophy, I do not hold it as difficult to refute on account of the diversity of their opinions; for one can easily upset all the foundations about which they are in agreement among themselves; and that accomplished, all their particular disputes would appear inept."[118] This judgment was reinforced as Descartes read more scholastic textbooks, seeking a textbook as good as Eustachius', but written by a Jesuit; Descartes told Mersenne, "I will also look at the Philosophy text of Mr. Draconis [that is, de Raconis], which I believe will be found here; for if he is more brief than the other and as well received, I will prefer it."[119]

Charles d'Abra de Raconis was born a Calvinist and converted to Catholicism. He taught philosophy at the Collège des Grassins and the Collège du Plessis, Paris. He then held a chair of theology at the Collège de Navarre, also in Paris. He published his *Summa totius philosophiae* in 1617, republishing it in parts and expanding it numerous times throughout the first half of the century, up to 1651.[120]

Later, Descartes wrote:

> I have seen the *Philosophy* of Mr. Raconis, but it is not as suitable for my design as that of Father Eustachius. And as for the Coimbrans, their writings are too lengthy; I would have wished wholeheartedly that they had written as briefly as the other, since I would have preferred to have dealings with the society as a whole, instead of a particular person.[121]

Descartes seems to have gained confidence as he read scholastic philosophy; he told Mersenne, "I thank you for the letter you have transcribed for me; but I find nothing useful in it, nor anything that seems as improbable to me as the philosophy of the schools."[122] He also informed Mersenne of his new project, the "design" to which he referred in the previously cited letter:

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[118] AT III, 231–232; CSMK 156.

[119] AT III, 234.

[120] See Lohr 1974.

[121] AT III, 251. Descartes does not mention one of the more interesting works in the genre, Dupleix 1627. Scipion Dupleix was more a historian than a philosopher, summarizing the school leaming of his day as succinctly as possible, for an audience that is not comfortable with Latin, that is, an unschooled audience. Cf. Faye 1986.

[122] AT III 256.

> My intent is to write in order a textbook of my philosophy in the form of theses, in which, without any superfluity of discourse, I will place only my conclusions, together with the true reasons from which I draw them—what I think I can do in a few words. And in the same book, I will publish an ordinary philosophy text [that is, a school text], such as perhaps that of Brother Eustachius, with my notes at the end of each question, to which I will add the various opinions of others and what one should believe about all of them, and perhaps, at the end, I will draw some comparisons between these two philosophies.[123]

Later, he informed Mersenne that he had begun the project.[124] He wrote to others about it; he floated a trial balloon with the Chief of the Jesuits, almost using the project as a threat, but also trying to determine the Jesuits' reaction to it. He even attributed the project to one of his unnamed friends.[125] But the project was soon aborted: "I am unhappy to hear about the death of Father Eustachius; for, although this gives me greater freedom to write my notes on his philosophy, I would nevertheless have preferred to do this with his permission, while he was still alive."[126] Descartes continued to use the project as a threat or bargaining chip with the Jesuits, but he no longer seemed willing to produce the work. He wrote to Mersenne, concerning a letter from Bourdin,

> I believe that his Provincial sent it in order to ask you whether it is true that I am writing against them … It is certain that I would have chosen the compendium of Father Eustachius as the best, if I wanted to refute

[123] AT III, 233; CSMK 157.

[124] AT III, 259; CSMK 161. The only new element added by Descartes concerned his hopes for the project, "that those who have not yet learned the philosophy of the schools will learn more easily from this book than from their teachers, because by the same means they will learn to scorn it, and even the least teachers will be capable of teaching my philosophy by means of this book alone" (AT III, pp. 259–260). About a month later, Descartes was deep into the project, having just completed the first part of the *Principles* corresponding with the *Meditations*, and being able to compare the two:

> I would be pleased to have as few distractions as possible, at least this year, since I have resolved to write my philosophy in such an order that it could easily be taught. And the first part, which I am now writing, contains almost the same things as the *Meditations* you have, except that it is written in a different style, and that what is written about at length in the one is abbreviated in the other, and vice versa.
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> (AT III, p. 276)

[125] AT III, 270.

[126] AT III, 280. Descartes had previously indicated that he only wanted to do the project "with the writings of a living person and with his permission, which it seems to me I would easily obtain when my intention, to consider the one I chose as the best of all who have written on philosophy, will be known" (AT III, 234).

> someone; but it is also true that I have completely lost the intent to refute this philosophy; for I see that it is so absolutely and so clearly destroyed by means of the establishment of my philosophy alone, that no other refutation is needed.[127]

The Eustachius project is instructive for many reasons. One of the inferences one should draw from it is that Descartes was not well acquainted with scholastic philosophy in the period of his greatest work, during 1637–1640. When he finally formulated his mature works, he departed either dramatically or by degrees from a scholastic tradition he no longer knew very well. Of course, Descartes was taught scholastic philosophy in his youth at La Flèche, but he abandoned his study of it for about twenty years, roughly between 1620 and 1640, and he picked it up again only in 1640, to arm himself against the expected attacks of the Jesuits. We should expect that Descartes was generally well-versed in scholastic philosophy[128] only when writing his earliest works, the *Rules for the Direction of the Mind* for example. (The remnants of scholasticism in Descartes' mature works, the *Discourse* and the *Meditations*, might therefore be deceptive for the interpreter.) Finally, from 1640 on, in the *Replies* to the *Objections* to the *Meditations* and in the *Principles of Philosophy*, Descartes relearned scholastic philosophy (and scholastic terminology) and began the process of reinterpreting his thoughts (or translating his doctrines) to make them more compatible with scholasticism.[129] One can detect Descartes' subtle shifts in doctrine or terminology by contrasting his early and later writings—roughly, those before and after 1640.

For example, in the aftermath of Galileo's condemnation, Descartes' change in view about motion and the motion of the earth resulted in a politically more tenable position. Descartes was pessimistic in *Le monde*

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[127] AT III, 470. For Descartes' keeping open the option to write such a philosophy as a threat against the Jesuits, see AT III, 470, 480–481. One has to remember that there were political and social considerations in the project of comparing the two philosophies, the consequences of which were not lost on Descartes. For example, Descartes considered publishing his project in Latin and calling it *Summa Philosophiae* for tactical reasons in what he called "a scholastic war"; he said to Huygens,

> Perhaps these scholastic wars will cause my *Le Monde* to be brought into the world. I believe it would be out already, were it not that I would want first to teach it to speak Latin. I would call it *Summa Philosophiae*, so that it would be more easily introduced into the conversation of the people of the schools, ministers as well as Jesuits, who are now persecuting it and trying to smother it before its birth (AT III, p. 523).

[128] But probably only the scholastic philosophy represented by the Coimbrans, Toletus, and Rubius, that is, a sixteenth- and seventeenth-century neo-Thomism.

[129] For differences between Jesuit scholasticism and non-Jesuit scholasticism, see chapters 2 and 4.

about the possibility of a definition of motion; he even ridiculed the scholastics' definition: "To render it in some way intelligible, they have not been able to explain it more clearly than in these terms: *motus est actus entis in potentia, prout in potentia est*. For me these words are so obscure that I am compelled to leave them in Latin because I cannot interpret them."[130] For Descartes, the nature of motion is simpler and more intelligible than the nature of other things; it is used to explain other things—lines as the motion of a point and surfaces as the motion of a line, for example instead of being explained by them. But, in the *Principles*, Descartes gave his own definition of motion, both in the ordinary sense of the word and in the strict sense, and even contrasted it with that of the scholastics, what he had claimed he could not do.[131]

Similarly, Descartes criticized the related scholastic doctrine of place in his early works; he rejected the scholastics' concept of intrinsic place[132] and parodied their concept of imaginary space.[133] But in the *Principles*, Descartes developed a doctrine of internal and external place clearly indebted to those he had previously rejected.[134] With respect to the scholastic concept of place, he asserted in the *Rules* (circa 1628): "When they define place as 'the surface of the surrounding body', they are not really conceiving anything false, but are merely misusing the word 'place.'"[135] But by 1644, Descartes could go along with the misuse, defining space as internal place and relating it to external place. In *Principles* II, art. 10–12, he asserted that space, or internal place, does not differ from the corporeal substance contained in it, except in the way that we conceive of it; the same extension that constitutes the nature of body also constitutes the nature of space. On the other hand, in art. 13–15, he defined external place and its relation to space. For Descartes, "place or space do not signify a thing different from the body which is said to be in place, but only designate its size, shape and situation among bodies." To determine its situation among bodies, however, we must take into account other bodies we consider motionless. So we can define an external place, namely, the surface of the surrounding body and ultimately some supposedly motionless points in the heavens, as the fixed and

[130] AT XI, 39; CSM I 94.
[131] *Principles* II, art. 24–25.
[132] *Regulae*, AT X, 433–434; CSM I, 53.
[133] AT XI, 31.
[134] Cf. *Principles* II, arts. 10–15. One can find these distinctions in Part III of Eustachius a Sancto Paulo's *Summa*. See chapter 2.
[135] *Regulae*, Rule 13.

determinate place for the motion of a body. The body then might simultaneously change and not change its place: it might change its external place (its situation) and not change its internal place (its extension or shape). Given that Descartes thought it impossible to discover any truly motionless points in the universe, he also thought that "nothing has any enduring, fixed and determinate place, except insofar as its place is determined in our minds." Thus, for Descartes, place, properly speaking, is internal place, or space, which is to be identified with the nature of body, that is, its extension, but we can mentally construct a situation, or external place, as the immobile reference for the motion of bodies.[136]

One can multiply such instances, but perhaps one or two examples might suffice to show that these instances are not limited to the more scientific aspects of Descartes' philosophy. One of the Cartesian philosophical doctrines under attack was the doctrine of material falsity. In the *Meditations* Descartes characterized material falsity as "occurring in ideas, when they represent non-things as things."[137] Descartes' example of material falsity was his idea of cold, which, though it is merely the absence of heat, represents cold as something real and positive. As Arnauld rightly pointed out, in his *Objections* to the *Meditations*, "if cold is merely an absence, then there cannot be an idea of cold which represents it to me as a positive thing."[138] Descartes' response seems to have been a shift away from his initial position; that is, Descartes asserted in the *Replies* that the reason he called the idea of cold materially false was that he was unable to judge whether or not what it represented to him was something positive existing outside his sensation.[139] But there was also an interesting addition in Descartes' reply. Descartes seems to have used the occasion to show off his knowledge of scholastic philosophy in an

[136] Descartes' choice of a relatively conservative, Aristotelian-inspired theory of space must have been a conscious decision. At the time, it was possible to choose from a number of non-Aristotelian concepts of space, originating from attempts to reestablish ancient views, such as Platonism and Epicureanism. Among the new Platonists were Giordano Bruno, Bernardino Telesio, and Tommaso Campanella. All three conceived of space as a container, independent of bodies, but always occupied by bodies. Moreover, Francesco Patrizi maintained a more radical line in which three-dimensional space was to be thought of not as substance or accident, but as something subsisting in itself, inhering in nothing else. Space is the infinite, immobile container in which God placed bodies, filling some places, but leaving others empty.

[137] AT VII, 44; CSM II, 30.

[138] AT VII, 207; CSM II, 145.

[139] AT VII, 234: CSM II 164. Wilson 1978, pp. 115–116, argues that Descartes' reply to Arnauld is inconsistent with his doctrine in Meditation III.

ostentatious manner; the reply looks suspiciously similar to those given to Morin. Descartes, who did not usually cite sources, went out of his way to state that he did not worry about his use of material falsity, because Suárez defined material falsity in the same way in his *Metaphysical Disputations*, disp. 9, sec. 2, n. 4.[140] The response is even more curious, given that Descartes did not refer to Suárez anywhere else, even though his correspondents did refer to him. And Suárez's scholastic doctrine is yet a third notion of material falsity. Suárez's doctrine was basically an expansion of the Thomist doctrine that truth and falsity consist in composition and divisions.[141] Thus, material falsity as used by Suárez was about propositions, not ideas.

There seems to have been some vacillation in Descartes' mind between the material falsity of an idea as representing being as nonbeing and as having so little content that we cannot tell whether it represents something or not; but Descartes aggravated the apparent vacillation with an uncharacteristic and surprising reference to Suárez on material falsity as arising from composition and division. In the end, the doctrine of material falsity seems to have disappeared entirely. It did not recur in the *Principles*, possibly having been replaced by Suárez's account, which would assimilate the notion with formal falsity.[142]

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[140] Replies IV; AT VII, 235.

[141] Aquinas, *On Interpretation* I, lect. I, n. 3. Here is Suárez, disp. 9, sect. 2, n. 4:

> Composition and division can be found either in the apprehension of a concept alone, abstracting from any judgment, or in a conception which involves a judgment at the same time. In the former case we have said that complex truth is properly found in the composition of our judgments; and the same must therefore be said of falsity, for contraries are of the same kind. Hence no one thinks he is deceived or goes astray until he judges how many false compositions he apprehends. But since the apprehension that happens without judgment regularly comes about by concepts of words, rather than things … (for in the composition of words there is falsity just as in the composition of signs), it can be admitted that in such apprehension, although there is something as it were materially false, it is not something false in the judgment that affirms or puts something forward, but merely in the sign, which signifies something false in its own right. Thus there is falsity in the proposition 'There is no God', either written down or materially put forward by him who reports 'The fool hath said in his heart 'There is no God'; and hence the account of this kind of falsity is the same as that which applies to the falsity which occurs in some verbal composition, as in a sign. But if the apprehension comes about by means of concepts of things, it is scarcely intelligible how there could be a composition of the apprehending mind without some judgment …''
>
> trans. in ACS pp. 35–36

[142] There is, of course, a large literature on material falsity, which these brief remarks

Descartes and Suárez on the Theory of Distinctions

Numerous scholars have pointed out the similarities between Descartes' theory of distinctions, *Principia*, I, art. 60–62, and that of Suárez, *Disputationes Metaphysicae*, disp. 7.[143] In the *Principles*, Descartes defines three kinds of distinctions, real, modal, and of reason. For Descartes, a real distinction is one that holds between two substances; as he says, "we can conclude that two substances are really distinct one from the other from the sole fact that we can conceive the one clearly and distinctly without the other."[144] A modal distinction holds between the mode and the substance of which it is the mode. The two things modally distinct are not really distinct, since we can clearly conceive a substance without the mode that differs from it, but, reciprocally, we cannot have a perception of the mode without perceiving the substance.[145] Finally, a distinction of reason holds between a substance and one of its attributes or between two such attributes of the same substance; the two things distinguished by reason are neither really nor modally distinct.[146]

Suárez argues for a third distinction between real and of reason, that is, a modal distinction, as opposed to the Scotist formal distinction: he argues against Thomas that there is a third distinction other than real and rational[147] and disputes the Thomist doctrine of a real distinction between essence and existence, calling it a distinction of reason with a basis in things, and between substance and accidents, though he rejects the Scotist formal distinction as vague and substitutes instead what he calls a modal distinction.[148] And for Suárez, like Descartes, two-way separability is a sign of a real distinction of a thing from another thing;[149] one-way separability is a sign of a modal distinction of a thing from its mode;[150] and mutual inseparability is a sign of a distinction of

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cannot adequately represent; see, for example, Wilson 1978, pp. 116–117 and M. Bolton, "Confused and Obscure Ideas of Sense," in A.E. Rorty 1986, pp. 389–404.

[143] For a typical discussion of scholastic and Cartesian theory of distinctions, see Ghisalberti 1996.

[144] *Principles* I, art. 60.

[145] *Principles* I, art. 61.

[146] *Principles* I, art. 62.

[147] Suárez 1998, disp. 7, § 1, no. 16.

[148] Suárez 1998, disp. 31, § 1, nos. 3–13.

[149] Suárez 1998, disp. 7, § 2, no. 2, 9.

[150] Suárez 1998, disp. 7, § 2, no. 3, 9.

reason of a thing conceived in some way from the same thing conceived in a different way.[151]

Descartes' theory of distinction seems clearly important to his philosophy. One can point to the fact that the subtitle of the *Meditations* and the title of Meditation VI indicate that the aim of that work, like that of the beginning of the *Principles*, is the demonstration of the real distinction between mind and body, that is, the demonstration is of a real, not of a modal distinction or distinction of reason. The thesis that the mind is a mode of the body is certainly not Descartes', though it is that of his erstwhile disciple Regius,[152] one that Descartes explicitly rejects.[153] There are two further occasions in the published 1641 *Meditations* in which Descartes talks about the real distinction between mind and body. Moreover, there is also an occasion in which he refers to a distinction of reason, though that instance, in Meditation III, in which he discusses the difference between God's conservation and God's creation of the world, is perhaps not phrased in any technical language; what Descartes says is "creation differs from conservation only by way of reason (*adeo ut conservatione sola ratione a creatione differre*)."[154]

But having just argued that Descartes was not a good reader of texts and that the remnants of scholasticism in Descartes' mature works, such as the *Meditations*, might be deceptive for the interpreter, I do not wish to conclude without careful examination that the post-1640 Suárezian distinctions from the *Principles* are necessarily present in the pre-1640 *Meditations*. There are four cases of Descartes referring to the real distinction between mind and body to consider in the pre-1640 work: 1) in the subtitle of the work; 2) in the title to Meditation VI; 3) in the Letter of Dedication to the Sorbonne; and 4) in the Synopsis of the *Meditations*.

Descartes revised the subtitle of his work between its Latin editions: originally entitled *Meditations on First Philosophy*, it was subtitled "in which the existence of God and the immortality of the soul are demonstrated," in the 1641 first edition, and "in which the existence of God and the distinction between the human soul and body are demonstrated," in the 1642 second.[155] Moreover, the 1647 French edition title is similar

[151] Suárez 1998, disp. 7, § 2, no. 28.
[152] AT VIIIb, 342–343.
[153] See AT VIIIb, 347–352.
[154] AT VII, 49.
[155] A number of hypotheses have been advanced for the change of subtitles. Adrien Baillet, in the abridgment to his biography of Descartes, asserts that *immortalitas* in the first subtitle was a misprint for *immaterialitas* (Baillet 1691, p. 171). Others argue that the

to that of the 1642 Latin edition, though not without some variations, both in the title and in the subtitle of the work, each containing an extra significant adjective not found in the Latin versions: The 1647 edition reads *Les Meditations Metaphysiques de René Descartes touchant la premiere philosophie*, dans lesquelles l'existence de Dieu, et la distinction réelle entre l'âme et le corps de l'homme, sont demonstrées. Thus, the term "real" in the subtitle of the *Meditations* was introduced in 1647. The term "real" in the title to Meditation VI was requested by Descartes, but not until January 28, 1641. In that letter to Mersenne, Descartes writes:

> I see that people take more account of the titles that are in books than of all the rest. This makes me think that to the title of the Second Meditation, *Of the Human Mind*, one can add, *that it is better known than the body*, so that it will not be thought that I wanted to prove its immortality there. And afterward, in the [...] sixth, one can add, *Of the existence of material things—and of the real distinction of mind from body*. For these are the things to which I want people to pay most attention.[156]

The two other cases of "real" distinction can also be dispensed with. Neither is integral to the text of the *Meditations* and both were written after the manuscript of the *Meditations* was circulated for *Objections* and *Replies*, although we do not have the original manuscript of either document and cannot tell exactly when Descartes inserted the term *real*.[157]

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subtitle was Mersenne's responsibility and his mistake. Neither hypothesis seems likely. It is true that Descartes says to Mersenne on November 11, 1640, "I am finally sending you my work on metaphysics, which I have not yet put a title to, in order to make you its godfather and leave you the power to baptize it" (AT III, 238–239; see also AT III, 235), but Descartes does suggest titles and subtitles to Mersenne (AT III, 235, 238, and 297). I find convincing the following passage from a Descartes letter to Mersenne of December 24, 1640: "As for what you say, that I have not said a word about the immortality of the soul, you should not be surprised. For I could not prove that God cannot annihilate it, but only that it is of a nature entirely distinct from that of the body, and consequently it is not bound by nature to die with it." (AT III, 265–266; see also AT III, 272). It is Mersenne who seems to have queried Descartes about the appropriateness of the subtitle with respect to the contents of the *Meditations* and Descartes who appears to be defending it.

156 AT III, 297.

157 The earliest mention of the *Letter to the Sorbonne* is November 11, 1640 (to Gibieuf, AT III, 236 and to Mersenne, AT III, 239). The earliest mention of the *Synopsis* to the *Meditations* is December 24, 1640 (to Mersenne, AT III, 268, where Descartes tells Mersenne that he will be sending him a synopsis in a week; also to Mersenne, December 31, 1640, where Descartes attaches a synopsis.)

A change in Descartes' views concerning distinctions operates subtly through the *Meditations, Objections*, and *Replies*; Descartes in the *Principles* ultimately acknowledges it to be a genuine change. In the *First Set of Objections* Caterus queried Descartes about his proof of a real distinction; Descartes responded in a muddled fashion. Caterus stated:

> He [Descartes] seems to prove the distinction (if that is what it is) between the soul and the body by the fact that they can be conceived distinctly and separately. Here I leave the very learned gentleman with Duns Scotus, who declares that, for one thing to be conceived distinctly and separately from one another, it suffices that there be a distinction which he calls "formal and objective," which he claims to be midway between a real distinction and a distinction of reason.[158]

Descartes answered:

> As far as the formal distinction is concerned, which the very learned theologian draws from Duns Scotus, I declare briefly that a formal distinction does not differ from a modal distinction, and that it applies only to incomplete beings, which I have carefully distinguished from complete beings. Moreover, it surely suffices for a formal distinction that one thing be conceived distinctly and separately from another by an act of abstraction on the part of the intellect inadequately conceiving the thing, yet not so distinctly and separately that we understand each one as something existing in its own right and different from every other thing.[159]

Descartes proceeded to illustrate his thought with the distinction between the motion and the shape of the same body, ultimately dealing with the distinction between justice and mercy, which Caterus had brought up as an example. Sometime later, prodded by the use Arnauld made of his distinctions, referring to Descartes' answer to Caterus,[160] it must have dawned on Descartes that he was confusing formal, modal, and distinction of reason. When he finally set out officially his theory of distinctions in the *Principles*, Descartes stated in the article on distinction of reason:

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[158] AT VII, 100. The issue is that if there is a third distinction between real and of reason, one cannot conclude that a difference between ideas entails a difference between things. The argument is made more fully by Duhamel, who believes that Descartes changes his theory of distinctions (Duhamel 1692, pp. 40–43).

[159] AT VII, 120.

[160] See AT VII, 200 ("For our distinguished author admits in his reply to the theologian …") and AT VII, 218 ("Further he recognizes no distinction between the states of a substance and the substance itself except for a formal one …").

> I recollect having elsewhere conflated this sort of distinction with modal distinction (near the end of the *Reply to the First Set of Objections* to the *Meditations on First Philosophy*), but then it was not necessary to treat accurately of these distinctions, and it was sufficient for my purpose at the time simply to distinguish them both from the real.[161]

That may be right, but still, this episode imparts the distinct impression that the Cartesian doctrine was in the process of formation.[162] There is no mention in Descartes of formal or modal distinction before Caterus' challenge in the *First Set of Objections*; there is no formal theory of distinction, Suárezian or otherwise, that Descartes was operating with before 1640, in the manuscript of the *Meditations*.

Was Descartes a reader of Suárez on the theory of distinctions? It seems plausible to presume so, though if he read him, it was after he had written the *Meditations*, at the end of 1640, beginning of 1641. Still, we do know he was reading carefully the *Summa Philosophica Quadripartita* of Eustachius a Sancto Paulo, at the time, and he had looked at the *Summa Totius Philosophiae* of Abra de Raconis. The varieties of distinctions are discussed in the Metaphysics sections of both these textbooks: Eustachius argues that there are three kinds of distinctions, real, from the nature of things (*a natura rei*), and of reason; he further subdivides the middle category into formal, modal, and potential.[163] De Raconis

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[161] *Principles* I, art. 62.

[162] The reconsideration continues in a letter to an unknown correspondent of 1645 or 1646. There Descartes comments on both his reply to Caterus and his articles from the *Principles*; he is clearly more comfortable with Suárez's vocabulary by then:

> I say that shape and other similar modes are strictly speaking modally distinct from the substance whose modes they are; but there is a lesser distinction between the other attributes. This latter distinction can be called modal—as I did at the end of my Replies to the First Objections—but only in a broad sense of the term, and it is perhaps better called formal. But to avoid confusion, in article 60 of Part One of my *Principles of Philosophy* where I discuss it explicitly, I call it a conceptual distinction—that is, a distinction made by reason *ratiocinatae*. I do not recognize any distinction made by reason *ratiocinantis*—that is, one which has no foundation in reality—because we cannot have any thought without a foundation; and consequently in that article, I did not add the term *ratiocinatae*. … So then, I postulate three kinds of distinction: first a real distinction between two substances; and then modal and formal distinctions, which are distinctions of reason *ratiocinatae*. All these three can be called real in contrast to the distinction of reason *ratiocinantis*. (AT IV, 349–350; CSM III, 280–281)

The 1647 French translation of the Principles does not change substantially from its 1644 Latin version and does not incorporate these developments from 1645–1646.

[163] Eustachius 1629, Metaphysica, Pars III, disp. 3, quaest. 5–8, pp. 52–55.

similarly argues for real, formal and modal, and rational distinctions in the context of debates, both real and terminological, between Thomas and Scotus.[164]

The Principles*, the Tree of Philosophy, and the Order of the Sciences*

We have outlined the generation of the *Principles* from a commentary to Eustachius' *Summa* to something that would stand by itself and enable collegiate professors to teach Descartes' philosophy. Descartes made public his new abbreviated project in the letter to Dinet: "in the hope of deriving some personal benefit from the publication of this letter, I will now say something of the philosophy I am writing at the moment, and which I have decided, unless any obstacle arises, to publish within a year or two."[165] He generally characterized the project as before, with a few new elements and more details:

> I have therefore decided to submit to the public the sum total of my few reflections on philosophy, and to fight for the widest possible acceptance of my views, if indeed they are true. Because of this, I shall not present them in the same order and style which I adopted when I wrote about many of these matters before—namely in the treatise of which I gave an outline in my *Discourse on the Method*, but instead I shall use a style more suited to the current practice in the Schools. That is, I shall treat each question, in short articles, in such an order that the proof of what comes later depends solely on what has come earlier, so that everything is connected together in a single structure. In this way I hope I can provide such a clear account of the truth of all the issues normally disputed in philosophy, that all those seeking the truth will find it without any difficulty in my book I am writing.[166]

The key elements in Descartes' mind seem to have been (i) to present a philosophy as wide-ranging as the one taught in the schools, that is, at least as complete as was *Le Monde*; (ii) to display it in the abbreviated style of the schools, with topics in short articles; and (iii) to do

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[164] De Raconis 1651, Metaphysica, Brevis Appendix, quaest. 1, art. 1, pp. 81–84.

[165] *Letter to Dinet*, AT VII, p. 574. There is a brief reference to the project in the first edition of the *Meditations*, Replies IV, AT VII, p. 252n (p. 255 in the 2nd edition). It is sufficient for the objectors in Objections VI to refer to "cette physique que vous nous promettez," AT VII, p. 417 (XIa, p. 222).

[166] *Letter to Dinet*, AT VII, p. 577.

so in an order of topics he previously called *more geometrico*, that the proof of what comes later depends solely on what has come earlier.

The first two elements were clearly dependent on the seventeenth-century school texts Descartes was familiar with at the time. He was clearly aware of their order of presentation; he had referred to the established order of teaching the sciences in the *Discourse on Method*: "it would be unreasonable for an individual . . . to plan to reform the body of the sciences or the established order of teaching them in the schools."[167] It would not be difficult to find the description of such an order in any of the text of Descartes' youth. For example, here is Toletus' classification of the sciences from the beginning of his *Physics*:

> What is contained in natural philosophy is either about the principles or about the things composed out of the principles. The book of the *Physics* is about the principles of all natural things and their common properties; the rest are about what is composed out of them. Now, what is composed is either a simple body not constituted from others, or composite and mixed. If they are simple, they are either incorruptible, like the heavens, which are treated in the first two books of *De caelo*, or corruptible, like the elements, which are the concerns of the last two books. . . . As for composites, because generation and corruption, and not only they, but also the simple elements themselves, are common to all, *De generatione et corruptione* first discusses the one and then the others. Of composites, some are inanimate and some animate. Inanimate composites are treated first, and then animate. Among inanimate things some are sublime, and are called meteors, and occur above us, like winds, rain, rainbows, haloes, and the like. The books of the *Meteors* are about them. Some are beneath us in intrinsic parts of the earth, like metals and stones, which are treated in the books of *Minerals*. As for animate things, because the soul is common to them, they are treated first of all in the three books of *De anima*, and then certain things that proceed from the soul, namely sleep, waking, youth, age, life, death, and the like are treated in the book of *Parva naturalia*. After those subjects, animate things themselves: of which some are animals, some plants. Animals and their kinds are extensively discussed in the books of *Historia* and in the books *De partibus animalium*. Finally there is *De plantis*.[168]

For Toletus, the order of the physical sciences was clearly specified; the principle of order dictated the sequence from principles to things composed of them and from simples to composites.

Thus, we should be able to establish that Descartes' intention to follow the order of topics as taught in the schools and to display it in short

[167] *Discourse on Method*, AT VI, p. 13.
[168] Toletus 1589, Prolegomenon, cap. 3, fol. 6^{b}.

articles was patterned after standard late scholastic practice. In format it most clearly resembles part III of the *Summa* of Eustachius (de Raconis, Dupleix, *et. al.*). The parts of the *Principles* do remind one of the scholastic order, in a number of respects. We have seen one such example in Toletus' order of presentation. The third part of Eustachius' *Summa*, about physics, displays a similar progression. It moves from "natural body in general," from principles of natural things, to their causes, to common properties, that is, matter, form, causes, place, infinity, void, time, and motion; then to "inanimate natural bodies," from the world and heavens, to elements, and mixed bodies; and finally to "animate natural bodies," from the soul in general, to vegetative, sensitive, and rational souls.[169] In very much the same way, Descartes' *Principles* moves from Descartes' metaphysical doctrines, to the principles of Cartesian physics, to the nature of the universe, and to the origins of the earth and terrestrial phenomena; Descartes also proposed two further parts: "a fifth part on living things, i.e. animals and plants, and a sixth part on man."[170] But there are still some minor problems to be resolved.

A first problem is an often-cited dissimilarity between Descartes and the schoolmen, that Descartes' metaphysics comes before his physics, whereas in the school order metaphysics comes after physics. However, that dissimilarity is more artificial than real. In order to accentuates their differences one compares what Descartes calls metaphysics, the first part of the *Principles*, with what Aristotelians discuss in their *Metaphysics*; however, one should really compare it with the abstract principles in the first half of what Aristotelians discuss in their Physics. That is what Cartesian metaphysics compares favorably with. One can argue, as does Jean-Luc Marion, that there is no Cartesian metaphysics in the Aristotelian sense of a science of being *qua* being.[171] In any case, textbooks writers did, in fact, feel the need to discuss metaphysics before physics. One of them, Théophraste Bouju, prefaced his *Physics* with two books of "universal metaphysics": 1. Of Being, of existence and essence considered transcendentally and of the properties appropriate to them; 2. The parts or members of the same being, not *qua* material or immaterial, substance or accident, and the like, but only *qua* being. And, after twenty-one books of physics, he discussed "particular metaphysics" in two books: 1. "Of

[169] See Eustachius' folding Schema generale between parts II and III of the *Summa*.
[170] *Principles* IV, art. 188.
[171] Marion 1986, chap. 1, pp. 9–72.

God, that is, of what can be known by natural reason"; 2. "Of Angels."[172] Bouju's distinction between a universal science, or first philosophy, and a particular science properly called metaphysics was previously advanced by the Jesuit, Benito Pereira and the Protestant, Rudolphus Goclenius.[173] Such terminological discussions indicate at the very least that, for the schoolmen, the position of metaphysics in the order of the sciences was problematic.

There is another way to make the same point. To think of Descartes' physics being grounded in his metaphysics as different from what a schoolman would have accepted is to think of the metaphor of the tree of philosophy from the preface of the French translation of the *Principles* as a peculiarly Cartesian image. As is well-known, that metaphor states that "All of philosophy is like a tree, whose roots are Metaphysics, whose trunk is physics, and the branches coming out of this trunk are all the other sciences."[174] In the opening section of his *Summa*, part III (*Physica*), entitled "Arbor Physicae," de Raconis compares the whole of physics to a tree whose roots are the first principles and causes of natural body, whose bark is the accidents of natural body, whose trunk is the world, and whose branches are the heavens, the elements, and mixed bodies.[175] Thus, even the image of the tree as an organic entity, a totality, can be found in the late scholastic textbooks with which Descartes was familiar. Given this context, it would be difficult to argue for an opposition between Descartes and Aristotelians on the classification of the sciences, or to maintain that Descartes would have intended to signal this opposition with his

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[172] La Métaphysique universelle: "1. De l' estant, de l' estre et de l' essence transcendemment considerez et des proprietés qui leurs conviennent; 2. Des parties ou membres du mesme estant, sans avoir esgard qu' il soit materiel ou immateriel, substance ou accident, et semblables; mais seulement selon qu' il est estant"; La metaphysique particuliere: 1. "De Dieu, à scavoir de ce qui se peut connoitre par raison naturelle"; 2. "Des Anges." And this in a book said to be "Le tout par demonstration et auctorité d' Aristote, avec eclaircissement de sa doctrine par luy-mesme," Bouju 1614.

[173] Lohr 1997 and 2002.

[174] AT IXb, p. 14. For more on the tree of philosophy as an attempted reconciliation with the schoolmen, see Ariew 1992.

[175] "Huius arboris anatomia, nobis in toto hoc opere proponitur, in qua quidem arbore, radices primum scilicet Principia, et causas corporis naturalis; corticem, accidentia corporis naturalis; truncum, mundum: et ramos, coelos nempe, elementa, mixta spectabimus …" de Raconis 1651, pars III, p. 1. I am indebted to Daniel Garber for pointing out this passage to me. The whole of de Raconis' Physics is arranged according to the metaphor; for example, the title of the disputation on the heavens is "Rami Physicae Arboris, Ramus Supremus, seu Coelum et Sphaera"; that of the disputation on the elements is "Ramus Secumdus [sic] Physicae Arboris, seu Elementa."

metaphor or that late scholastics would have understood the metaphor as a rejection of their view.

A second problem is more difficult. Regardless of any superficial general similarities there may be a deeper difference between Descartes and the schoolmen since there may be a significant difference between the order of the sciences, that is, the order of the topics, and the order of proofs as understood by Descartes. Thus we should be more specific about what Descartes intended by order and see whether it corresponded with what Eustachius and others had in mind.

In a letter to Mersenne of 24 December 1640, Descartes distinguished between the order of topics and the order of reasons:

> It should be noted that throughout the work [the *Meditations*] the order I follow is not the order of topics, but the order of reasons, This means that I do not attempt to say in a single place everything relevant to a given topic, because it would be impossible for me to prove it properly, since there are reasons that must be drawn in some cases from considerably more distant sources than in others; instead I reason in an orderly way *a facilioribus ad difficiliora*, making what deductions I can, now on one topic, now on another. This is the right way, in my opinion, to find and explain the truth.[176]

Moreover, during the same period, in Replies II, responding to the suggestion that "it would be worthwhile if you set out the entire argument in geometrical fashion (*more geometrico*), starting from a number of definitions, postulates and axioms,"[177] Descartes responded that he did set out the *Meditations* in geometrical manner. He then gave a lengthy and notorious discussion of the geometrical manner, distinguishing the order (*ordo*) and the reason (*ratio*) of demonstration. Descartes divided the "reason" of demonstration into two, analysis (or resolution) and synthesis (or composition).[178] In some particularly confusing passages, Descartes defined analysis as showing "the true way by means of which the thing in question was discovered methodically, and as it were (*tanquam*) a priori," and synthesis as using "by contrast a directly opposite way, and as it were (*tanquam*) a posteriori (though the proof itself is often more a

[176] To Mersenne, 24 December 1640, AT III, pp. 266–267. Descartes continues: "The order of topics is good only for those whose reasoning is disjointed, and who can say as much about one difficulty as about another." It is interesting to note that these comments were made just before the more extensive comments in *Replies II* and just before Descartes had received the *Quod Deus Sit* of J.-B. Morin, which gives a geometrical presentation of proofs of God's existence—see Garber 1995.

[177] Objections II, AT VII, p. 128; IXa, p. 101.

[178] Replies II, AT VII, pp. 155–156; IXa, pp. 121–122.

priori than it is in analysis)."[179] The French translation by Clerselier, presumably reviewed by Descartes, adds a layer of difficulty by translating *tanquam a priori* by "the effects depend on the causes," and *tanquam a posteriori* by "the causes by their effects."[180]

Modern commentators have made much of Descartes' discussion of analysis and synthesis. Some have linked it to Descartes' previous statements about an order of knowledge and an order of being.[181] Others have linked it to Descartes' previous statements about method, or resolution and composition.[182] And others have decided that Descartes' corpus contains different senses of analysis and synthesis.[183] At least one essay concludes that the terms "analytic" and "synthetic" taken in the sense Descartes gives them in a mathematical context seem particularly inappropriate as a way of construing what Descartes is doing in the *Meditations*.[184] It is worth pointing out that Descartes does not mention analysis and synthesis in a non-mathematical context in any printed source before his 1641 discussion in *Replies II*[185] (which occurred after his reading of Eustachius).[186] Descartes did discuss resolution and composition (the Latinate version of the distinction) as an aspect of his method of investigation in the *Regulae*, but that does seem to be a different distinction from analysis and synthesis as a "reason" of demonstration or exposition. The basic point again is that resolution and composition in the

[179] "veram viam ostendit per quam res methodice et tanquam a priori inventa est," AT VII, p. 155; "contra per viam oppositam et tanquam a posteriori quaesitum (etsi saepe ipsa probatio sit in hac magis a priori quam in illa)," AT VII, p. 156.

[180] That is, *tanquam a priori* by "et fait voir comment les effets dependent des causes," and *tanquam a posteriori* by "comme en examinant les causes par leur effets," AT IXa, pp. 121–122.

[181] For example, Gueroult 1968.

[182] For example, Hintikka and Remes 1974; see also Hintikka 1978.

[183] For example, Buchdahl 1969, pp. 118–141.

[184] Gaukroger 1994.

[185] It is interesting to note that Adam and Tannery's *index général* refers the reader to volumes VII and IX (the *Meditations*) and volume X (pp. 379–380 of the *Regulae*) for analysis and synthesis. Strictly speaking, analysis and synthesis do not occur in the *Regulae*. There are, of course, references in Descartes to the analysis of the ancients and to analysis in mathematical contexts. Cf. *Discourse*, AT VI, p. 20; for the analysis of the geometers and the analysis of the ancients, see AT VI, p. 17, and Rule 4 of the *Règulae*, AT X, p. 373. Descartes himself says that he has rarely used the word. Complaining about Bourdin saying that he had not read the *Discourse*, Descartes replied that it seems unlikely, since "he has often complained about my analysis … even though I did not treat of it anywhere else, and did not even speak of the word analysis except in this *Discourse on Method* about which he said he had not read." AT VII, 569–570.

[186] For more on the effect that Descartes' reading of Eustachius might have had on him, see chapters 1 and 2.

Regulae are two aspects of the same method, whereas analysis and synthesis in *Replies II* are two "reasons" of demonstration or two manners of writing. Similarly, Descartes did distinguish between individual things "in relation to the order they have with respect to our knowledge" and "as they really exist,"[187] but again, there is no real reason to connect this distinction from the *Regulae* with analysis and synthesis.[188]

All the above distinctions were available in school philosophy. The distinction between the order of knowledge and the order of being was standard in the Aristotelian and Thomistic corpus. The notion of order was not foreign to Aristotle's *Physics* itself; Book I of the *Physics* began with a distinction between things most knowable for us and most knowable in themselves.[189] Aristotle indicated that the first book of the *Physics* makes up a unity that could be followed up with a study of metaphysics or with the rest of natural philosophy, that is, the other books of the *Physics* together with the *De Caelo, Meteorology*, *De Anima*, etc.[190] Aristotle's comments were themselves commented upon, yielding interesting discussions and distinctions, including Aquinas', that what is known better to us and known better in itself should be correlated with the singular and universal, respectively.[191]

One can also find the distinction between analysis and synthesis. For example, there is the following definition of analysis and its etymological derivation in Dupleix's *La logique*:

> Analytic (in the same way as *Resolutive* in French) is a Greek word derived from *Analysis*, that is to say, *Resolution*; it is nothing more than a regress or return of a thing to its principles and (to speak more clearly) a dissolution

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[187] *Regulae*, AT X, p. 418.

[188] I should emphasize that I am not claiming that a real inconsistency arises by conflating the two distinctions (except, perhaps about the status of the *Principles* as synthetic). For discussions of these problems, see Garber and Cohen 1982 and Curley 1986.

[189] 184a17–184b14. This is the forerunner of the ordo cognoscendi and the ordo essendi.

[190] 192a33–192b2.

[191] Aquinas 1953, lectio 1, sec. 7. There are also the critiques of Aristotle by such Platonists as Proclus: "And certainly beauty and order are common to all branches of mathematics, as are the method of proceeding from things better known to things we seek to know and the reverse path from the latter to the former, the methods called analysis and synthesis," *Commentary on Book I of Euclid's Elements*, first translated into Latin circa 1560. That Proclus' methods are intended to be a critique of Aristotle can be seen by understanding that, for Proclus, analysis proceeds from universal conclusions to the universal premises that will establish them and synthesis from universal premises to the universal conclusions that follow from them.

> of the pieces of which a thing is composed—so that it is the contrary of composition. For example, throw a bush into the fire: what will be fire in it will be turned into fire; air will be exhaled; water will be evaporated; but if the wood is green, the air and water will mix and a kind of foam will come out of the pores; the terrestrial will be resolved into ashes. And through this resolution we will judge that this wood was composed of the four elements.[192]

Of course, some of these distinctions did get confused with one another; Eustachius even spoke of analytic and synthetic order or method in an elaboration of the Aristotelian distinction between the order of knowledge and the order of being.

In one of the Preliminary questions on the *Physics*, Eustachius asked whether there is an order to be followed in the different parts of philosophy,[193] and he asserted that there is an order appropriate both for the nature of things and doctrine, namely the order going from the most simple things to those more composite, from the principles to that from which they are constituted, at the same time progressing from the most universal things to the lesser universals, to the genera and species. Eustachius also asserts that Aristotle made use of such an "order or method" in his writings on the various parts of philosophy. According to Eustachius, Aristotle in the *Physics* started with principles, causes, and the general properties of natural things then progressed "partly in analytic order and partly in synthetic order"[194] from the most universal principles to the singular species of natural bodies; he then first differentiated the inanimate bodies—from the simplest, the heavens and elements in the *De Caelo* to the mixtures and more composite bodies in the *Meteorology*.[195] As we have previously indicated, Eustachius ordered his own exposition into three parts: 1. natural bodies in general, 2. inanimate natural bodies, and 3. animate natural bodies.[196] Eustachius actually rearranged Aristotle's topics and even rearranged the *Physics* itself in

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[192] Dupleix 1984, pp. 269–270; trans. in ACS p. 99. Dupleix claims to be following an analytic order even in his 1993.

[193] Eustachius a Sancto Paulo 1629, quaest. prooeminales, quaest. III: Quis ordo sit servandus in tractanda hac philosophiae parte, p. 5.

[194] This also needs to be put into the context of what he asserts in Tract. II, De Methodo, of the *Logic*: "Methodus sive ordo resolutionis, quae dicitur analysis …" and "Quoniam vero analysis, id est, divisioni opponitur synthesis, id est, composito …" Eustachius a Sancto Paulo 1629, pp. 120–121.

[195] Eustachius continues by enumerating the animate bodies of the *De Anima* and *Parva naturalia*, then the books on Plants and the history, generation and parts of animals.

[196] See Eustachius' folding Schema generale between parts II and III of the *Summa*.

keeping with his notion of order. For instance, he delayed the discussion of motion (Aristotle, *Physics* III, 1–3) until after book IV, going directly from the discussion of causes (Book II) to infinity (Book III, 4–8).

All of the various distinctions called analytic and synthetic are listed by Rudolphus Goclenius in his *Lexicon Philosophorum* of 1613. Method is said to be "an intellectual path from what is known to what is unknown," which is further subdivided into "demonstrative, from cause to effect" and "analytic, from effect to cause."[197] But Goclenius also divides method differently. One of the divisions terminates with a distinction between *synthetica* (*componens ordo*) and *analytica* (*resolvens ordo*); synthesis progressing from the first principles of things to secondary ones and analysis progressing from final notions to principles.[198] Moreover, another of the divisions, under the heading of syllogism and demonstration, terminates with a distinction between *synthetica* and *analytica*, synthesis being linked with *propter quid* and analysis with *ab effectu* and *inductione*.[199]

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[197] That is, "via intellectuali a notis ad ignota," which is further subdivided into "demonstrativa, a causa ad effectum" and "analytica, ab effecto ad causam." Goclenius 1613, p. 683. Compare with Eustachius' definition of method and the triple order of resolution, composition, and definition:

> There are two principal things to be considered in any science, namely the objects of the inquiry and the means which are generally used to explain those objects. And the objects of inquiry may be compared among themselves, or the means among themselves, or finally the means with the objects of inquiry. Hence there is a triple order to be observed in any science. First the many objects of inquiry must be compared among themselves, and what are prior must be expounded earlier, and what are posterior, and incapable of being understood without what has gone before, should be explained later. Second, the means should be compared amongst themselves; and when there are many means to prove a given result, those which are closer to the thing to be proved should be dealt with in an earlier place, and those which are more remote in a later place. Third and finally, the means must be compared with the objects of inquiry; the order to be observed here designed to ensure that the prior means correspond with the prior objects of inquiry, and the posterior means with the objects which are posterior,
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> Eustachius 1629, p. 120, trans. in ACS pp. 75–76

[198] Goclenius 1613, p. 684. One can find the same distinction in the discussion of ordo, divided into "artificialis et perfectus" and "inartificialis et imperfectus." The former is further subdivided to yield ultimately "syntheticum" and "analyticum." The definition of synthetic is the disposition of the parts of disciplines as a progression from a universal subject to particulars and from simples to composites. Analysis progresses from a final notion to the knowledge of principles (pp. 279–281).

[199] Goclenius 1613, p. 684. For the distinction in other writers, such as Melanchthon, see Freedman (1993). Freedman quotes Melanchthon as dividing method into analytic and synthetic—analytic: "posteriores to priores" and "inductio singularium et

Now, none of this completely resolves the serious interpretive problems relative to these concepts in Descartes' texts. However, it is clear that whatever one decides about Descartes' order and method, analysis and synthesis, such notions can be found in ordinary school texts from the first few decades of the seventeenth century. Given Descartes' aim in the project, namely, to publish his principles in the style of the schools, it is likely that what Descartes meant by these notions was not intended to diverge from traditional views. Thus, any interpretation of Descartes about these matters must start with the textbook tradition; since this tradition is equivocal, there is a strong presumption that Descartes' talk about analysis and synthesis at various times is also equivocal.

Situated in the 1640s, it is clear that Descartes was having a conversation with the Aristotelians. The project he was working on involved a contrast between his principles and scholastic principles, but it does not involve a contrast between the format of the *Summa* and his treatise. In fact, in order to be understood better by his audience, the schoolmen, Descartes borrowed the *form* of the late scholastic textbook, pedagogical elements such as their order of presentation or order of the sciences, their mode of exposition, their image of the tree of knowledge, and even some of their terminology. Analysis and synthesis in this context had little to do with the universal method of the *Regulae* and its reductive and composite steps. They are not intended as a rupture with scholasticism. They were meant to evoke the tradition and to solidify Descartes' continuity with it.

Reconciliations and Condemnations

There is another attempt by Descartes to evoke tradition and show his philosophy's continuity with previous philosophies. Descartes, aware of the Jesuits' distaste of novelty, especially in matters theological or akin to theology, defends the bizarre opinion that his philosophy is not new—that it is older than Aristotle's. This episode unfolds throughout the 1640s; it starts with an obscure exchange between Descartes and Bourdin, who called something Descartes had said "familiar even to the least novice." Descartes answered: "I would certainly not argue with the last statement. For I have never sought any praise for the novelty of my

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specialium" to "generalissimum"; synthetic: "priores et notiores to posteriores et ignotiores" and "generales et universales" to "speciales et singulares," p. 109.

opinions."[200] Descartes' reply involved a delicate subject that must have been a major worry for him at the time.[201] He was certainly conscious of the usual answers given on the subject; he also understood the risk that the accusation of novelty presented for the reception of his philosophy. He dealt with the issue in his published *Letter to Dinet*, where he simply denied the novelty of his opinions:

> It may hardly seem likely that one person has managed to see more than hundreds of thousands of highly intelligent men who have followed the opinions that are commonly accepted in the Schools. Well-trodden and familiar pathways are always safer than new and unknown ones, and this maxim is particularly relevant because of theology. For the experience of many years has taught us that the traditional and common philosophy is consistent with theology, but it is uncertain whether this will be true of the new philosophy. For this reason some people maintain that the new philosophy should be prohibited and suppressed at the earliest opportunity, in case it should attract large numbers of inexperienced people who are avid for novelty, and thus gradually spread and gain momentum, disturbing the peace and tranquility of the Schools and the universities and even bringing new heresies into the Church.[202]

According to Descartes, the solution to this problem—a solution he himself recognized as paradoxical—was that all of Peripatetic philosophy, insofar as it is different from other philosophies, is new, and that his is ancient. In fact, with respect to the principles of his philosophy, Descartes claimed that he accepted only those "which in the past have always been common ground among all philosophers without exception, and which are therefore the most ancient of all." And since what he deduced from these principles is contained in them, the truths deduced were equally ancient. The principles of the prevalent philosophy were new when Aristotle invented them and they should not be considered better now than

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[200] AT VII 464.

[201] Descartes was attacked for the novelty of his opinions by the Academic Senate of Utrecht in 1642. Among the reasons given by these magistrates was that Descartes' philosophy "is opposed to the traditional philosophy which universities throughout the world have hitherto taught on the best advice, and it undermines its foundations." Moreover, "it turns away the young from this sound and traditional philosophy and prevents them [from] reaching the heights of erudition; for once they have begun to rely on the new philosophy and its supposed solutions, they are unable to understand the technical terms which are commonly used in the books of traditional authors and in the lectures and debates of their professors." The edict sums up the problem by saying that "various false and absurd opinions either follow from the new philosophy or can be rashly deduced by the young—opinions which are in conflict with other disciplines and faculties and above all with orthodox theology" (AT VII, 592).

[202] AT VII, 578–579.

they were then. Besides, "everything deduced from them is controversial and liable to be changed by individual philosophers, depending on the fashion in the Schools, and hence it is exceedingly new, since it is still being revised every day."[203] Descartes put into relief the elements most necessary for understanding his defense against novelty. His philosophy is ancient because it is true, and one can understand that it is true because it is innate with us; thus, one can recognize its great age as soon as one becomes aware of its truth.[204]

The point of view of Descartes' *Principles of Philosophy* is consistent with such a strategy. Part of Descartes' task in the *Principles* is to deny that his principles are novel, or that they are "opposed to the traditional philosophy universities throughout the world have hitherto taught." Indeed, *Principles*, Part IV, article 200 is entitled "There are no principles in this treatise that are not accepted by all men; this philosophy is not new, but is the most ancient and most common of all." The text states: "But I likewise desire that it should be observed that although I have here tried to give an explanation of the whole nature of material things, I

[203] AT VII, 580. See also AT VII, 581: "Again, there is no need to fear that my opinions will disturb the peace of the Schools. On the contrary, philosophers already take sides against each other on so many controversies that they could hardly be more at war than they are now." Descartes' defense might have seemed *ad hoc*. He did not say how he knew that all philosophers generally accepted his principles and why he thought that his principles were the most ancient of all. But it can be shown that his reply was not constructed just to satisfy the Magistrates of Utrecht. He had already attempted on several occasions to avoid having his philosophy called novel. (See Descartes' exchange with Noël, above.) In the *Dedicatory Letter to the Deans and Doctors of the Sorbonne*, Descartes had rejected the judgment that his method was novel:

> And finally, I was strongly pressed to undertake this task by several people who knew that I had developed a method for resolving certain difficulties in the sciences—not a new method (for nothing is older than the truth), but one which they had seen me use with some success in other areas; and I therefore thought it my duty to make some attempt to apply it to the matter in hand" (AT VII, 3)

[204] AT VII, 464. Descartes continued to maintain such a defense, elements of which made their way into one of his replies to the question of the novelty of the *cogito*. As he wrote,

> I am much obliged to you for informing me of the passages in Saint Augustine that can help in authorizing my opinions. Some other friends of mine have already done something similar. And I take great satisfaction in the fact that my thoughts agree with those of so sainted and excellent a person. But I am not at all of the habit of thought of those who desire that their opinions appear new. On the contrary, I accommodate mine to those of others insofar as truth allows me to do so (AT IV, 113)

have nevertheless made use of no principle that has not been approved by Aristotle and by all the other philosophers of every time." Descartes asserts that he has considered only the figure, motion, and magnitude of each body, and what must follow from their collisions according to the laws of mechanics, as they are confirmed by certain and daily experience. He thus turns Aristotle into a fellow mechanist. Two articles later, he reinforces this revisionist history through a comparison of his principles and those of both Democritus and Aristotle: "That the philosophy of Democritus is not less different from ours than from the vulgar."[205] He both attenuates the contrast between his philosophy and that of Aristotle, and accentuates his differences with atomists such as Democritus, presumably in the hope of bringing his Aristotelian readers into his camp. These issues are raised in the later French edition Preface to the *Principles* as well, though Descartes seems to have attempted to have it both ways. Descartes says: "The … reason that proves the clarity of these principles is that they have been known from all time and even received as true and indubitable by all men." However, he adds,

> But although all the truths I place in my Principles have been known from all time and by everyone, nevertheless there has never yet been anyone, as far as I know, who has recognized them as the principles of philosophy, that is to say, as principles from which may be derived a knowledge of all things that are in the world.[206]

After the publication of the *Meditations*, while he was writing the *Principles*, Descartes became involved in philosophical controversies on a larger scale. He quarreled with Voetius, rector of Utrecht University, and judgment was pronounced against him by the Utrecht magistrates in 1642.[207] Perhaps because of his greater problems with the Protestants in the Netherlands, Descartes sought to make peace with the Jesuits. There was a reconciliation between Descartes and Bourdin in 1644. Descartes visited Bourdin at the Collège Clermont, and Bourdin offered to play the role of Mersenne in Paris, to distribute Descartes' letters. Descartes also visited La Flèche itself, for the first time since he had left it. From 1644 to his death in 1650, the relations between Descartes and the Jesuits remained outwardly cordial.[208] However, in 1651, a general

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[205] *Principles* IV, art. 202.
[206] AT IXb, 10–11.
[207] See Verbeek 1988 and 1992.
[208] See, for example, AT IV, 156–158, 584. In AT IV, 159, Descartes tells Dinet: "Having

instruction on teaching, with lists of topics that should be excluded from university teaching, was issued after the Ninth Congregation of 1649–1650 by Francesco Piccolomini.[209] The list contained several theses that were defended by Descartes. In 1663, the works of Descartes themselves were put on the *Index of Prohibited Works* with the notation, "donec corrigantur"—"until corrected"[210] and specific Cartesian doctrines were prohibited in an assembly of Jesuits and Oratorians in 1678.[211] But this did not prevent Descartes from having followers. Descartes even picked up some followers among the Jesuits of La Flèche, though very belatedly. For example, one can find support for various early modern doctrines in a student thesis (by Ignace de Tremblay) defended on July 1700 at La Flèche.[212] One can also find a Malebranchiste and Cartesian Jesuit, the Père André, teaching at La Flèche, though not without some problems with his superiors.[213]

A final spasm of opposition to Descartes' work, within the Jesuit order, occurred during the first decade of the 1700s.[214] Michel-Angelo Tamburini was elected General of the Order on January 31, 1706; his first act was the promulgation of thirty prohibited propositions.[215] Some of the propositions seemed to be condemnations of Malebranchian positions rather than those of Descartes. In any case, the attempt at condemnation could not have succeeded for very long; as one can see, among the Jesuit propositions are even the denial of the relativity of motion and the denial of the conservation of inertia. Once again, however, the resiliency of Aristotelian ideas seems to have been demonstrated.

Moderns tend to think of Cartesianism as having dealt the fatal blow to scholasticism; and that, despite the surprising tenacity of Aristotelianism, has the ring of truth to it. However, the defeat of Aristotelianism was accomplished by tactical measures as well as by arguments and doctrines.

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attempted to write a philosophy, I know that your Society alone, more than any other, can make it succeed or fail."

[209] "Ordinatio pro Studiis Superioribus," in Pachtler 1890, vol. 3, pp. 77–98.

[210] The likely reason Descartes was put on the Index was, ironically, his attempt to dabble in theology, his account of transubstantiation. See Armogathe 1977; see also chapter 7.

[211] See chapters 7–10.

[212] Rochemonteix 1899, vol. IV, pp. 357–364.

[213] Rochemonteix 1899, pp. 82–88, 94–98.

[214] Cartesianism seems also to have been frowned upon by the civil authorities until 1715; see Brockliss 1992, p. 353. See also chapters 8–10.

[215] Rochemonteix 1899, vol. IV, pp. 89n–93n: I. The text, in English translation, may be found in ACS pp. 258–260.

Descartes, as we have seen, was keenly aware of this aspect of his relations with contemporaries and predecessors; in a letter to Beeckman, he wrote:

> Consider first what are the things a person can learn from another; you will find that they are languages, stories, experiences, and clear and distinct demonstrations, such as those of the geometers, that bring conviction to the mind. As for the opinions and maxims of the philosophers, merely to repeat them is not to teach them … who teaches me, that is, who teaches anyone who loves wisdom? No doubt it is the person who can first persuade someone with his reasons, or at least by his authority.[216]

Descartes won some early battles by seeming to defy authority and lost others when trying to identify himself with conventional authorities; many years later, after his death, he finally won the war, perhaps by persuading others with his reasons.

[216] AT I, 156.

CHAPTER TWO

DESCARTES AND THE SCOTISTS

Gilson's Index

To date, the most substantial works on the intellectual relations between Descartes and his predecessors have been Etienne Gilson's masterful studies.[1] In the *Index scolastico-cartésien*, Gilson catalogued various concepts in Descartes and matching ones in his scholastic predecessors. Gilson's choice of antecedents was carefully chosen. He compared Descartes' works with those of Thomas Aquinas, the Jesuits of the University of Coimbra, Francisco Suárez, Franciscus Toletus, Antonius Rubius, and Eustachius a Sancto Paulo.[2] As Gilson indicated in his introduction to the *Index scolastico-cartésien*, the teaching at Descartes' Jesuit college, La Flèche, was based on Saint Thomas, and Descartes continued to consult Thomas throughout his life. Further, Descartes became acquainted at La Flèche with the works of the Coimbran Jesuits, Toletus, and Rubius. Gilson defended the choice of Suárez by indicating that Descartes was familiar with his work—that Suárez's *Disputationes metaphysicae* was basically the handbook in metaphysics for Descartes' teachers. Gilson added passages from Eustachius a Sancto Paulo to those of Thomas and the others—all Jesuits—because Descartes had read Eustachius' *Summa* and it could be said to summarize scholastic teaching faithfully and concisely.[3] It would be difficult to disagree with any of Gilson's reasons.

Descartes clearly knew the works of Saint Thomas; he even brought one of Thomas' volumes along with him on his travels—at least, that is what he said in the letter of 25 December 1639 to Marin Mersenne: "I am not at all so deprived of books as you think, and I have here still a *Summa* of Saint Thomas and a Bible that I have brought with me from France."[4]

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[1] Gilson 1913, 1989 [1913], 1925, and 1930.
[2] Gilson also adds an appendix to the *Lexicon* of Etienne Chauvin (1692).
[3] Gilson 1913, pp. iv–v.
[4] AT II, 630.

As is well known, Descartes disputed with Caterus about Thomas' views in his *Replies* to the *First Objections* and on various occasions compared his own views on the Eucharist with those of Thomas.[5] Similarly, in a notorious passage about material falsity in the *Fourth set of Replies* to Arnauld, Descartes cited Suárez's *Disputationes metaphysicae*. Thus Descartes must have consulted Suárez's works at least once.[6] Moreover, as we have previously indicated, there was a revival of the Thomistic interpretation of Aristotelian philosophy during the second half of the sixteenth century. In 1567 Pope Pius V proclaimed Saint Thomas Doctor of the Church; Saint Ignatius of Loyola, founder of the Jesuits, advised the Jesuits to follow the doctrines of Saint Thomas in theology and those of Aristotle in philosophy. This advice was made formal in the Jesuits' *ratio studiorum* of 1586. The result was the well-known Jesuit penchant for Thomistic doctrines, at least for the period of the generalship of Claudio Acquaviva (1581–1616), when Descartes was a student at La Flèche (roughly 1606–1614).[7]

As for the question of which textbooks Descartes consulted while at La Flèche, that can easily be settled. Descartes did refer to the Jesuits of Coimbra, Toletus, and Rubius as author of textbooks he remembered from his youth.[8] As can be expected, those textbooks were often paraphrases of Thomas' reformulations of Aristotle. But seventeenth-century Thomism was not identical to thirteenth-century Thomism. At the very least, seventeenth-century Thomism was taught against the background of competing fourteenth to sixteenth century doctrines; and since Thomism did not have a doctrine for every possible topic, certain other doctrines and terms were imported to fill gaps. Descartes also indicated that he had read the *Summa philosophica quadripartita* of Eustachius a Sancto Paulo.[9] The textbooks mentioned by Descartes were

[5] In the letter to Charlet of 31 December 1640 there is even a specific reference to Thomas' views on the Eucharist (AT III, 274). For more on these topics, see chapter 7.

[6] AT VII, 235. There is a story that Descartes carried the *Disputationes Metaphysicae* with him in his travels. The story is repeated by Heilbron (1979), p. 108, but it is unlikely at best, and, as far as I know, there is no evidence for it in AT's eleven volumes. Heilbron gives three references, but they basically cite one another and lead nowhere.

[7] See chapter 1.

[8] AT III, 185. For more details on the Coimbrans, Toletus, and Rubius, see chapter 1.

[9] AT III, 232. It is unlikely that Descartes had read Eustachius' *Summa* at la Flèche. Eustachius also published a *Summa Theologiae Tripartita* (Eustachius a Sancto Paulo 1613–1616). As Descartes continued his reading of scholastic textbooks, he looked at the textbook of someone he called Draconis (AT III, 234), that is, Abra de Raconis. For more on these matters, see chapter 1.

very widely read Latin-language philosophy texts from the first half of the seventeenth century, with Eustachius a Sancto Paulo's *Summa* probably taking first rank.[10]

Dalbiez's Critique of Gilson

With the *Index scolastico-cartésien* as his instrument of research, Gilson proceeded to work on his commentary on Descartes' *Discours de la méthode*. Immediately, Roland Dalbiez issued a criticism of the commentary. At stake was Gilson's comment that "in scholastic thought, objective being is not a real being, but a rational being; it does not need a special cause. In Cartesianism, objective being is a lesser being than the actual being of the thing; however, it is a real being and, as a consequence, it requires a cause of its existence."[11] Dalbiez agreed with the comment as long as "scholastic thought" in it was restricted to Thomism. He pointed out that the Thomist doctrine was disputed by many previous thinkers, and especially Scotists. For Thomists, objective being is only a being of reason; for Scotists, it is more than a being of reason.[12] Dalbiez proceeded to show that Tommas Cajetan, Thomas Aquinas' sixteenth century commentator, dealt in some detail with Scotus' doctrine of objective reality, contrasting it with that of Thomas. And Cajetan's commentaries were

[10] The seventeenth century also saw an enormous growth of French-language philosophy texts written by the tutors of the nobility. The movement began in the 1560s with the first French translations of Aristotle's works, but took off in the 1590s with the first French-language commentaries on the *Physics*. Works in this genre not mentioned by Descartes included Bouju 1614, by Henry IV's almoner, Théophraste Bouju, and Ceriziers 1643, by the Jesuit, le Père René de Ceriziers, who became a secular almoner of the Duc d' Orléans and later counselor to Louis XIV (also Marandé 1642, among others). The most noted of such works was Dupleix 1627, by Cardinal Richelieu's favorite historian, Scipion Dupleix. It exceeded Eustachius' *Summa* in popularity; there were more than 24 editions of Dupleix's *Physique* in various incarnations during the first half of the seventeenth century. (See Ariew 2002.) Of course, there were other textbook authors who had a following, not mentioned by Descartes. For example, Henry Alsted seems to have been read by Leibniz, Rudolph Arriaga by Bayle, Franco Burgersdijk by Locke, John Magirus by Newton, and Daniel Sennert by Boyle and Leibniz. In Paris, Latin-language textbook authors included the Protestant, Pierre du Moulin, and Catholics such as François Le Rees, J.-C. Frey, Jacques du Chevreul, and Jean Crassot. See C.H. Lohr's series of articles, and Schmitt and Skinner 1987. For other sources for the textbook tradition in the seventeenth century, see Reif 1962 and 1969; Brockliss 1981 and 1987.

[11] Dalbiez 1929, p. 464, citing Gilson 1925, p. 321.

[12] Dalbiez 1929, p. 465.

published with the master edition of the works of Saint Thomas in Rome, 1570–1571 (at the behest of Pope Pius V)—the edition that Descartes probably consulted.

Dalbiez also discussed an issue that seemed tangential to the debate between Thomists and Scotists about objective being, but was waged within the Jesuit order itself, between two of its greatest metaphysicians, Suárez and Gabriel Vasquez. It concerned the distinction between the formal and objective concept and the role of the latter in the definition of truth. Durandus a Sancto Porciano[13] had maintained that truth consists in the conformity of the objective concept and the thing. Suárez reported and criticized this thesis:

> The first proposition [of Durandus] is that truth does not reside in the formal act or cognition of the intellect, but in the thing cognized as objective in the intellect, so that the thing is in conformity with itself in respect to the existent thing, and in this way he explains that truth is the conformity of the intellect to the thing, that is, the conformity of the objective concept of the enunciative intellect to the thing according to its real being.[14]

As Dalbiez said, for most scholastics, the objective concept is the thing itself, insofar as it is cognized, but for Durandus, the objective concept seems to become a third reality (*tertium quid*) between the formal concept and the thing. Suárez rejected the thesis, Vasquez defended it, specifically referring to Durandus.[15] Dalbiez concluded that "Descartes could not have been completely unaware of the debate. Whether Descartes' professor of philosophy was a follower of Suárez or Vasquez, he could not have neglected the exposition of a controversy that divided the two most noted doctors of the Society."[16]

The scholastic debate therefore revolved about whether the objective concept collapses into the formal concept, that is, into an act of the intellect, and objective being is thus a being of reason, or whether the objective concept is a third reality between the formal concept and the thing, and objective being is also something more than a being of reason. It is noteworthy that this debate can also be found at the University of Paris in the first few decades of the seventeenth century, for example, in

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[13] An early fourteenth-century Dominican who held various anti-Thomist views in physics and metaphysics.

[14] Dalbiez 1929, p. 468, quoting Suárez discussing Durandus a Sancto Porciano.

[15] Dalbiez 1929, p. 469.

[16] Dalbiez 1929, p. 470.

the *Summa philosophia* of Abra de Raconis.[17] De Raconis distinguishes between objective and subjective concepts:

> Something can be in the intellect in two ways, either objectively or subjectively: objectively, such as man, insofar as it is the object of the intellect, subjectively, such as an intellection, that which is received in the intellect itself; as a result, there is a difficulty between philosophers, namely, in what consists the causes of exemplar ideas, whether they consist in the objective concept, in which these things are objectively in the intellect, or in the formal concept, in which these things are subjectively in the intellect.[18]

And de Raconis asserts that there are two opposite opinions about the *ratio* of the exemplar or idea. The first is held by Thomas and Suárez: "Saint Thomas, part I quest. 15 art. 1, and, supporting him, Suárez, M 1 d 29 s2 n. 10 *et seq*., hold that the *ratio* of exemplar causes consists in the formal concept and not in the objective"; but de Raconis thinks that the second opinion, held by Durandus, is more probable: "the essential *ratio* of the exemplar does not consist in the formal concept: Durandus, 1 Sent. dist. 36 and elsewhere."[19] He clearly favors the latter interpretation, siding with Durandus, and he supports it with various propositions.[20]

Eustachius a Sancto Paulo holds the same view as Abra de Raconis, although it is often difficult to make out exactly where Eustachius stands on particular issues, since he does not usually cite authorities or impart many details. With de Raconis' discussion as background, one can see more clearly what Eustachius intends. For Eustachius an idea is an image of a thing in the mind of the artificer; it is also an act of the mind.[21] Thus, for Eustachius, ideas or concepts can be taken in two ways, objectively or formally. He states:

> The concept of any given thing may be taken in two senses, one formal and the other objective. The latter strictly speaking is called a concept only in an analogical and nominal sense; for it is not truly a concept, but rather a thing conceived, or an object of conception. A formal concept, however, is the actual likeness of the thing which is understood by the intellect, produced in order to represent the thing. For example, when the

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[17] For more on de Raconis, see chapter 1.

[18] Abra de Raconis 1651, Physica, Tractatus de causis, art. secundus, de causa exemplaris, pp. 94–95. At the risk of multiplying the terminology, in Cartesian language something can be in the intellect objectively or formally (the latter is the same as subjectively for de Raconis).

[19] Abra de Raconis 1651, loc. cit., p. 95.

[20] Abra de Raconis 1651, loc. cit., pp. 95–96; see also de Raconis 1651, Metaphysica, tract III, pp. 57–68. For more details, see chapter 3.

[21] Eustachius 1629, Physica, Pars III, disp. 1, quaest. III, p. 36. See chapter 3.

> intellect perceives human nature, the actual likeness, which it produces in respect of human nature, is the formal concept of the nature in question, as understood by the intellect. We say actual likeness to distinguish it from the intelligible species, which is the habitual image of the same thing. It may be understood from this that the formal concept is the word which the mind possesses, or the species which it forms of the thing that is understood. The objective concept, however, which is then said to be the formal *ratio*, is the thing as represented to the intellect by means of the formal concept; thus in the example just given, human nature, as it is actually apprehended, is called the objective concept.[22]

And, in case it might be thought that the objective concept would collapse into the formal concept or the thing, Eustachius specifies that

> To understand what is meant by objective being in the intellect, one must note the distinction between objective and subjective being in the intellect. To be objectively in the intellect is nothing else than to be actually present as an object to the knowing intellect, whether what is present as an object of knowledge has true being within or outside the intellect, or not. To be subjectively in the intellect is to be in it as in a subject, as dispositions and intellectual acts are understood to be in it. But since those things which are in the intellect subjectively can be known by the intellect, it can happen that the same thing can at the same time be both objectively and subjectively in the intellect. Other things which really exist outside the intellect, though they are not subjectively in the intellect can be in it objectively, as we have noted. But since all these things are real, they have some real being in themselves apart from the objective being in the intellect. There are certain items which have no other being apart from objective being, or being known by the intellect: these are called entities of reason.[23]

The doctrines of Eustachius and de Raconis are plainly an amalgam of those of Scotus and Durandus.[24] Although Durandus' doctrine, that truth is the agreement of the objective concept and the thing, might be held separately from Scotus' doctrine, that objective being is greater than a being of reason and less than a real being, the doctrines clearly complement each other. Durandus' doctrine makes sense within the general framework of a theory of distinctions that would allow for a third kind of distinction beyond real distinctions and distinction of reasons. To

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[22] Eustachius 1629, Metaphysica, Pars I, Tract. I, disp. 1, quaest. 2, p. 6. Trans. in ACS p. 93, slightly modified.

[23] Eustachius 1629, Metaphysica, Pars I, Tract. I, disp. 2, quaest. 3, pp. 10–11. Trans. in ACS pp. 93–94.

[24] For an analysis of the relation between the doctrines of seventeenth-century scholastics (Eustachius, de Raconis and others) and Descartes on ideas, see chapter 3. See also Leslie Armour's discussion of Eustachius on (transcendental) truth consisting in the conformity of things to God's intellect (Armour 1993).

play its role, the objective concept must be distinguished both from the thing and from the formal concept and those distinctions must be other than distinctions of reason. But formal and objective concepts are both in the intellect; thus, they must be distinguished formally or modally. And of course the formal distinction (or the third kind in addition to real and rational distinctions) is a notorious Scotist doctrine[25] accepted by both Eustachius and de Raconis.[26]

As one can see, Dalbiez's critique of Gilson can be both extended (to other writers) and generalized (to other topics). Not only did Gilson miss the Scotism in the seventeenth century scholastic theory of ideas—not only did he fail to notice that Scotism survives in Cajetan's commentaries on Thomas and in debates within the Jesuit order itself—but, in addition, he did not recognize that Scotist doctrines also survive in the teaching of University of Paris professors such as Eustachius and de Raconis. In fact, it can be shown that the philosophical climate in France from the early 1600s (with perhaps the major exception of Jesuit philosophy in the first half of the seventeenth century)[27] was predominantly Scotist and not Thomist.

What Is a Thomist? What Is a Scotist?

There are, of course, no necessary or sufficient conditions for being a Scotist (or a Thomist, or even an Aristotelian). However, there are a number of different issues on which Scotus disagreed with Thomas, both major and minor, ranging through the philosophical corpus (including logic, metaphysics, physics, and ethics) and theology.[28] Many of Scotus' followers took up these issues, continuing the disagreement. In the seventeenth century those oppositions were considered significant enough that some authors wrote books detailing the "two great systems of philosophy," Thomism and Scotism;[29] others tried to reconcile them;[30] still

[25] See, for example, Wolters 1990, pp. 27–42. For a discussion of scholastic and Cartesian theory of distinctions, see Ghisalberti 1996.

[26] See chap. 1 above, sec. on Descartes and Suárez on the Theory of Distinctions.

[27] Though again with the proviso that seventeenth-century Thomism might itself contain a fair number of Scotist terms and doctrines.

[28] For an excellent account of these variations, see Schmutz 2002 and 2008.

[29] Or the three great systems—Thomist, Scotist and Nominalist (or Ockhamist); sometimes the Averroist system was added. For example: d' Amici 1626, de Rada 1620, Vincent 1660–1671. See also Di Vona 1994.

[30] For example, Boccafuoco 1589; Sarnanus 1590.

others wrote books following Thomas[31] or following Scotus.[32] Thus, the categories, Scotist, Thomist, are not anachronisms or historians' constructions, but come from the sixteenth and seventeenth century writers themselves.[33]

As important as these self-identifications were, the bulk of philosophical teaching in France did not openly align itself with any particular philosopher. Textbooks were simply called something like *Summa philosophiae quadripartita* or *Universae philosophiae*; they made few general claims to be following any philosopher (other than Aristotle).[34] As a result, we have to delve a bit deeper to find a commitment to any specific system. Looking inside the textbooks at particular *quaestiones*, we might then be able to determine whether there are any legitimate generalizations about their contents.

So, first, let us see whether we can determine in a general way what is a Thomist.

It happens that the modern Catholic Church, under the leadership of Pope Leo XIII (with his 1878 encyclical *Aeterni Patris*) and thereafter, promoted what it called Thomism. In 1914, with the approval of Leo's successor Pius X, the Sacred Congregation of Studies attempted to define Thomism through 24 theses they thought embodied its essentials.[35] I will describe these Thomist theses and compare them with the treatment these same issues received by the Dominican Antoine Goudin in his seventeenth century textbook, in which he claimed he followed the thoughts of Saint Thomas.[36] In this way I hope to be able to recapture what some-

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[31] For example: Goudin 1726 [1668], 1864; John of St. Thomas 1663.

[32] For example: Frassen 1668 and 1672–1677; de Llamazares [1669?]; Poncius 1672.

[33] In now-fashionable terminology, they are "actors' categories."

[34] And following Aristotle does not usually mean what we would mean by it.

[35] Sacra Studiorum Congregatio 1914. I think the theses present a fairly accurate picture of the essentials of Thomism (though again it is not likely that there are necessary or sufficient conditions for being a Thomist). It is not important, for my purposes, that this characterization should be agreed to universally; I just want to use the 24 theses in order to sort out the relevant issues. See the Appendix to this chapter for the full text of the "24 Theses."

[36] Goudin was born in Limoges 1639 and died in Paris 1695. He became a Dominican in 1657. He taught philosophy and theology at Limoges, Avignon, Brive, and Paris (the latter from 1672 on). His philosophy textbook was reprinted numerous times in the 17th and 18th centuries; there was a Latin edition and even a French translation of it in the 19th century (Paris, 1865). The 19th century French translation indicates that the work had considerable influence on century Neo-Thomism. See Narciso 1960. I am indebted to the Scholasticon entry on Goudin (www.ulb.ac.be/philo/scholasticon/nomenG.htm#goudin) for this last bibliographical reference.

one in the seventeenth century might have thought was at stake in the opposition between the two great systems (and perhaps also to show some continuity between the seventeenth century views and what we or Gilson might have thought as Thomism and Scotism).

The first six of the Church's theses characterized Thomistic metaphysics. All beings are composed of potential and actual principles, except God, who is pure act, utterly simple, and unlimited. He alone exists independently; other beings are composite and limited. Being is not predicated *univocally* of God and creatures, and divine being is understood *by analogy*. There is a real distinction between essence and existence and between substance and accidents.

We encounter here an important Thomist thesis, with many ramifications, that what we say about God is only by analogy to what we say about creatures. The doctrine complements well Thomas' "anti-Platonist" views that we do not have direct access to God's Ideas or eternal exemplars in this life (as the souls of the blessed do) and that we do not have knowledge of God's essence. This set of theses is also discussed in the first three *quaestiones* of Goudin's *Metaphysica*. In quaest. I, art. 2, Goudin calls act and potency the two chief constitutive principles of being.[37] He then argues at length in quaest. II, art. 2, that being is not said of God and creatures univocally, but analogically,[38] and that being is not univocal with respect to substance and accident.[39] One of the objections handled by Goudin in this article involves the knowledge of God and his attributes; he affirms, in good Thomist fashion, that we have only limited knowledge of God: "the knowledge we have of God is certain, but it does not penetrate perfectly to divine *being* nor to the manner this being is suitable for God; what we know is not much better than negation, insofar as we recognize in God a manner of being much more sublime than that of creatures"[40] Scotus is the target of all of these arguments: "Let us first say that almost all philosophers admit that there is no univocity between a *being* of reason and a real *being*, given that the former is only fictive and assumed. The only difficulty is with respect to God and creatures, substances and accidents. Scotus claims that being is univocal among all of these."[41] Scotus is also the target in Goudin's third article,

[37] Goudin 1726 [1668], *Metaphysica*, quaest. I, art. 2, p. 188.
[38] Goudin 1726 [1668], *Metaphysica*, quaest. I, art. 2, p. 200.
[39] Goudin 1726 [1668], *Metaphysica*, quaest. I, art. 2, p. 203.
[40] Goudin 1726 [1668], *Metaphysica*, quaest. I, art. 2, p. 207.
[41] Goudin 1726 [1668], *Metaphysica*, quaest. I, art. 2, p. 200.

about the distinction between essence and existence: "The only question is whether essence and existence are really distinct. Most philosophers deny it; Saint Thomas affirms it wisely. Scotus holds that the distinction arises from the difference between the form and the nature of the thing."[42]

As we have just discussed, implied in this set of theses is a theory of distinctions in which there can be only two kinds of distinctions: real and rational. Goudin's discussion also continues in this manner: quaest. III, art. 2, concerns various kinds of distinctions. Goudin pits Scotus' view that there is a formal distinction, operating before the operation of the intellect, and holding according to the nature of the thing, against "Saint Thomas' opinion, held universally" that in such cases "there is only one and the same entity conceived diversely."[43]

The seventh Thomist thesis asserts that spiritual creatures are composed of essence and existence and substance and accident, but not matter and form. This is a transitional thesis, mostly about angels, that was also disputed, along with their individuation, manner of cognition, volition, and their ability to effect changes in creatures. Goudin discusses some of these issues, but does not specifically contrast the Thomist position against the Scotist one.[44]

Theses 8–14 treat corporeal beings. They are composite, that is, constituted of matter and form, meaning potency and act, neither of which may exist *per se*—Goudin argues that what is changed cannot be absolutely simple but must necessarily be composed of potency and act.[45] Bodies are extended in space and subject to quantification; quantified (or *signate*) matter is the principle of individuation. Bodies can be in only one place at a time. There are animate and vegetative souls, which are destroyed at the dissolution of the composite entity.

It happens that all of these theses became the object of intense debate. Goudin, of course, reflects these discussions. He argues that prime matter is pure potency and thus has no existence of itself, against the view that matter and form have each their own proper and partial existence. He relates the latter to the Scotist thesis that existence is not to be distinguished from essence in reality, something he claims to refute in his

[42] Goudin 1726 [1668], *Metaphysica*, quaest. I, art. 2, p. 208.
[43] Goudin 1726 [1668], *Metaphysica*, quaest. I, art. 2, p. 224; see also p. 226.
[44] Goudin 1726 [1668], *Metaphysica* II, quaest. 2, art. 1, pp. 255–257.
[45] Goudin 1726 [1668], *Physica* I, axiom 2, p. 48.

Metaphysica.[46] He tackles the implication of the Thomist doctrine head on. In *Physica* I, disp. 1, quaest II, art. 4 he asks "whether God could create matter without form by his omnipotence." He replies: "Scotus affirms this, as do some authors outside the school of Saint Thomas; Saint Thomas and all Thomists deny it";[47] and he proceeds to defend the Thomist denial. In his *Metaphysica*, quaest III, art. 1, Goudin also defends the Thomist view about the numerical unity and multiplicity of substances: "they arise from matter that connotes quantity. Thus think all Thomists against Scotus."[48] And he rejects Scotus' *haecceity* as the principle of individuation.[49] Moreover, he devotes a lengthy discussion to the topic of "whether the same body can be in several places by way of extension or circumscription, denied by Saint Thomas, Saint Bonaventure, and others, against Scotus."[50]

Theses 15–21 deal with humans more specifically. Human souls are capable of existing apart from their bodies, are created by God, are without parts, and so cannot be disintegrated naturally (that is, they are immortal). They are the immediate source of life, existence, and perfection in human bodies, and are so united to the body as to be its single substantial form. The Thomist theses continue by distinguishing the two faculties of the human soul, cognition and volition, from each other, and sensitive knowledge from intellection. They assert that the proper object of the human intellect, in its state of union with a body, is restricted to "quiddities" (or essences) abstracted from material conditions. For Thomists, volitions are said to be free. It is notable that Goudin finds grounds to dispute with the Scotists even with respect to such seemingly unimportant questions as whether the intellect is nobler than the will.[51]

This set of theses might seem fairly innocuous, but it contains the disputed principle (referred to by Borgia—see chapter 1) of the unity of the human soul, which, it is argued, cannot be composed of a plurality of forms, rational, sensitive, and vegetative, as well as the "empiricist" thesis that the proper object of the human intellect is what is abstracted from material conditions. Goudin reflects these debates as well. He rejects the

[46] Goudin 1726 [1668], *Physica* I, disp. 1, quaest II, art. 2, p. 69.
[47] Goudin 1726 [1668], *Physica* I, disp. 1, quaest II, art. 2, p. 77.
[48] Goudin 1726 [1668], *Metaphysica*, quaest III, art. 1, p. 219.
[49] Goudin 1726 [1668], *Metaphysica*, quaest III, art. 1, p. 221.
[50] Goudin 1726 [1668], *Physica* I, thesis III, quaest. 4, p. 315.
[51] Goudin 1726 [1668], *Physica* IV, quaest IV, art. 3, p. 408.

Scotist opinion about the *form of corporeity* subsisting after death for the Thomist view that in substantial corruption there is resolution to matter deprived of all forms: when a person dies and the rational soul departs, all human accidents perish at the same time and are replaced by similar accidents.[52] Goudin then details a debate between Scotists and Thomists about how qualities are intensified, taking the Thomist side, as usual.[53] And he devotes a whole article against the Ockhamist view of the plurality of forms and the Scotist view on the *form of corporeity*.[54] On the question about the object of the intellect, Goudin is fairly clear: in his *Physics* he states: "the object of the human intellect in its state of life is the quiddity of material or sensible things and what can be deduced out of them. That is the doctrine of Saint Thomas";[55] however, in his *Metaphysics* he further specifies: "the material object of the intellect is real being, created and uncreated, substance and accident, but the formal object of the intellect is the common notion of being abstracted all from matter."[56]

Finally, Thomist theses 22–24 concern knowledge of God. Divine existence is neither intuited nor demonstrable *a priori*, but it is capable of demonstration *a posteriori*. The simplicity of God entails the identity between his essence and his existence. God is creator and first cause of all things in the universe. Goudin comments on Thomas' five *a posteriori* demonstrations for the existence of God and defends them against various objections,[57] including Scotus' objection to the first argument that the power that moves a thing can be located in what is moved.[58]

Clearly the Thomist claim that God is not demonstrable *a priori* is a consequence of the opinion that God's essence cannot be grasped in this life. "Platonists" such as Augustine and Anselm held that the existence of God could be demonstrated *a priori*.

There were other points of disagreement between Thomists and Scotists, some of which played an important role in seventeenth century debates (as already glimpsed in Goudin's exposition), but they but no longer figured as essential to Thomism as defined in 1914. For example, Thomist theory of place required the immobility of the universe

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[52] Goudin 1726 [1668], *Physica* III, quaest I, art. 3, p. 117.
[53] Goudin 1726 [1668], *Physica* III, quaest II, art. 3, pp. 132–133.
[54] Goudin 1726 [1668], *Physica* IV, quaest I, art. 3, pp. 238–246, esp. pp. 243–244.
[55] See Goudin 1726 [1668], *Physica* IV, quaest IV, art. 2, p. 404.
[56] Goudin 1726 [1668], *Metaphysica*, quaest. proem., art. 1, p. 183.
[57] Goudin 1726 [1668], *Metaphysica*, disp II, quaest I, art. 1, pp. 240–252.
[58] Goudin 1726 [1668], *Metaphysica*, disp II, quaest I, art. 1, p. 244.

as a whole as the frame of reference for motion,[59] whereas for Scotists space was radically relative: there is no absolute frame of reference for motion.[60] Similarly, Thomists thought that without motion there would be no time,[61] whereas Scotists thought that time was independent of motion.[62]

Thus we have some clearly defined positions by which we can judge whether a school philosophy that does not openly declare itself as following any particular author might be considered leaning toward Thomism or Scotism. Here is a small sample of some sharp dichotomies from the theological-metaphysical-cosmological side of the curriculum (apart from the constellation dealing with the formal distinction, objective being, and objective concept that we have already mentioned).

Thomas	Scotus
1. The proper object of the human intellect is the quiddity of material being (*quidditas rei materiali*)[63]	1*. The proper object of the human intellect is being in general (*ens in quantum est*)[64]
2. Only analogical predication holds between God and creatures[65]	2*. The concept of being holds univocally between God and creatures[66]
3. Man is a unity of single form (the rational soul)[67]	3*. Man is a composite of a plurality of forms (rational, sensitive, and vegetative souls)[68]
4. Prime matter is pure potency[69]	4*. Prime matter can subsist independently of form by God's omnipotence[70]

[59] Aquinas 1953, *In octo libros De physico auditu sive physicorum Aristotelis commentaria*, IV, lectio 8. See also Goudin 1668, *Physica* I, thesis III, quaest IV, art. 1.
[60] Scotus 1639, *Quaestiones Quodlibetales*, quaest. XII.
[61] Aquinas 1953, *In octo libros De physico auditu sive physicorum Aristotelis commentaria*, IV, lectio 16–17. See also Goudin 1668, *Physica* I, thesis III, quaest III, art. 2.
[62] Scotus, *Quaestiones Quodlibetales*, quaest. XI.
[63] Aquinas 1964–1976 I, quaest. 84, art. 7.
[64] Scotus 1639, *Opus Oxoniense* I, dist. 3, quaest. 3.
[65] Aquinas 1964–1976 I, quaest. 13, art. 5.
[66] Scotus 1639, *Opus Oxoniense*, II, dist. 3, quaest. 2.
[67] Aquinas 1964–1976, I, quaest. 76, art. 3.
[68] Scotus 1639, *Opus Oxoniense*, IV, dist. 11, quaest. 3.
[69] Aquinas 1964–1976, I, quaest. 66, art. 1.
[70] Scotus 1639, *Opus Oxoniense*, II, dist. 12, quaest. 1.

Thomas	Scotus
5. The principle of individuation is signate matter (*materia signata quantitate*)[71]	5*. The principle of individuation is a *haecceity*, or form[72]
6. The immobility of the universe as a whole is the frame of reference for motion[73]	6*. Space is radically relative: there is no absolute frame of reference for motion[74]
7. Without motion there would be no time[75]	7*. Time is independent of motion[76]

If I may be permitted a certain level of generality, the first couple of theses present Scotus' moderate Augustinianism, his commitment to the doctrine that humans have knowledge of infinite being,[77] leading him even to accept the ontological argument in some fashion[78] (as self-evident to us, and not as Thomas would have it,[79] as merely self-evident in itself). Most of the other theses demonstrate Scotus' attachment to the doctrine of God's absolute omnipotence, causing him to reject or modify many propositions he thinks infringe too much upon that omnipotence.

Seventeenth Century Scotism

It thus would seem useful to discuss the destiny of these propositions in the first half of the seventeenth century, that is, to ask whether or not they were generally supported by early modern scholastics.

On the key question of whether the proper object of the human intellect, that which is studied by the science of metaphysics, is the quiddity of material being (with the intellect proceeding up the hierarchy of beings ultimately by analogy alone) or whether it is being in general, Eustachius sides with Scotus (proposition 1*):

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[71] Aquinas 1933, chap. 3.
[72] Scotus 1639, *Opus Oxoniense*, II, dist. 3, quaest. 6.
[73] Aquinas 1953, IV, lectio 8.
[74] Duns Scotus 1639, *Quaestiones Quodlibetales*, quaest. XII.
[75] Aquinas 1953, IV, lectio 16–17.
[76] Scotus 1639, *Quaestiones Quodlibetales*, quaest. XI.
[77] Though also attempting to avoid the extreme Augustinianism of Henry of Ghent. See Gilson's discussion of this issue in Gilson 1952, 116–215.
[78] Scotus 1639, *Opus Oxoniense*, I, dist. 2, quaest. 1 and elsewhere.
[79] Cf. Aquinas 1964–1976, I, quaest. 2, art. 1.

> Philosophers differ on this matter. Some maintain that the object of metaphysics is God, others that it is separate substances, others that it is substance in general, others that it is finite (or so called predicated) being. All these definitions are too narrow, as will appear. Others extend its scope too far, when they say that the object of metaphysics is being taken in the broadest sense, to include both real entities and entities of reason; yet a true and real science, especially the foremost and queen of all the sciences, does not consider such tenuous entities in themselves, only accidentally. So the standard view is far more plausible, namely that the complete object of metaphysics in itself (for our question is not about its partial or incidental object) is real being, complete and in itself, common to God and created things.[80]

Without referring to any particular authority, Eustachius rejects the Thomist position that the object of metaphysics is predicated being. Interestingly, after rejecting another position as too daring, he accepts the Scotist one, that the object of metaphysics is being, common to God and created things, as the standard view. Eustachius also accepts the proposition that God's essence cannot be conceived except as existing:

> Existence belongs to God and to created things, but with a difference. For God exists not through existence being added to his nature, but through his very essence (just as quantity is said to be extended through itself). But this is not true of created things, since their existence is accidental to their essence. Hence existence is essential to God, so that it is a contradiction that he should not exist, but existence is not essential to created things, which can either exist or not exist. Hence the divine nature cannot be conceived except as actually existing; for if it were conceived as not actually existing, there would be something missing in its perfection, which is quite inconsistent with its actual infinity. But the formal or essential concept of a created thing is distinct from its existence.[81]

And, consistently with the two previous passages, he argues that we can form concepts of God's essence in this life (proposition 2*):

> By means of the natural light we can even in this life have imperfect awareness of God, not merely of his existence but even of his essence. For by the power of natural inference we can infer that God is an infinite being, a substance that is uncreated, purest actuality, an absolutely primary cause, supremely good, most high and incomprehensible. All these things belong to God by his very essence, and indeed uniquely, since they cannot belong to any other being. Hence when I grasp in my mind an infinite or uncreated being, or some such, I fashion for myself a concept uniquely applicable to

[80] Eustachius 1629, Metaphysica, Praef. quaest, 2, p. 1. Trans. in ACS p. 92.

[81] Eustachius 1629, Metaphysica, Pars II, Disp. II, quaest. 4, p. 24. Trans. in ACS pp. 95–96.

> God, in virtue of which I have imperfect awareness of his essence. Hence we can in this life form concepts of God which are unique and proper to him.[82]

These passages suggest that Eustachius was structurally or fundamentally Scotist, not Thomist. It would not be difficult to document his support of any of the other Scotist theses—to show that he also accepts the plurality of forms (proposition 3*), for example.[83]

Yet, by themselves, the passages do not show that the intellectual context of early seventeenth-century France was Scotist. For that, one has to compare Eustachius and other French scholastics in the seventeenth century with respect to the key doctrines listed above. I discuss the issues of matter and form in seventeenth century scholasticism (propositions 4* and 5*) in chapter 4. It should suffice here to assert that Eustachius thinks that prime matter can subsist independently of form by God's omnipotence (and so do de Raconis, Dupleix, and others, but not Toletus and the Coimbrans), and that he thinks that the principle of individuation is not signate matter, but a form (the same for de Raconis, Dupleix, and others). What follows is a sample of such comparisons for some issues dealing with space and time (propositions 6, 6* and 7, 7*). Again the pattern is that Jesuits (and Dominicans) generally take Thomas' side, at least in the first half of the century,[84] and the University of Paris doctors usually take Scotus' side.

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[82] Eustachius 1629, Metaphysica, Pars IV, Disp. III, quaest. 1, p. 71. Trans. in ACS p. 96. Eustachius continues, however, by denying that we can demonstrate God's existence a priori, since God is not known to us *per se nota* (quaest. 2, pp. 73–74).

[83] Eustachius 1629, Physica, Pars III, tract. I, disp. 1, quaest. 6, pp. 174–175. It should be noted that Jesuits were specifically required to teach that "there are not several souls in man, intellective, sensitive and vegetative souls, and neither are there two kinds of souls in animals, sensitive and vegetative souls, according Aristotle and the true philosophy," see chapter 1. See also the discussion of what Emily Michael calls "Latin pluralism" in Michael 1997.

[84] The situation, as usual, is more complicated. It might seem that early (perhaps Iberian and Roman) Jesuits were Thomist-leaning, but later (perhaps French) Jesuits were not. (See Ariew 2005.) However, even this conclusion should be qualified. When one reads the *Disputationes Metaphysicae* of the great Jesuit metaphysician Suárez, one is struck by the fact that in general he proceeded by considering issues in the light of his predecessors, especially Thomas and Scotus, and sides with Scotus almost as often as he sides with Thomas, though he also often takes a direction that is his alone. Of course, even when he sides with Thomas or Scotus, he modifies their doctrines significantly. Suárez accepts analogical predication, with Thomas (disp. 28, sec. 3, no. 2) but thinks that a concept of being can be found which is strictly unitary (disp. 2, sec. 3, no. 7) and, thus, he sides with Scotus on this issue: "the proper and adequate formal concept of being as such is one." Suárez adds that this is the common opinion; its defenders are "Scotus and all his

The Relativity of Space and Motion

To comprehend the debates about space one has to understand the context in which these debates were conducted, that is, the Aristotelian theory of place, which was itself developed against the backdrop of Platonic and atomist conceptions of space. Plato in the *Timaeus*[85] held that space is an everlasting receptacle that provides a situation for all things that come into being. It is not clear whether Plato's talk of space as a receptacle entailed its independent existence; according to Aristotle, Plato thought matter and space the same and identified space and place.[86] Aristotle agreed. His primary concept was "place," or location in space, as one might say, space being the aggregate of all places. He defined place as the boundary of a containing body in contact with a contained body that can undergo locomotion. But he also asserted that place is the innermost *motionless* boundary of what contains. Thus, the place of a ship in a river is not defined by the flowing waters, but by the whole river, because the river is motionless as a whole. These definitions gave rise to questions about whether place is itself mobile or immobile. They also engendered a problem about the place of the ultimate containing body, the ultimate sphere of a universe constituted from a finite number of homocentric spheres. If having a place depends on being contained, the ultimate sphere will not have a place since there is no body outside it to contain it. But the ultimate sphere, or heaven, needs to have a place because it rotates, and motion involves change of place. Aristotle recognized these difficulties.[87] In part, his solution was a distinction between place *per se* and place *per accidens*. Place *per se* is the place that bodies capable of

disciples" (disp. 2, sec. 1, no. 9). He accepts the Scotist doctrine of matter existing without form by divine power (this leads him to being listed among the Scotists by the Doctrinaire Jean Vincent—disp. 34, sec. 5, no. 36) but he sides with Thomas on the plurality of forms (disp. 15, sec 10, no. 61). He argues, against both Thomas and Scotus, that the principle of individuation is matter and form (disp. 5, sec. 2, nos. 8–9—rejecting both Thomas' *signate* matter and Scotus' *haecceitas*—disp. 5, sec. 6, no. 15). Most importantly, he argues against Thomas that there is a third distinction other than real and rational (disp. 7, sec. 1, no. 16). He disputes the Thomist doctrine of a real distinction between essence and existence (calling it a distinction of reason with a basis in things) and between substance and accidents (though he rejects the Scotist formal distinction as vague and substitutes instead what he calls a modal distinction—disp. 31, sec. 1, no. 3). Suárez, an important early Iberian Jesuit, seems to have been as much a Scotist as a Thomist (or perhaps may be better understood as neither Thomist nor Scotist).

[85] *Timaeus* 52a–52d.

[86] *Physics*, 209b11–16.

[87] *Physics* 212b7–12.

locomotion or growth must possess. Place *per accidens* is the place that some things possess indirectly, "through things conjoined with them, as the soul and the heaven. Heaven is, in a way, in place, for all its parts are; for on the orb, one part contains another."[88]

Aquinas accepted and modified slightly Aristotle's account of the place of the ultimate sphere; according to him, the parts of the ultimate sphere are not actually in place, but the ultimate sphere is in a place accidentally because of its parts, which are themselves potentially in place.[89] He also rejected Averroes' popular solution to the same problem, that the ultimate sphere is lodged because of its center, which is fixed.[90] The technical vocabulary developed to interpret Aquinas' view was a distinction between material place and formal place (where, in Aquinas' vocabulary, formal place is the real ground or *ratio* of place). Place is then moveable accidentally (as material place) and immovable *per se* (as formal place, defined as the place of a body with respect to the universe as a whole). Thus the ship is formally immobile (with respect to the universe as a whole) when the waters flow around it. We can note that Averroes' view required the immobility of the earth and that Aquinas' view did not, though it did require the immobility of the universe as a whole. However, the Thomist views were not universally accepted, in part because they required the immobility of the universe. This view conflicted with part of the 1277 condemnation of the complex proposition "That God could not move the heavens in a straight line, the reason being that he would then leave a vacuum."

Scotus and Scotists considerably modified Aristotle's and Aquinas' accounts. They rejected the distinction between material and formal place, arguing instead that place is a relation of the containing body with respect to the contained body. Place is then a relative attribute of these bodies. (They also made use of the term *ubi*, sometimes referred to as inner place, to denote the symmetric relation of the contained body with respect to the containing body). Since the relation changes with any change of either the contained body or the containing body—here contained or containing bodies—the place of a body does not remain the same when the matter around it changes, even though the body in question might remain immobile. When a body is in a variable medium,

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[88] Aristotle 1910–1952, *Physics* IV, chap. 5 (212b12–14).

[89] Aquinas 1953, IV, lectio 7, and *De Natura Loci*, Opusc. LII of Aquinas 1954. See also Duhem 1985, chap. 4–6.

[90] Aquinas 1953, IV, lectio 8, and *De Natura Loci*, Opusc. LII of Aquinas 1954.

the body is in one place at an instant and in another at an other instant; to capture what is meant by the immobility of place, Scotists said that these two places are distinct but *equivalent places* from the view of local motion.[91] On the question of the ultimate sphere, Scotus denied both Averroes' and Aquinas' solutions, claiming that heaven can rotate even though no body contained it and could rotate even if it contained no body; it could rotate even if it were formed out of a single homogeneous sphere. (Scotus even denied that the Empyrean heaven could have lodged the ultimate sphere.)[92]

The seventeenth century discussions of the two questions about the immobility of place and the place of the ultimate sphere generally followed the expected pattern. Toletus, for example, took Aquinas' side against Scotus on the question of the immobility of place.[93] So did Théophraste Bouju, who also kept some Averroist elements. Bouju asserted that place is moveable *per se* in what he called "lieu de situation" and *per accidens* in what he called "lieu environnant":

> The earth … is in a *lieu environnant* and can also be said to be in a *lieu de situation* with respect to the poles of the world. But it cannot change place with respect to its totality; thus it is immobile in that respect and mobile only with respect to some parts that can be separated from the totality and moved into others. The firmament is also in a *lieu de situation* with respect to the earth, but it cannot change except with respect to its parts and not in its totality, in the fashion of the earth.[94]

Eustachius, in contrast, used Scotus' vocabulary: place and *ubi* are relations between the containing and contained bodies, and places are the same *by equivalence*.[95] So did Abra de Raconis, who even attributed the terminology to Scotus.[96] Eustachius also developed, very briefly, some odd views about the place of the ultimate sphere. The place of the

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[91] Duns Scotus 1639, *Quaestiones in librum II Sententiarum*, dist. II, quaest. VI. See also Duhem 1985, chap. 4–6.

[92] Duns Scotus 1639, *Quaestiones Quodlibetales*, quaest. XII.

[93] Toletus 1589, IV, quaest. V: An locus sit immobilis, fol. 120^{r}–121^{r}. Cf. Grant 1976. Here is an abbreviated version of the doctrine, from du Moulin 1644, chap. 9, Du Lieu et du Vide: "Le lieu particulier est la superficie interieure du corps, qui touche prochainement le corps contenu. Ainsi la superficie interieure d'un tonneau est le lieu du vin dont il est plein. Ce lieu est mobile. Mais il y a un lieu immobile, a savoir celuy qui se considere au regard de l'univers."

[94] Bouju 1614, vol. I, pp. 458–459 (chap. VII: Comment le ciel et la terre sont en lieu, et peuvent estre dits se mouvoir de mouvement de lieu); see also vol. I, p. 460 (chap. IX: Que le lieu naturel est immobile).

[95] Eustachius 1629, Physica, tract. III, 2nd disp., quaest. 1, Quid sit locus, pp. 56–58.

[96] Eustachius 1629, Physica IV, tract. II, sec. 3, pp. 205–206.

outermost sphere is internal place or space and external, but imaginary place.[97] This seems to be a seventeenth century development, since Abra de Raconis and others held a similar doctrine. De Raconis discussed two kinds of place, external and internal, external being the surface of the concave ambient body, and internal being the space occupied by the body.[98] The ultimate heaven is in place internally, or occupies a space of three dimensions,[99] given that the external place is the surface of the concave ambient body. "Imaginary place" thus became the standard answer to such questions as to where God could move the universe, if he chose to move it, and what there was before the creation of the universe, that is, before the creation of any corporeal substance. Imaginary places, however, were generally thought of not as real things, independent of body, but on the model of a privation of a measurable thing, like a shadow, given that a privation of a measurable thing can be measured.[100] Similarly,

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[97] Eustachius 1629, Physica, tract. III, 2nd disp., quaest. 2, Quotuplex sit locus, pp. 58–59. For more on imaginary place, see Grant 1981, chap. 6–7. There is a nice rejection of the doctrine of imaginary space on pp. 86–90 of Ceriziers' *Métaphysique* (Ceriziers 1643):

> On ne peut traitter de l'immensité de Dieu, sans toucher quelque chose: par ce mot d'imaginaires on entend un vuide infiny, qu'on feint au dela des cieux, ou l'on place cet estre tout parfait, de peur qu'il ne soit a l'estroit des vastes et larges voutes de l'empyrée. Ceux qui tiennent cette opinion s'appuyent de l'escriture et de la raison; de l'escriture qui assure que Dieu est plus haut que les cieux; de la raison qui ne peut souffrir qu'on limite une essence infinie. Qui ne voit que ce grand Vuide est un estre d'imagination, c'est à dire une chimere? Car ou ces espaces sont quelque chose, ou elles ne sont rien; si elles sont quelque chose de reel, on a tort de les nommer imaginaires; si elles ne sont rien, pourquoy on dit que Dieu est dans le rien? Mais quoy? Sa puissance peut creer un monde hors de celuy-cy, il faut donc qu'il soit dans cet espace, que ce nouveau monde occuperoit: je l'avoue, s'il y a un espace; mais s'il n'y en a point, il n'y est pas: or il n'y a point d'autre espace que celuy que nous y concevons possible: de sorte qu'on ne peut pas dire plus proprement que Dieu y est, que nous dirions qu'il est en ces hommes qui naitront dans le siecle à venir.

Ceriziers' opposition to any God-filled imaginary space is an interesting counterpoint to his (ambiguous) acceptance of the relativity of motion in his *Physics*, p. 91: "Le lieu est donc la superficie du corps, qui nous entoure. D'ou il suit contre l'opinion du vulgaire, que nous pouvons changer de place sans nous remuer; et mesme que nous la changeons aussi souvent, que le vent agite l'air ou l'eau qui nous contient."

[98] The distinction between external and internal place (or space) can also be found in Toletus and the Coimbrans; but they do not use the distinction to resolve the two standard problems about the mobility of place and the place of the universe. For more on internal and external place, see Grant 1981, chap. 2.

[99] *Physica*. IV, tract. II, sec. 1–2, pp. 204–205.

[100] In his article on the void, Eustachius further clarified his notion of imaginary space above the heavens by asserting that it is not a vacuum, properly speaking; Eustachius

it was held that no time elapsed when time and the world began, but that an immense privation of time—an imaginary time—had preceded the creation.

As is often the case, it was Dupleix who stated the contrast most sharply. He held that place is immobile in itself, while bodies change places. He took it that Aquinas had a different opinion, interpreting Aquinas' doctrine of formal place as the view that one can imagine a distance from each place to certain parts of the world, with respect to which a given place, though changeable, may be said to be immobile. Dupleix raged against this doctrine:

> But since all this consists only in useless imaginations, I am surprised that this opinion was received in several schools of philosophy; however, there are so many weak though opinionated brains who follow so closely the doctrine of certain persons that they would follow them right or wrong, and forget the golden sentence of the Philosopher: *I am a friend of Socrates, a friend of Plato, but rather more a friend of truth*. These are, I say, weak minds who resemble certain soldiers who would give such devoted service to a Lord that they would just as soon follow him to an unjust as to a just war.[101]

Dupleix preferred a doctrine that he attributed to Philoponus and Averroes, that when air is blowing around a house, one says that the place of the house changes accidentally. The house is in the same place *by equivalence*.

On the subject of the place of the universe, Dupleix also rejected Aquinas' opinion, which he called completely wrong and a mistake. He said of Aquinas' opinion "Mais c'est abuser et mescompter."[102] Dupleix also held that the heavens do not change place or move locally, since they merely rotate within their own circumference. Ultimately, Gaultruche, a Jesuit, rejected the Thomist doctrine of place, including the Thomist doctrine that the universe cannot move as a whole.[103] As with matter and

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1629, Physica, tract II, 2nd. disp., quaest 5, An motus in vacuo fieri possit, p. 61. See also Leijenhorst 1996.

[101] Dupleix 1990, pp. 149–150.

[102] Dupleix 1990, p. 153.

[103] Gaultruche 1665, vol. II, p. 331: "notabis vero 5. contra Thomistas; Perinde esse, an puncta illa distantiae sint realia, an solium fictitia et imaginaria. Nam saltem sunt virtualiter realia, quatenus idem per ea praestari potest, quod per realia formaliter. Atque hujusmodi quidem assignari possunt in iis spatiis, quae per imaginationem finguntur a nobis existere supra caelos. Prob. Quia mundus universus potest divinitus moveri sursum, aut deorsum motu recto; quo in casu mutaret locum; et consequenter mataret etiam aliquas id genus distantias." Lawrence Brockliss thinks that Gaultruche is representative

form, the debate about the concept of place was not completely settled by the second half of the seventeenth century.[104]

In sum, while late scholastics agreed in rejecting the independence of space from body, they disagreed about other important issues. Hidden within the debate between Thomists and Scotists on the question of the mobility/immobility of place and the place of the ultimate sphere were questions about the relativity of motion or reference for motion. Some thinkers supported a Thomist doctrine in which the motion of a body is referred to its place, conceived as its relation to the universe as a whole, a universe which is necessarily immobile; others supported a Scotist doctrine in which the motion of an object is referred to its place, conceived as a purely relational property of bodies.

The Ideality of Time

In somewhat the same way as space, the concept of time involved questions about whether it is dependent or independent of bodies, whether it is mind-dependent, and whether there is an absolute reference for it or it is radically relative. One can find disagreement over such issues at the start of the seventeenth century. Many Aristotelians thought time dependent on bodies, but not mind-dependent. Others sided with Augustine, thinking it independent of the motion of bodies.

For Aristotle, time is the "number" of motion, that is to say, time is the enumeration of motion. There cannot be any time without there being some change; we measure motion by time and time by motion. Consequently, there are as many times as there are motions and all are able to serve as the definition of time. However, the choice of a motion

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of French Jesuits and argues that French Jesuits were not always strongly aligned with Thomism (Brockliss, 1992 and 1995); he may be right. However, I think the evidence supports a developmental thesis. The one French Jesuit author of a textbook before 1665, Ceriziers, holds various Thomistic doctrines which Gaultruche will reject, including that no matter can be without form (though with a modification): "on ne doit pas pourtant nier que Dieu ne puisse conserver la matière sans aucune forme, puis que ce sont deux estres distinguez, qui ne dependent pas d'avantage l'un de l'autre, que l'accident de la substance, qui se voit separé d'elle dans l'eucharistie" (pp. 51–52).

[104] Although Scotists such as Frassen seem to have had the best of the argument (Frassen 1686, pp. 357) and others such as Barbay and the Jesuit Vincent opted for the middle ground (Barbay 1676, pp. 261–272; Vincent 1660, vol. 2, pp. 847–925), some Thomists resolutely maintained their position (Goudin 1727 [1668], vol. 2, pp. 310–311; 1864, vol. 2, pp. 504–506).

to measure time is not arbitrary. Although Aristotle thought that time has no reality outside of the motion it measures—"the before and after are attributes of movement, and time is these *qua* numerable"[105]—he did not think that time has no reality outside of the measurer of the motion.

Thomas seems to have accepted the Aristotelian doctrine that without motion there would be no time,[106] but Scotus rejected many elements of Aristotle's doctrine; inspired by Augustine's theory of time, Scotus argued that even if all motion were to stop, time would still exist and would measure the universal rest.[107] The standard late scholastic view seems to have been that time began with the motion of the heavens and will end with it also. Toletus argued a Thomistic line that if there is no motion, there is no generation or time;[108] on the other hand, Eustachius argued for what may have been the successor to the Scotist line: time is divisible into real time and imaginary time, where imaginary time is that which we imagine precedes the creation of the world.[109] And Dupleix referred favorably to Augustine's account of time and talked of time measuring both motion and rest.[110] René de Ceriziers summed up the apparent consensus about time in seventeenth century scholasticism:

> Aristotle claims that time is the number of motion or of its parts, insofar as they succeed one another. Now it is certain that time is a work of our mind, since we construct a separated quantity from a continuous one, naming it the number of motion, that is, of the parts that we designate in it. There are

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[105] *Physics* IV, chap. 14, 223a28–29.

[106] "Quod tempus non sit motus neque sit sine motu," Aquinas 1953, IV, lectio 16, and "quod tempus sequitur motum," lectio 17.

[107] Scotus 1639, *Quaestiones Quodlibetales*, quaest. XI. Questions about the relativity of time also gained theological inspiration through the condemnations of 1277, especially the condemnation of the proposition "That if the heaven stood still, fire would not burn flax because God [time?] would not exist." See also Duhem 1985, chap. 7–8. Similar arguments were later propounded by anti-Aristotelians. For example, Bernardino Telesio had asserted that Aristotle was right about the constant conjunction of time and motion, but misunderstood their true relation: "the fact that we always perceive them together is no reason to claim that one of them is the ground of the other, but only, what seems to be the case, that every motion occurs in its own time and that no motion can take place without time" (*De rerum natura* I, 29).

[108] Toletus 1589, IIII, quaest. XII: An tempus sit numerus motus secundum prius, & posterius, fol. 142^{v}–143^{v}.

[109] Eustachius 1629, *Physics*, tract III, quaest. II: Quomodo distinguatur tempus a motu, pp. 63–64. See also Marandé 1642, p. 257: "Le temps imaginaire est celuy que nous figurons auparavant la creation."

[110] Dupleix 1990, pp. 299–303.

> two kinds of time: internal is the duration of each thing or its permanence in being, external is the measure of this duration.[111]

De Ceriziers then discussed a criticism of the argument that time measures rest and is thus not dependent on motion: "rest is to time as darkness is to light; it is even impossible to understand rest except by relation to motion"; but he limited the critique, saying, "there is no being composed out of what is not … One can say that time is composed of instants or parts whose nature consists in existing by fleeing … Time is distinguished from motion and the existence of the being only by the various relations that things have among one another."[112] However, as with the questions about space, the debate about time, whether it is mind-dependent and whether it is dependent on motion, continued into the seventeenth century with the majority supporting a Scotist line and Dominicans such as Goudin supporting the Thomist position.[113]

Descartes' Scotism

A commentator writing about Descartes' scholastic background, detailing Descartes' possible knowledge of fourteenth-century philosophy, concluded that Descartes is "firmly rooted in a Scholastic tradition which is deeply in debt to Duns Scotus."[114] I can only agree. Descartes leans towards Scotism for every one of the Scotist theses, as long as they are at all relevant to his philosophy. It can be argued[115] that Descartes agrees that the proper object of the human intellect is being in general; that the concept of being holds univocally between God and creatures;[116] that

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[111] De Ceriziers 1643, vol. II, p. 100. The same distinction is made in Marandé 1641, p. 256.

[112] De Ceriziers 1643, vol. II, pp. 102–103.

[113] For example, see Frassen 1686 (quoting Scotus), pp. 400–402, and Goudin 1864 (quoting Thomas), vol. 2, pp. 483–485.

[114] Normore 1986, p. 240. The sentence continues: "This makes the problem of Descartes' immediate sources and the question of his originality even more puzzling." In his article, Normore acknowledges the difficulty of comparing Cartesian philosophy to the philosophies of Aquinas and Suárez; because of that difficulty, he proposes to begin in the fourteenth century and work forward, rather than to work backward from Descartes. While I agree with the sentiment expressed, I think that one can progress from Descartes and his contemporaries to his potential sources, given that the fourteenth century doctrines are still alive in seventeenth century scholasticism. I hope to have identified some of the sources to be examined.

[115] Obviously, every one of these propositions might require an extended defence.

[116] See, for example, Vincent Carraud, "Arnauld: From Ockhamism to Cartesianism," in

extension subsists independently of any form; that the principle of individuation is soul, that is, a form;[117] that space is radically relative;[118] and that time is independent of motion[119] (i.e. propositions 1*, 2*, 4*, 5*, 6*, and 7*). Proposition 3*, on the plurality of forms, is moot, since for Descartes there is only one kind of form, mind; however, given that that form informs another substance, extension, Descartes still has Scotistic-type problems about the unity of man. Descartes, of course, also accepts the ontological argument and thinks that objective being requires a formal cause of its existence.

As Dalbiez stated, Descartes could have become aware of Scotist doctrines from a number of disparate sources. He could have been exposed to the commentaries of Cajetan in the master sixteenth century edition of Thomas' works. He could have become acquainted with Scotist thought in the very commentaries from which he was taught—after all, they did generally give references to Scotus as an authority before rejecting his views. We should add that Descartes was often in Paris (that center of Scotist thought, we have argued) during the decade between his law degree at Poitier and his long-term retreat to the Netherlands. Moreover, Descartes frequented Dutch libraries in which he could have read Scotist philosophy: one can find Descartes' name in the student registers of the University of Frankener in 1629; he presumably registered at the University in order to use its facilities. Thus, there are many possible sources for any Scotism in Descartes' thought. Finally, we should emphasize that Descartes read Eustachius (and looked at de Raconis) in 1640. This is surely relevant to understanding any change in his thought before and after 1640—from the 1632 *Le monde* to the 1644 *Principia*, let us say.[120]

Ariew and Grene 1995, pp. 110–128. In his article, Carraud compares Arnauld's teaching in 1641 with Descartes' philosophy, especially as it concerns the object of metaphysics and the univocity of being. At the Sorbonne, in 1641, Arnauld taught both propositions 1* and 2*, though he was forced to retract 2*.

[117] See chapter 7.

[118] This is a very complex issue; on the question of the relativity of motion, see Garber 1992, chap. 6, and Des Chene 1995.

[119] Time is a difficult topic in Descartes' philosophy; but what is clear is that "time adds nothing to duration taken in general except a mode of thought," (*Principles* I, art. 57), and duration is a mode of thought or extension. In this way, duration is independent of motion (although there is a dispute about whether motion is independent of duration). Cf. Garber 1992, pp. 173–176.

[120] See chapter 1.

I should return briefly to Gilson in conclusion. The question is, given (what I believe is) very ample evidence of a Scotist climate in seventeenth century philosophy, how did Gilson miss it? First, he was obviously not anticipating great differences in seventeenth century scholasticism; given the dominance of Thomism in Rome during the sixteenth century, he must have expected Catholic schoolmen to follow along. He might not have been sufficiently attuned to differences within the Church (between the Roman Church and the Gallican Church, for example). Gilson thought that Eustachius faithfully summarized the teaching of the schools, but there was no reason to believe that those doctrines were the same in all schools, in the colleges of the University of Paris as well as in the Jesuit colleges (not to mention possible individual differences among philosophers).[121] It would be worthwhile to remember that there were significant cultural and political differences between scholars and teachers of the University of Paris and those of the Jesuit colleges. Throughout the sixteenth and seventeenth centuries the University of Paris feuded with the Jesuits; the University waged three separate legal battles to prevent them from establishing a college in the city. From the 1560s, when Collège Clermont (the Jesuits' main college in Paris) was first established, to their expulsion from France in 1595, to their re-establishment in France (and the subsequent establishment of the Collège de La Flèche in 1604), to the re-establishment of Collège Clermont in 1616—even as late as the mid 1640s—the University tried to stop the Jesuits from teaching in Paris; it even refused to recognize degrees bestowed by them as equivalent to its own degrees for admittance into its graduate faculties of Law, Medicine, and Theology.[122] The cultural opposition between Paris and the Jesuits was just as keen as their legal battles. As J.-R. Armogathe reminds us, Jesuits were foreigners: "in the France of Henry IV, 'modernity' spoke Latin; the use of French was the domain of the 'bons français', who were convinced that what came from beyond the Alps—Jesuits, Italians, Latin—could only ruin the purity of the ancient ways that they wished to preserve or rediscover."[123]

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[121] For an example of an author influenced by Gilson's treatment of Eustachius as a Thomist, please see Carriero 1990, especially the methodological remarks in the Preface, pp. v–ix.

[122] See Douarche 1970.

[123] J.-R. Armogathe, "L'approche lexique en histoire de la philosophie," p. 59 in Fattori 1997.

Political and cultural differences by themselves do not entail directly doctrinal differences. The question about whether Eustachius' philosophy was the same as that of the Jesuits and Thomas might not have needed to be answered as long as Gilson limited himself to collecting various doctrines without actually making any claims about the relationship between Descartes and the scholastics as a whole.

Gilson's expectations might have been reinforced by the resurgence and dominance of Thomism for Catholics in the late nineteenth and early twentieth centuries (due to the 1878 encyclical *Aeterni Patris* of Leo XIII). In any case, not expecting great differences among seventeenth century scholastics, Gilson did not try to locate any. In the *Index*, Gilson did not generally quote Eustachius and Thomas and the Jesuits on the same topics. And when he did, it was usually on different aspects of the issue. Given the passages Gilson does quote in the *Index*, it would be difficult to determine that the philosophers cited held conflicting opinions (even if one can sometimes sense their divergences). Had he probed deeper, Gilson would have found that he was right in saying that Eustachius "faithfully summarizes scholastic teaching," but not in the way he meant it. Ironically, Eustachius did faithfully summarize the teaching of the University of Paris, a teaching that leaned toward Scotism rather than Thomism.

APPENDIX

Twenty-Four Theses[124]

1. Potency and act divide being in such a way that whatever exists is either pure act or is necessarily composed of potency and act as its first and intrinsic principles.
2. Act, insofar as it is perfection, is not limited except by potency, which is the capacity for perfection. Therefore, in whatever order act is pure, it exists as unlimited and unique in that same order, but where it is finite and multiple, it comes into true composition with potency.
3. Thus, in the absolute *ratio* of existence itself, God alone subsists; he alone is most simple. All other things that participate in existence have a nature by which existence is constricted and are composed of essence and existence as two really distinct principles.
4. Being, which derives its name from existence, is not predicated univocally of God and creatures—nor merely equivocally—but it is predicated analogically, by an analogy of both attribution and proportionality.
5. There is, moreover, in every creature a real composition of subsisting subject with forms secondarily added, that is, accidents; indeed, this could not be understood unless existence were received in an essence distinct from it.
6. In addition to absolute accident there are accidents that are relative, or "with respect to another." However, "with respect to another" does not signify secondarily something having its own *ratio*, but often has a cause in things and therefore a real being distinct from the subject.
7. The spiritual creature is altogether simple in its essence. But there remains in it a dual composition: of essence with existence and of substance with accidents.
8. The corporeal creature, however, is in its own essence composed of potency and act. Such potency and act are designated in the essential order by the names matter and form.
9. Neither of these parts has existence *per se*, nor is produced or destroyed *per se*; nor placed in a category except reductively, as a substantial principle.
10. Although extension into integral parts follows corporeal nature, it is not, however, the same for body to be a substance as to be something quantified. For substance of itself is indivisible, not certainly after the manner of a point, but in the manner of what is outside the order of dimension. Quantity, which makes substance extended, really differs from substance and is truly named accident.
11. Signate or quantified matter is the principle of individuation, that is, numerical distinction (a distinction which is impossible among pure spirits) by which individuals of the same species are distinct from one another.

[124] Sacra Studiorum Congregatio 1914.

12. It is also through quantity that a body is circumscribed in a place, and in this modality, by any means whatsoever, it can be only in one place.
13. Bodies are divided into two: some are living and others without life. In living bodies, in order to have intrinsically a moving part and a moved part in the same subject, the substantial form, which is called the soul, requires an organic disposition or heterogeneous parts.
14. Souls of the vegetative and sensitive order neither subsist nor are produced *per se*, but merely exist and are produced as a principle by which the living thing exists and lives. Since they depend entirely on matter, they are accidentally destroyed at the dissolution of the composite thing.
15. On the other hand, the human soul subsists *per se* and is created by God when it can be infused in a sufficiently disposed subject, and it is by nature incorruptible and immortal.
16. This same rational soul is so united to the body as to be its single substantial form. By it man is man, and animal and living, and body, and substance, and being. Soul therefore gives man every essential degree of perfection. It communicates to body the act of existence by which it itself exists.
17. Faculties of a dual order, organic and inorganic, naturally emanate from the human soul. The subject of the former, to which sense belongs, is the composite thing. The subject of the latter is the soul alone. The intellect then is a faculty intrinsically independent of any organ.
18. Intellectuality necessarily follows immateriality, and in such a manner that the degree of intellectuality is in proportion to the remoteness from matter. The adequate subject of the human intellect is being itself. The proper object of the human intellect in the present state of union is restricted to quiddities abstracted from material conditions.
19. We therefore receive knowledge from sensible things. But since no sensible thing is actually intelligible, except for the intellect, which is properly intelligent, we must admit in the soul an active power that abstracts the intelligible forms from the phantasms.
20. Through these species we know the universal directly. We attain the singular by the senses and also by the intellect through conversion to phantasms. We ascend by analogy to knowledge of spiritual things.
21. The will follows, and does not precede the intellect; it necessarily desires what is offered to it as a good which entirely satisfies the appetite; it freely chooses among several goods that are proposed as desirable by this wavering judgment. Choice then follows the last practical judgment; still it is the will that determines it to be the last.
22. We do not know by immediate intuition that God exists, nor can we demonstrate it *a priori*, but we can certainly demonstrate it *a posteriori*, that is by those things that are made, arguing from effect to cause: namely, from the things moved and the impossibility of their own adequate principle of motion to a first unmoved mover; from a process of worldly things and causes subordinate to one another to a first uncaused cause; from corruptible things which can equally be or not be, to the absolutely necessary being; from those things which, according to minor perfections of being, living, and understanding, exist, live, and understand to various degrees, to him

who is maximally intelligent, maximally living, maximally being; and finally, from the order of the universe to the separate intellect who has ordered and disposed, and directs these things to their end.

23. The divine essence is well proposed to us as constituted in its metaphysical concept by its identity with the exercised actuality of its existence, or in other terms, as the very subsisting being, and by the same token exhibits to us the *ratio* of its infinity in perfection.
24. By the very purity of his being, God is therefore distinguished from all finite things. Hence in the first place it is inferred that the world could not have proceeded except through creation by God; secondly, that the creative power which directly effects being as being cannot be communicated even miraculously to any finite nature; and finally, that no created agent exercises any influence on the being of any effect unless through a motion received from the first cause.

CHAPTER THREE

IDEAS, BEFORE AND AFTER DESCARTES

What John Locke called "the new way of ideas" governed philosophy for more than a century, years that were both fruitful and fateful in the history of philosophy. So central were "ideas" to the philosophy of this period that Arnauld and Nicole could write at the head of the first chapter of their widely adopted *Logic*: "Some words are so clear that they cannot be explained by others, for none are more clear or more simple. 'Idea' is such a word. All that can be done to avoid mistakes in using such a word is to indicate the incorrect interpretations of which it is susceptible."[1] Now the *Port Royal Logic* was more than a "logic"; it was the first standard text of modern philosophical method. What was the concept intended by this "clear" and "simple" word? And in particular, we want to ask, what was the historical context in which this seemingly perspicuous term took hold? In other words, where did the "new way of ideas" come from?

Traditionally, the term in its authoritative modern sense is attributed to Descartes. Thus, for example, L.J. Beck wrote of Descartes' usage: "It is notorious that Descartes' use of the word 'idea' is peculiar to himself in that previously the term was used to describe the Ideas of Plato and had no current usage in the terminology of the Schools."[2] And Descartes himself gives a similar impression, when he tells Hobbes: "I used the word 'idea' because it was the standard philosophical term used to refer to the forms of perception belonging to the divine mind, even though we recognize that God does not possess any corporeal imagination. And besides, there was not any more appropriate term at my

[1] Arnauld 1964, p. 31.

[2] Beck 1965, p. 151. Beck states that "for once he [Descartes] also invents a new technical terminology"; he continues by asserting that "the term itself and its usage was taken up by Gassendi and spread into England with Locke." For more on "idea" in Locke and British philosophy, see R. Hall, "*Idea* in Locke's Works," and John W. Yolton, "The Term *Idea* in Seventeenth and Eighteenth-Century British Philosophy," in M. Fattori and M.L. Bianchi 1990, pp. 255–264 and 237–254.

disposal."[3] This remark certainly seems to confirm a reading like Beck's.[4] Descartes says he is borrowing a term used to refer to God's ideas (the post-Augustinian heir of the Platonic or neo-Platonic "idea"), and (as he remarks elsewhere), using it more generally for "everything which is in our mind when we conceive something, no matter how we conceive it."[5]

Ideas, in and before Descartes

What we want to do here is to challenge the standard reading of this situation and, *a fortiori*, expand the Cartesian account. We want to ask how the term "idea" was used in the seventeenth century before Descartes and to consider in the light of this evidence both the possible sources for Descartes' usage and the true originality in his conception.

First, then, was the term "idea" current in the seventeenth century and how was it used? Two rather different contexts must be distinguished. There was a novel usage in French and English literature which is quite unequivocal, and a more obscure and ambiguous complex of philosophical definitions.

In the literary usage, "idea" refers to images, usually derived from sense. This is clear from dictionaries of the period. Jean Nicot, for example, in his 1606 *Trésor de la langue française tant ancienne que moderne*, defines ideas as follows: "*Ideas* are imaginations that people construct in their thoughts: *Ideae, idearum*. These are also the images of things that are impressed on our soul. Platonists say that there are some eternal models and portraits of all things in God, which they call ideas."[6] Modern dictionaries of this period also give the term its image-related sense. Thus Huguet's dictionary of sixteenth century French gives image as the first meaning, with a passage from Rabelais (III, 10): "Puys nous demanda: Que vous semble de ceste imaige?—C'est (respondit Pantagruel) la ressemblance d'un pape … Vous dictez bien (dist Homenaz).

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[3] AT VII, 181. CSM II, 127–128. We wish to restrict our discussion of idea in Descartes to this later conception; there is in Descartes an earlier conception of *corporeal ideas*. For a discussion of the earlier concept, see Michael and Michael 1989. See also Armogathe, "Sémanthèse d'*idée/idea* chez Descartes," in M. Fattori and M.L. Bianchi 1990, pp. 187–205, for the different senses of idée/idea in Descartes.

[4] Though not everybody accepted Beck's reading; see, for example, Urmson 1967, vol. IV, pp. 118–121.

[5] AT III, 393; CSMK, 185.

[6] Nicot 1606.

C' est l' idee de celluy Dieu de bien en terre, la venue duquel nous attendons devotement."[7] The *Dictionnaire Robert* lists the meaning of "representation" as beginning in the seventeenth century.[8] A similar use is given in the *Oxford English Dictionary* as current from the late sixteenth century.[9] Dictionaries of earlier usage, on the other hand, such as F. Godefroy's *Dictionnaire de l' Ancienne Langue Française et de tous ses dialectes du IXe au XVe siècle*, have no entry for "idée" whatsoever. By the end of the seventeenth century, of course, the Cartesian conception itself has entered into lexical accounts, as for example in Furetière's *Dictionnaire Universel*, where the second of five meanings includes an explicit reference to Descartes' usage.[10]

It is, then, clearly in accordance with this new literary usage that Descartes calls ideas in Meditation III "as it were images of things." No wonder Hobbes took him to be following the doctrine in which ideas were identified with images. At the same time, of course, Descartes' statement to Hobbes also suggests his opposition to this equation; he used the word that people employed to designate the concepts in God's mind, although God has no corporeal imagination. Our ideas, like God's, are concepts, mental acts or mental contents, but decidedly not images. Other passages explicitly stress this difference, as against the Hobbesian (or Gassendist) identification of idea and image. Thus, for example, in July 1641, Descartes writes to Mersenne: "... by 'idea' I do not just mean the images depicted in the imagination; indeed, in so far as these images

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[7] Huguet 1949, IV, p. 536. Huguet also quotes Palissy, Aubigné, de Cornu, Montaigne, and de Sales using *idée* as image. He also gives as second meaning "Modèle, type parfait, idéal."

[8] Robert 1953, III, p. 575.

[9] *Oxford English Dictionary*, III, p. 614, col a. The *OED* also gives "idea" its meaning of image from at least 1589. Classical Latin dictionaries do not list *idea* at all, even though the term can be found in Seneca. *Smith's Smaller Latin-English Dictionary*, a later-classical and medieval-leaning dictionary, does list *idea*, but as Platonic idea or archetype, referring to Seneca's *Epistles*.

[10] Furetière 1690, II: "Idée, se dit aussi des connaissances que l' esprit acquiert par le rapport & l' assemblage de plusieurs choses qui ont passé par les sens. Descartes prouve nettement la necessité de l' existence de Dieu par l' idée qu' on se forme naturellement d' un Tout infiniement parfait, dont l' existence est une de ses perfections." See also the *Dictionnaire de l' Académie française*, for the now standard different meanings of *idée*. One also senses Descartes' influence in the database of the INaLF, which is predominantly post-Cartesian; see Gérard Gorcy, "*Idée*(s) dans le corpus textuel de l' INaLF du dix-septiéme siècle (1601–1715), Descartes et Malebranche exceptés," in M. Fattori and M.L. Bianchi 1990, pp. 155–186, especially the interesting pre-Cartesian occurrences included on pp. 160, 162–163, 166, 176, and 180.

are in the corporeal imagination, I do not use that term for them at all."[11] And there follows the statement already quoted: "Instead, by the term 'idea' I mean in general everything which is in our mind when we conceive something, no matter how we conceive it."[12] Descartes has been discussing the comments of an unknown correspondent about his use of "idea." He continues:

> But I realize that he is not one of those who think they cannot conceive a thing when they cannot imagine it, as if this were the only way we have of thinking and conceiving. He clearly realized that this was not my opinion, and he showed that it was not his either, since he said himself that God cannot be conceived by the imagination. But if it is not by the imagination that God is conceived, then either one conceives nothing when one speaks of God (which would be a sign of terrible blindness) or one conceives him in another manner; but whatever way we conceive him, we have the idea of him. For we cannot express anything by our words, when we understand what we are saying, without its being certain thereby that we have in us the idea of the thing which is signified by our words.[13]

Thus Descartes appears to be drawing on the current literary usage, in which ideas are not just exemplars in God's mind, but actual psychological events in our minds, while at the same time refusing the identification of idea and image that the new literary sense suggests. So we must ask, further, what sources did Descartes find in the philosophical literature of his own time on which to ground his own usage? Where did the current image-oriented use appear in the philosophical as against the literary works of the period, and on the other hand, how does the conceptual (non-image) use Descartes was to devise relate to the philosophical use of "idea" in general?

We will suggest answers to these questions by referring to a number of early seventeenth-century philosophical writers. Not that Descartes was directly influenced by one or more of them. Even though Descartes read some of the writers at some time in his life, the more important point is that they were well-known thinkers whose terminology would have been familiar to any scholar of the time, whether to Descartes himself or to those in his circle. The main examples we will discuss are four in number, arranged chronologically, differing in their form of exposition and in the professional status of their authors. Three out of

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[11] AT III, 392–393. CSMK, 185.
[12] AT III, 392–393. CSMK, 185.
[13] AT III, 393; CSMK, 185. Cf. AT III, 382; VIII, 1, 21; VII, 67, 139, 165, 179, 180, 185.

the four authors taught at the University of Paris during the first few decades of the seventeenth century, namely, Eustachius a Sancto Paulo, Jean Crassot, and Charles François d'Abra de Raconis; the other was Rudolph Goclenius, the author of a celebrated philosophical dictionary.[14] All these authors will impart some clues to the revised meaning Descartes will initiate.

But first, let us look at a thoroughly traditional text, which will indicate the context or occasion for the discussion of ideas in the philosophical corpus of seventeenth century scholasticism. The following passage, for example, can be found in the 1614 *Corps de Philosophie* of Théophraste Bouju:

> To these four kinds of causes we have just spoken of, the Platonists add a fifth, which they call exemplar or idea; for insofar as God is the universal artisan of all things and only makes things wisely and perfectly, understanding what he makes and why he makes it, there must be ideas, intelligible notions or forms, in his divine understanding, of the things he makes. This exemplary form is also found in the understanding of men; for in this way the natural agent has in himself the natural form by which he produces his effect and renders it similar; similarly the agent who acts through the understanding has in himself the intelligible form of what he wants to do, trying as much as possible to make what he is making resemble it. Thus the doctor tries to introduce health to his patient in accordance with the idea he has of it, and the architect to construct a house materially similar to the one in his thought.[15]

Bouju, sieur de Beaulieu, King's almoner and counselor, is writing an ordinary philosophy textbook in French (for those not comfortable or not educated in the Latin of the schools). His account is entirely traditional.[16] The context in which he discusses ideas is the standard one. He has been enumerating the Aristotelian causes and adds a discussion of "exemplary causation." Ideas are routinely identified with exemplars, that is, either Platonic ideas or ideas in God's mind. And the question

[14] Goclenius has a certain usefulness, since he attempts to summarize as precisely as possible *all* the philosophical distinctions current at the start of the seventeenth century. Thus, we can use him to represent the important doctrines prior to 1613, such as Suárez's (1597), allowing us to concentrate on the milieu at Paris circa 1609 to 1618.

[15] Bouju 1614, vol. I, pp. 297–298 (chap. CXIII: De la cause exemplaire). The talk of exemplar causes as a Platonic fifth kind of cause to be added on to the four Aristotelian causes dates back at least to Seneca, *Epistle* no. 65.

[16] The seventeenth century scholastics Descartes is known to have read in his youth are also fairly traditional. See, for example, the Conimbricences 1596, lib. II, quaest. 3 and 4, and Toletus 1589, lib. II, cap. 3, quaest. 7.

is whether in serving as models for creation, ideas (as exemplars) *cause* the things that imitate them in some fifth way. Further, the architect in building a house tries to make it like the one "he has in his mind," the physician has an idea of health, and so on. Now this sounds at first glance very like the psychological meaning of idea that we have discussed in the literary usage of the period. Granted, the physician's idea of health is perhaps not an image, but it is surely something psychological. It soon emerges, however, that Bouju is chiefly echoing a well established Scholastic-Aristotelian tradition, in which ideas are either the forms in God's mind according to which he makes things, or the exemplars in artificers' minds when they make their objects, houses, statues, or paintings. Ideas as exemplars, however, are not strictly psychological, like Rabelais' or Hobbes' images. They are forms which are general, not particular, patterns to be followed in this or that case, rather than particular mental events. Thus, still discussing the question of causality, Bouju continues:

> But this cause is not of another kind than the four we have posited, since, according to the opinion of most philosophers, it reduces to the formal separated and external cause; as the thing is determined and derives its specific perfection from the form which is part of the composite and its internal cause, so also, in the same way the work (*effet*) of the artisan is in its way determined according to its particular perfection through the exemplar that resides in his mind, to which he refers when making the artificial thing by introducing something similar in it.[17]

Bouju's argument echoes Thomistic usage: "Ideas are exemplars existing in the divine mind, as is clear from St. Augustine. But God has the proper exemplars of all the things that He knows; and therefore He has ideas of all things known by Him."[18] This is of course the standard sense Descartes

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[17] Bouju 1614, vol. I, pp. 297–298. Scotus, in his well-known question on the existence of God, resolved the issue by asserting that exemplar causes are efficient causes: "the causality of an exemplar, which is added, is not a different kind of causality than efficient, since there would then be five types of causes. And so the exemplar cause is some kind of efficient cause, which acts through the intellect as distinct from acting through nature." Scotus 1639, *Opus Oxoniense*, book I, dist. II, quaest. 1 & 2; also *Opus Oxoniense*, book I, dist. 36, quaest. unica.

[18] Aquinas 1964–1976, I, quaest. 15, art. 3 (Aquinas 1945, p. 166); See also Jordan 1984 and R. Busa, S.J., "*Idea* negli scritti di Tommaso d' Aquino," in M. Fattori and M.L. Bianchi 1990, pp. 63–88. Interestingly, by the start of the seventeenth century, the ideas in God's mind include ideas of things that will never be produced: "Mais Dieu estant infiny il y a en soy des idées d' une infinité de choses, lesquelles ne seront jamais idées pratiques, parce qu' il ne produira point des choses respondantes à icelles," Dupleix 1992, p. 189.

is referring to in his reply to Hobbes. Earlier in the same passage St. Thomas had extended the reference to the natural (and artifactual), as well as the divine. He begins, as usual, with the divine mind:

> It is necessary to posit ideas in the divine mind. For the Greek word *Idea* is in Latin *Forma*. Hence by ideas are understood the forms of things, existing apart from the things themselves. Now the form of anything, existing apart from the thing itself, can be for one of two ends; either to be the exemplar of that of which it is called the form, or to be the principle of the knowledge of that thing, according as the forms of knowable things are said to be in him who knows them. In either case we must posit ideas.[19]

Similarly, "the likeness of a house pre-exists in the mind of the builder. And this may be called the idea of the house, since the builder intends to build the house like the form conceived in his mind."[20] Here, as for Bouju, the idea that is "in the mind" is rather a form than a particular mental act. It is an analog of the patterns in God's mind, where ideas primarily exist.

That there are exemplars in God's mind raises an important side issue: whether the intellectual soul knows material things in the eternal exemplars. Aquinas cites as an objection what might be thought to be the standard scholastic position, that the soul does not know the eternal exemplars because it does not know God, in whom the eternal exemplars exist, and that the eternal exemplars are known through creatures, and not the converse. He also objects that if we say that the intellectual soul knows all things in the eternal exemplars (knows as "principle of knowledge," not as "object"), we return to Plato's opinion that all knowledge is derived from the exemplars (assuming, with Aquinas, following Augustine, that the Platonic forms are permanent exemplars in the mind of God). Aquinas denies the objections and asserts that the intellectual soul knows all truths in the eternal exemplars, distinguishing between the soul in its present state of life, which cannot see all things in the eternal exemplars, and the blessed, who see God and all things in him, and thus know all things in the eternal exemplars.[21] Bouju follows Aquinas:

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[19] Aquinas 1964–1976, I, quaest. 15, art. 1 (Aquinas 1945, pp. 161–162).

[20] Aquinas 1945, p. 162.

[21] Aquinas also asserts that there is a sense in which the human soul, even in its present state, knows all things in the eternal exemplars, since we know all things by participation in the exemplars: "For the intellectual light itself, which is in us, is nothing other than a participated likeness of the uncreated light in which are contained the eternal exemplars," 1964–1976, I, quaest. 84, art. 5 (Aquinas 1945, pp. 389–392).

> Some have wanted to say that things are true insofar as they resemble and are in conformity with the idea of their essence and nature which is in God. To this I respond that there is no doubt that true things are in conformity with ideas which are in the divine understanding; but it is not there that we must refer the proofs of human knowledge according to the reasons of philosophy, that is, to know whether something is true; otherwise, we would never have any certainty, given that it is outside our power to know these ideas during this life.[22]

Bouju gives us an instance of a standard approach to the nature of ideas with no hint of a new, psychological sense. On the other hand, the four authors we will now consider do suggest, in various ways, a revision of the traditional meaning of the term.

The first instance of the psychological usage in the philosophical literature seems to occur in the first part of the *Physics* of Eustachius de Sancto Paulo, *Physics* being the third part of his *Summa Philosophica Quadripartita*. Eustachius was educated at the University of Paris, receiving his doctorate from the Sorbonne in 1604. Like Bouju, he is also writing an ordinary philosophy textbook, but one in Latin, instead of in the vernacular. When Descartes needed a concise textbook in philosophy, in order to review school philosophy and to compare it to his own, he made use of Eustachius' *Summa*, subsequently calling it the best book of that kind ever written.[23]

As was customary, *idea* is taken by Eustachius to be synonymous with *exemplar*, and exemplars are discussed under the topic of causation, corresponding to Aristotle's analysis in Book II of his *Physics*. The question is, whether exemplary causes constitute a fifth class in addition to the canonical four. Eustachius' answer is that in the case of natural causation exemplary cause may be taken to be a kind of efficient cause, and in the case of an artificer it belongs (more obscurely!) to formal cause. What concerns us here, however, is not this traditional question (which we shall return to in any case in connection with our other examples), but the nature of idea as the equivalent of exemplar. Eustachius writes:

> What the Greeks call Idea the Latins call Exemplar, which is nothing else but the explicit image or species of the thing to be made in the mind of the artificer. Thus the idea or exemplar is in this case some image (*phantasma*)

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[22] Bouju 1914, vol. I, p. 177 (chap. XIII: Que la verité des choses ne nous est point connue par leur rapport aux idées qui sont en l' entendement de Dieu.)

[23] AT III, 231; CSMK, 156.

> or work of imagination (*phantasiae*) in the artificer to which the external work conforms. And so in the artificer insofar as he is an artificer there are two internal principles of operation, namely the art in his mind or reason and the idea or exemplar in his imagination (*phantasia*). Art is a certain disposition, but idea is a certain act or concept represented by the mind. So, the mind first represents a copy of the thing to be made through art, then it contemplates what it has represented, and directs the external work to its likeness.[24]

Note that idea here *is* an image—and, what is particularly crucial for the Cartesian reading, it is "an act or explicit concept of the mind." In this brief passage, then, we have the contemporary meaning that Descartes will exploit; idea is as it were an image—expressive of something—something which the mind contemplates. It is both something I do—an act—and something I "see": "*illam expressam intuetur*." What Descartes makes of the "image" part of the story is another question, to which we shall return. In the meantime, let us look at some other versions of the use of exemplar or idea in the same period.

The second case, the *Lexicon* of Goclenius, both echoes the tradition and illustrates the complexity of the issues involved. Goclenius' dictionary was, and still is, a standard source for philosophical usage in the seventeenth century. "Ideas," as we have seen in our previous cases, are identified with exemplars; thus, his dictionary should be consulted under both headings, as well as under the related heading of species, and also under *conceptus*, which, as we have already noticed, is equally important in the Cartesian case. ("Concept" also occurs in our brief citation from Eustachius.)

"Exemplar," Goclenius says, "is twofold, Created and Uncreated. Plato in the *Timaeus*. The uncreated exemplar is the idea in the divine mind. The created exemplar is the universal species caused by the thing. Scotus distinct. 3, bk l. Thus there is a double conformity and a double truth, one conformity to the Created exemplar, the other to the Uncreated."[25] The first, uncreated exemplar, of course, is exactly what Descartes refers to as his precedent for the use of "idea." Note also that truth consists in the conformity of the thing to the exemplar/idea. Although the truth of clear and distinct ideas, for Descartes, will run in the other direction, from ideas to things (a point we will return to later), it is worth

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[24] Eustachius a Sancto Paulo 1609, Physica, Pars III, disp. 1, quaest. III: Quid sit exemplar, & ad quod genus cause revocandum sit, p. 36.

[25] Goclenius 1964, p. 196.

noticing that the close relation Descartes will initiate between ideas and truth does seem to find a precedent here.[26]

The entry for "idea" is long and complex, including a relatively detailed historical section about Plato and Platonic commentators. Two main entries are given, though not really about separate senses of the term:

> 1. [Idea] signifies the species or form, or external reason (*ratio*) of the thing (which is outside the thing). Aug. l. 83. qq. quaest. 46. And thus distinct from the thing. Nor is it the form of the thing, but one of the four causes. [Note the causal context, as with both Eustachius and Bouju.] Its description is general or special. In general the idea is the form or exemplar of the thing, which the maker is contemplating when he makes that which he is aiming at in his mind. Seneca Ep. 66, as the painter has in mind the exemplar of that image which he can or wishes to paint.[27]

At first reading this important passage may sound like the literary usage: the idea would be the image in the painter's mind ("ideas are as it were images of things"). However, what the painter has in mind is the *exemplar* of the image: that is, the species or form—the *eidos* (the Greek equivalent of species, identified as such by Goclenius under that heading).[28] And the "image" here is of course the painting—nothing mental at all, but the actual object that the painter "can or wishes to produce," itself a copy of the idea, its model. Thus the idea here, far from being the particular image in the artist's imagination, is its very contrary: the image is the product, and the idea is the object to be imitated in that productive process. More surprisingly, in Seneca's account—which will be echoed, though not referred to, in our next example—it is the actual, real-life model that *is* the *idea* on which the painter bases his image, in this case, his portrait. Thus in Seneca's account, the artist is painting Virgil, and Virgil himself, the poet in the flesh, is the model = exemplar = idea. Thus Seneca's

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[26] As it did, in a limited fashion, with Aquinas and Bouju. Eustachius' view is discussed by Armour in 1993, sect. 2, pp. 4–14.

[27] Goclenius 1964, p. 208.

[28] Peter Dear quotes an interesting passage from Fonseca, the main Coimbran and Aristotelian commentator in his own right, about the indifference of translating "*idea*" as "*forma*" or "*species*"; Fonseca remarks that "truly, dialecticians are not so much hampered by a religion of words," *Institutiones*, p. 54, as quoted in Dear 1988, p. 21. Fonseca is obviously a good source for discussions of such terms. In fact, there is a recent article by Norman Wells (1993, pp. 513–535), treating Descartes in the context of Fonseca and Suárez. In most respects, this article is complementary to ours, except insofar as Wells claims that Descartes thinks of idea as a form, citing his reply to Arnauld (AT VII, 232). However, Wells' evidence is not conclusive; in *Replies IV*, Descartes seems to be adopting what he thinks would be Arnauld's vocabulary and drawing out its consequences, not committing himself to ideas being some kind of form.

discussion of ideas, which seems to have been a standard source,[29] entails a dramatic reversal of the original Platonic conception. Rather than serving as other-worldly models for their real-world imitators, "ideas" become real-world models for the artist's use. At the same time, every account of ideas does retain enough of Plato's conception (exemplified in the *Timaeus*), to make ideas in God's mind the models of creation, themselves the primary reality, in imitation of which particular things are made. What Seneca's account, and here Goclenius', seem to be drawing on, then, is the analogy between ideas in God's mind, the exemplars for his creation, and forms in the created world, the exemplars which the artist's work imitates. God makes things that imitate His ideas, and the artist in turn makes imitations of those created realities. "Things" are images of God's ideas, while the images made by artificers imitate *those* images. The psychological act by which the artist understands, or "sees," an image *of* his eventual work is simply omitted from this account.

So much for the first account of idea "in general." Goclenius continues: "Specifically, or in particular, [the idea is] the form, or the rationale (*ratio*) of the thing, in the divine mind, eternal and immutable, which he envisages when he makes something similar to it. This is suitable only for God. Or it is the divine essence itself as known by God, as that according to the likeness or imitation of which each thing itself is produced, and in which also the thing as in its eminent exemplar is known by God."[30]

Goclenius asserts further that the essence of God is "both the principle and the object of knowledge." He explains what he means by this:

> The principle and objective knowledge of a thing is that in which the thing is known as in its likeness. For it is fitting that there be some similarity between the idea and the thing … Thus the idea is the principle of operation in the fashion of an exemplar, since the thing is to be made in its likeness … And the idea is in the divine or created mind.[31]

All this supports the traditional conception Descartes claims to be relying on. The signal exception is that Descartes seems to have had no interest in the created as against the non-created context. The case of the artist does not seem to have interested him.[32]

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[29] See, in particular, Panofsky 1968.

[30] Goclenius 1964, pp. 208–209.

[31] Goclenius 1964, p. 209.

[32] Gassendi, who clearly knows the tradition, tries to get Descartes' reaction to it, referring to a painter who is the cause of the image displayed on the canvas (AT VII, 289) and an architect who makes up an idea of a house in his mind (AT VII, 298). This does not elicit much of a response from Descartes; see AT VII, 369.

To return to Goclenius: he adds a second, briefer account of idea: "What idea is: 1. Idea is the architectural rationale (*ratio architectatrix*) in the mind of the maker, that is, the reason according to which the fabrication is carried out."[33] Note that this is, once more, not so much a particular psychological act on the part of the maker, as it is a model, a norm: an exemplar, to which his product is to conform. Goclenius continues:

> It is therefore a relative Being, that is, the essence of the idea is said to consist in its relation to something else, or to be referred to something else, that is, to be the exemplar of something else or its archetype. Thus both the first idea and the first exemplar are called *archetypon* exemplar.
>
> The first idea, or first exemplar, is sometimes accepted as a thing subsisting in itself, as when the idea of the World is said to be sempiternal, where the sempiternal and immutable wisdom and reason of God, by which he makes the world, is understood, that is, God himself. The Platonists call the world *noeton*, that is, intelligible, most remote from our eyes, to which they oppose the sensible world, which we inhabit.[34]

This appears overall to repeat the traditional more or less Platonic view. Moreover, it confirms Descartes' intention of separating ideas from sense. Ideas are intelligible and other than what is sensed. That may be why the notion of idea as God's concepts was a useful source for him, since God is non-corporeal and thinks without sensing. So far, again, this is far from the identification of idea with (sensible) image that Hobbes and Gassendi favor.

Finally, let us look at Goclenius' entries under species and concept. Species or *eidos*, that is, form, is given eight meanings, of which the most important for our purposes is the third: "species is taken from the image, whether conceived in the mind, 1 de anima chap. 12, or pictured or carved by the artificer, whether it is empty, or representing or expressing a true thing."[35] Here, as in Eustachius, we find, at least in part, an identification of idea with (psychological) image: "the image conceived in the mind." But the image here is *either* made or carved, *or* imagined: "conceived in the mind." Thus we seem to have two meanings in one: the psychological one common in literature, where *eidos* is the artist's mental image (or conception), and the more realistic sense in

[33] Goclenius 1964, p. 209.
[34] Goclenius 1964, p. 209.
[35] Goclenius 1964, p. 1068.

which the image is what the artist produces—painting or statue—as a copy of an external entity. (It may even be empty; suggesting a place for imaginary entities as the products of the artist's work; he may paint a chimera or carve a hydra.) In any event we have here a second occurrence in the philosophical literature of the psychologized "idea" on which Descartes was to build his conception.

Additionally, attention should be drawn to Goclenius' definition of "concept" (*conceptus*). Except for the indirect link from exemplar to species, then to idea, and finally to species as *mente concepta*, there is no immediate connection here with Descartes' idea as "anything the mind can conceive." Nevertheless, Goclenius' definition is significant for Cartesian usage, especially because of his distinction between formal and objective concepts (reminiscent of Descartes' formal and objective reality applied to ideas in Meditation III). Goclenius writes: "*Concept* is not used univocally by the Scholastics. In one way Concept(ion) is, improperly, the act of conceiving or of knowing. In another way it is, *properly* the thing conceived (as object) with the act of knowing, given that it signifies the former and truly connotes the latter, just as *phantasm* signifies chiefly the thing itself seen as particular and connotes the act of imagining."[36]

Descartes' clear and distinct idea seems to conflate these two aspects; it is both the act of thinking and what is thought of *as* the object of thought. But Goclenius goes on to enumerate the two distinctions we just mentioned, which will be important for the Cartesian argument: "The formal concept is that which we form concerning something apprehended by the intellect. The objective concept is the thing which is conceived insofar as it is the object of our formal concept."[37] Indeed, here, Goclenius himself is setting forth the distinction much as Descartes himself will use it. Formally an idea is an act of the mind, but it also exists as content: as the object of the formal act. In Cartesian terms, an idea (or conception) has formal reality as my act of thinking and objective reality as representative of what I am thinking about. (Note, by the way, Goclenius' disagreement with Eustachius. For the former, it is the particular mental act that "idea" or "concept" properly signifies.)

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[36] Goclenius 1964, p. 427.

[37] Goclenius 1964, p. 428. There is, of course, a sizable literature on the objective and formal being of ideas in Descartes and his predecessors, from Etienne Gilson and his critics to the present. For references to this literature, see Marjorie Grene (1991); see also chapter 2.

Goclenius goes on to identify "conception" as synonymous with concept; the latter, he specifies, is either clear or obscure—another celebrated Cartesian distinction—but here that distinction is given a theological reference: "The Scholastics employ this distinction when they deal with the conception of God. For they call the abstractive obscure; that, moreover, is what is made through the species of created things or as it shines in created things: the intuitive indeed, which is as it is in itself, they say is clear."[38] Though applied to the conception of God, not to human conception, this account recalls the "intuition" of Descartes' early *Rules*, the incomplete forerunner of the *Meditations*. Clear and distinct ideas are the successors to intuitions as the units of Cartesian knowledge.[39]

In summary, there are a number of possible sources available here for the Cartesian idea—in the definitions of idea itself as well as in the related terms, species or form and concept or conception. They are not yet molded into the unity Descartes will make of them, nor are those aspects eliminated which he will all but abandon. But there is certainly a rich store of connotations here on which the (relatively) new Cartesian sense of the term could have drawn.

Our third example is from the *Physics* of Jean Crassot. Crassot was a professor of philosophy at the University of Paris; the work we are citing was published posthumously in 1618. He was well known for his lectures, which he presented in outline form, and his published text corresponds to his lecture style. In his discussion of the causes he includes a chapter on exemplars and ideas—here, again, exemplar and idea are linked. Exemplar, he says, "sometimes means specimen and example, sometimes archetype or something in whose likeness something is intentionally worked out."[40] Further, exemplar "is said to be example, type, Idea, *eidos*, but properly idea, exemplar: *eidos*, form, which is copied in accordance with the Idea."[41] Further distinctions follow. Thus: "an exemplar is internal (and formal), like the thought of the king's countenance or external, like the king's countenance."[42]

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[38] Goclenius 1964, p. 428.

[39] A further distinction reminiscent of Descartes' earlier work is that which follows between simple and complex ideas.

[40] Crassot 1618, p. 104.

[41] Crassot 1618, p. 105.

[42] Crassot 1618, p. 105.

This is, once more, the "realistic" idea stemming from Seneca: there it was Virgil who was the model, and in this sense the idea the painter was copying. "It is natural, dianoetic: either efficacious, like a signet ring, or inefficacious, like the countenance of the king"[43]—presumably because the countenance doesn't produce anything.

> It is eternal, like the exemplars of things in the divine mind, or perishable, like the type of the house in the mind of the architect. It is similar in species, like the shape of the king's countenance and the shape of the marble countenance. Or similar only in proportion, like the countenance of the king to the picture, the type of house to the house …

In addition: "An exemplar is Platonic, or not: Platonic is either natural, like the horse itself, or mathematical, like the triangle itself, or artifactual, like the house itself, the shield itself, etc."[44]

The dianoetic exemplar is further specified: "The dianoetic exemplar is the form, which someone imitates … The dianoetic exemplar is strictly an exemplar. But in the very strictest sense, it is that which is dianoetic and objective."[45] Here we have once more a possible source of Cartesian objective reality, this time, as with Goclenius' *conceptus*, specifically a distinction in type of concept. A dianoetic exemplar is "either an *objective* concept, like the king's countenance, or a *formal* concept, like the awareness of the king's countenance in the mind of the painter, or the dianoetic or intelligible *species* such as the *image* of the countenance of the king in the memory of the painter." As with Goclenius, the image sense enters here in the context of *species*, perhaps because the "species," the form without the matter, is what is taken up in perception and lingers as an image in the mind.[46]

The exemplar is also real or intentional, internal or external. Oddly enough, finally, "the thing thought seems to be able to be the exemplar of its future."[47] There is also a reference to God's making the thing itself through his thought. In short, the pair God and the artificer, eternal and perishable, creator and created, seems to be always invoked when exemplars/ideas are spoken of. In Descartes' case, however, as we have already noticed, the artist seems to be dropped.

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[43] Crassot 1618, p. 105.
[44] Crassot 1618, p. 105.
[45] Crassot 1618, pp. 105–106.
[46] Compare with Hobbes, *Leviathan*, part I, chap. 2: "imagination is nothing but decaying sense."
[47] Crassot 1618, p. 106.

The last example is Abra de Raconis. He is another of the authors whose name came up, along with Eustachius a Sancto Paulo, when Descartes wrote to Mersenne about the scholastic texts he might consult when he was considering drawing up a parallel set of principles of their philosophies and his.[48]

As usual, idea is identified with exemplar in the context of a discussion of causality: "exemplar or idea: for these two are the same."[49] And as usual the exemplar is what the artificer imitates "so that he can work according to the laws of his art." Again, also, a distinction is drawn between an external exemplar: "what is set before the eyes of the artist to be imitated," and an internal: "what is formed by the artist in his mind."[50] Some people, Abra asserts, take the exemplar to be only internal, and in this he differs from them. On the existence of the exemplary cause we are given various authorities, and reminded that, as St. Augustine has declared, the exemplar in the divine mind of things to be made is seen only by the blessed. As to exemplars in general, presumably in the finite (human) case, Abra provides a detailed discussion, clearly pertinent for the Cartesian enterprise, as to whether the exemplar consists in the objective or subjective (= formal) concept. Abra favors the former interpretation, which he supports by a number of propositions:

> First proposition
>
> The essential *ratio* of exemplar does not consist in the formal concept …
>
> This is demonstrated by common sense (*communi ratione*). The idea or exemplar is what the artificer contemplates in operating intentionally, as we plainly saw. But the artificer does not operate by contemplating his formal concept, for this inspection is a certain superfluous reflection of the mind, since without it the artificer can operate by contemplating the exemplar itself, or object of his formal concept. Therefore, etc.
>
> Second proposition
>
> The essential *ratio* of the idea or exemplar consists in the objective concept, or in the thing which is its object (*obiicitur*) …
>
> … the exemplar is properly said to be what the artificer contemplates when he operates intentionally; and in fact the artificer operates by contemplating the objective concept of the thing to be made: e.g. the painter

[48] See chapters 1 and 8.
[49] De Raconis 1651, p. 94.
[50] De Raconis 1651, p. 94.

> contemplating the objective concept of the image of Caesar, or the image itself, as it is projected on the mind (*obiicitur*), intends to paint another image similar to that.[51]

Here we meet "image" in both the senses anticipated in Goclenius' exposition: the image to be produced in addition to the image in the painter's mind. Clearly, it is the image itself insofar as it is "*obiicitur*" in the mind, that Descartes will draw on. The act of the maker (in Descartes' case, thinker) is itself representative: it is *of* something reflected in the mind, and in this sense objective.

De Raconis reports and analyses several objections to this view, and appends two further propositions in support of his own position:

> Third proposition
>
> It is not necessary that the exemplar be an objective concept distinct from the objective concept of the thing which is to be made by art; but it can be the concept of the thing itself to be made, known in advance by the artist.[52]

This proposition needs consideration particularly with respect to God's creation of things, since their idea is contained in God's mind, yet they "are not like him, but imitate him only minimally."[53] He creates them through his idea of them, but they do not touch his essence. There follows a fourth proposition:

> It is not necessary that the exemplar be the objective concept of the thing itself that is to be made, but it can be of something else in imitation of which the other thing was made.
>
> It is explained, for example: it can happen that the image of Caesar reflected in the mind (*menti obiecta*) might be the internal exemplar of another similar [thing] to be made, in so far as the painter looks at it assigning it to something similar. Therefore the exemplar can be the objective concept of another thing.[54]

Note the loosening here of the link between the painter's image and the reality. What is objectified in the mind has its own being, apart from Caesar himself, who is being copied. Analogously, the reality of a Cartesian idea, though it is *of* something, is itself a mental existent, not tied to an external reality. *Contra* Caterus (or Aquinas), it has its

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[51] De Raconis 1651, pp. 95–96.
[52] De Raconis 1651, p. 97.
[53] De Raconis 1651, p. 97.
[54] De Raconis 1651, p. 98.

objective as well as its formal being. Finally, like our other writers, Abra de Raconis discusses the relation of exemplar causality to the four causes, and concludes that it is a kind of formal cause, but extrinsic. The exemplar (or idea) is not the "informing form" intrinsic to the thing, but something outside it. Decidedly, however, it is not a fifth cause.

Now this whole context is certainly not Cartesian. Although Descartes will link the objective reality of ideas to his version of the causal principle, it is a question, for him, of how ideas *are* caused, not of how they operate as causes. He does not use the term "exemplar," which suggests the traditional Platonic context, where, as in the *Timaeus*, ideas are models or archetypes for creation. He does use the term "archetype" once, in the Third Meditation argument, when explaining that ideas, even if caused by other ideas, must ultimately be caused by something non-ideal, "which is a copy of the archetype (*instar archetypi*) in which as much formal reality is contained as there is objective reality in the idea."[55] This does indeed echo the traditional theme: if ideas are ultimately caused by things (Descartes' causal principle), those things copy the Ideas in the divine mind, which serve as models for them. But this is a very puzzling passage.[56] In general, however, Idea as model for creation, whether divine or human, is left aside in the Cartesian texts. What is retained is the notion of a mental act that is also (as we would say) intentional. And this Cartesian *leitmotif* does seem to be anticipated in de Raconis' account. The formal act of the mind, the particular thought ("as it were, image"), is *of* the object, though not necessarily of a "real" object, "out there." The object of thought becomes, not necessarily the thing—Virgil, Caesar, the king's countenance—but what my mind seizes on in this thought (or "image") as its object. Thus in discussing ideas, Abra retains the traditional context of exemplary causality, while loosening the link between the formal, intellectual act and its object in a way reminiscent of the Cartesian position to come.

We have been looking at examples of the seventeenth century use of the term "idea," with a view to finding background sources for Descartes' new, or reformed, conception, the idea that, for Arnauld and Nicole

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[55] AT VII, 42. CSM II, 29 translates the passage as "which will be like an archetype which contains formally ⟨and in fact⟩ all the reality ⟨or perfection⟩ which is present only objectively ⟨or representatively⟩ in the idea."

[56] In the passage Descartes seems to be alluding to the tradition about ideas as exemplars—and even to ideas as images—only for the benefit of his audience, who would be well-versed in the tradition. There is no reason to believe that these characteristics would be features of Descartes' ideas.

and their generation, would be self-evidently the unit of philosophical thought. What can we conclude from this brief survey?

First, clearly, Descartes did draw on the current literary usage, in which an idea was a particular occurrent act of thinking, especially of imagination. And he had philosophical precedents for this as well, in writers like Eustachius, Goclenius or Abra de Raconis. "Ideas are as it were images of things": they are mental acts that represent something, whether in the *cogito* my own thinking itself here and now, or, in the Third and Fifth Meditations, God, or, in V and VI respectively, the essence or existence of extended things. Second, by calling on the ideas in *God's* mind as his source (rather than the minds of the painter or sculptor so frequently discussed), he set ideas as psychological free from their link to sensation: we noted earlier the frequent passages in which he insists on this distinction. Third, there is precedent also in the philosophical literature for Descartes' insistence on the truth of ideas. The clear and distinct idea is the proper unit of thought, corresponding to the simple concept of Goclenius, and once we know that God is no deceiver, we can trust such luminous ideas to carry us to truth. Even though, in the terminology of the School, judgment is the formal locus of truth, for Descartes, in the third and fourth Meditations, judgment is the place where we may run the risk of error. It is in the assertion (admittedly through judgment, especially through existential judgments) of our clear and distinct ideas, that, in one firm step after another, we proceed on the road to Cartesian science. Admittedly, Descartes has made an odd twist here in the relation of ideas to truth. In the usual discussion of exemplary (or ideal) causality, it is things that must conform to the idea in the mind of the maker, divine or human. This accords with the account of the *Timaeus*, where Ideas serve as models for things as well as artifacts. The psychological idea, however, the particular mental act, can serve as vehicle for conformity *to* things, rather than, conversely, as the standard to which things conform. Thus the adequation of intellect to things can be transferred from risky judgments to much more reliable clear and distinct ideas. Ideas thus become, in Hamlyn's words,[57] the *atoms of evidence* out of which argument, knowledge, the mind's road to reality, is to be built.

In taking this psychologizing path, however, Descartes seems (with the one exception of the archetype passage already mentioned) to have

[57] As quoted in Marion 1975, p. 135.

canceled out the major context of the traditional doctrine of ideas: the context of archetype or model, where the idea informs its imitations, and gives them, or their "images," such reality as they have. Traditionally, ideas are identified with forms, species (or eide): they have power through a certain agency; they are "efficacious," unlike particular things, which are relatively inert. It is Ideas that, primarily through God's thought (or creation), inform things and make them the things they are. Analogously, though of course in a lesser degree, the artist's mind produces a copy of a reality, itself in turn informed by the divine patterns, the Ideas, in God's mind. But the artist is entirely ignored in Descartes' rendering, and even God as model follower occurs only in that one strange passage in the first proof of God. Nor does Descartes ever speak of "exemplars," which, though synonymous with "ideas," fail to carry the particular, psychological connotation implicit in the newer usage.

Why, we may wonder, did Descartes borrow the term "idea," but remove it almost altogether from its traditional context, and therefore its traditional import? Two reasons may be advanced, one epistemological and one metaphysical. Epistemologically, he was using the notion of God's ideas, which of course are not corporeal, to turn the new psychological meaning *away* from imagination, to pure thought. His professed goal in the *Meditations* was to lead the mind away from the senses.[58] Cartesian ideas, aping God's pure cogitations, are entertained by minds *qua* minds, not by the embodied beings we now are. They are psychological units such as mathematicians employ in thinking through problems: thinking of thousand-sided figures as easily as of triangles and pentagons, which they could, but need not, imagine. Ideas as concepts, whether formal or objective or both in one, are the units by which Descartes (and his heirs) can free pure minding from its childish and scholastic bonds to sense (free it also from the foolish scholastic apparatus of judgments, syllogisms and the like). Ideas, so isolated, thus perform an important epistemological function.

Metaphysically, moreover, when abstracted from their usual embedding in the Aristotelian tradition, they liberate the thinker from the whole rigmarole of form/matter ontology. We have, or enact, ideas of ourselves as thinking, of God as infinite power responsible for our very being through his creation and concurrence, and we have clear and distinct ideas also of matter as simply spread-outness. Thus, except in the case

[58] See Gueroult 1968.

of our odd, if temporary, embodied being as mind × body, we need no substantial forms, no quiddities, no real qualities: none of the rigmarole of Scholastic definition and redefinition, argument pro and con, "more probable" or less probable views on these esoteric matters. Idea as unit of thought, both formal and objective, frees the mind to move ahead in the construction of a science at least morally certain, such as the *Principles* will be meant to instantiate. It is indeed the case that Descartes made a new start in philosophy with his "idea," but it is also clear that he shaped this new conception by using readily available meanings of the term and at the same time purifying them of much of their habitual connotation.

Ideas, after Descartes

During the second half of seventeenth century, Descartes' account of ideas was subject to a great debate between the two most prominent Cartesians, Antoine Arnauld and Nicolas Malebranche.[59] For Malebranche, an idea is an object present in the mind representing the outside world to that mind; for Arnauld, an idea is a mental act, not a representative proxy standing between the perceiver and the outside world.[60] The reception of Descartes' account of ideas is obviously a large and complicated topic with many dimensions to it and, in addition to the Cartesian debate about ideas, it includes also the scholastic critique of the Cartesian accounts. I wish to restrict my discussion here to the relation between the scholastic and Cartesian view of idea and, especially, to the representation of the Cartesian debates in the scholastic critique and Cartesian response to it. The debate is precipitated by Pierre Daniel Huet's assessment of the

[59] When Malebranche published the *Recherche de la vérité*, Arnauld thought it a fine, though somewhat unorthodox, exemplar of Cartesian philosophy. Malebranche then published the *Traité de la nature et de la grâce* and Arnauld changed his mind about Malebranche's *Recherche*, coming to understand that its doctrines would lead to anti-Jansenist views on such issues as grace. Arnauld replied to the *Recherche* with *Des vraies et des fausses idées*, Malebranche replied to the reply, and Arnauld replied to Malebranche's reply and published the *Réflexions philosophiques et theologiques sur le nouveau système de la nature et de la grâce*. The debates continued and involved most of the important thinkers of the late seventeenth century: Leibniz, Bayle, Locke, Foucher, and Desgabets, among others.

[60] See, for example, Nadler 1989. Nadler places Arnauld's account of intentionality within the tradition of late Scholastic doctrines to which they are indebted; he argues that Arnauld's theory more faithfully interprets that of Descartes and provides a foundation for a direct realist theory of perception.

Cartesian view of ideas in his *Censura Philosophia Cartesianae*; it engendered replies by Pierre-Sylvain Régis against Huet, Jean Duhamel in reply to Régis, and Régis in reply to Duhamel.

Huet accuses Descartes of not having had "a sufficiently clear and distinct idea of an idea." In fact, Huet thinks Descartes is equivocal about idea. According to Huet, Descartes retains a Stoic notion of idea as perceptions of our minds or "apprehensions"; he sometimes "would have it that an idea is an action of the mind by which it applies itself to the images of things, or that it is some manner of perceiving." Huet asserts that Descartes sometimes says that

> an idea is an image of the thing itself, not as it is impressed in the fantasy, but in the soul. . . . Elsewhere, however, what he calls an idea is not only the image of particular things, but also a comparison we make of these images, which is a second act of the mind commonly called 'judgment.' Sometimes he also says that that he uses this term for everything we have in our mind, and thus for reasoning, which is a third act of the mind.[61]

So Huet thinks that Descartes' account of idea encompasses: (i) images of things impressed upon the mind, (ii) the perception of these images, that is, an act of the mind, (iii) the comparison of these images or judgment, and (iv) the comparison of these comparisons or reasoning. In the chapter on the existence of God, Huet makes the core of his point more concisely: "the meaning of the term 'idea' is ambiguous; for it picks out either the action of the mind by which we think, or the thing itself that is set before the mind and about which we think."[62]

Régis replies by agreeing in general with Huet. According to Régis, Descartes did not have a distinct idea of idea because "idea" is not known by another idea but by itself. That does not prevent Descartes from having expressed himself sufficiently: Huet understands that Descartes means by "idea" the perceptions of his mind. Régis then poses a few rhetorical questions: "Now, what is a perception of the mind other than a certain manner of thinking? What is a certain manner of thinking other than a mode of the thinking substance? And finally, what is this mode of thinking substance other than the image of an object impressed, not in the fantasy, that is, in the brain, but in the mind itself? Now, is that not that to which Descartes says the word idea properly befits?"[63] However,

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[61] Huet 2003, pp. 123–124 (modified).
[62] Huet 2003, p. 155.
[63] Regis 1691, pp. 96–97.

Régis rejects the accusation that "idea" is ambiguous, asserting that "by the word *idea* Descartes never understood the object about which we think, but only the action by which we think of this object."[64]

Duhamel gives a longer exposition and criticism of Descartes' account of idea, accepting Régis' interpretation of Descartes. First, Duhamel summarizes four uses of idea by various "Philosophers and Theologians":

1. The impression that determines in us the power to think of one object rather than another. Duhamel adds that it is in this sense that one says "I have kept or lost the idea of such and such a thing" and "why idea often signifies what scholastics call 'impressed species.'"
2. The actual perception of an object. This is the Cartesian sense of idea, why Cartesians say "to have the idea of God is actually to think of God."
3. The thing perceived insofar as it is perceived. Duhamel adds that "it is in this sense that one says that properties are known in the idea of a thing, for that means that the known thing makes its properties be known."
4. The model or exemplary cause to which one intends to make some effect resemble. Duhamel adds that "it is in this sense that Plato admitted the eternal and incorruptible ideas as the exemplary causes of all corruptible individuals; it is also in this sense that Caesar is the idea of his painting or of his statue."[65]

Duhamel continues with a critique of the alleged Cartesian distinction between the formal and objective being of ideas, claiming that Cartesians have it backward. According to Duhamel, "Philosophers and Theologians" use this distinction, but "by 'the formal being of ideas,' they mean the virtue of modifying and virtue of representing all together and by 'the objective being of ideas,' they mean the virtue of being represented—and not the virtue of representing, as with the Cartesians—that is, passive and not active representation."[66] Given this understanding of the distinction, it is not difficult for Duhamel to reject the Cartesian *a posteriori* proof for the existence of God based on our idea of God. Duhamel can conclude

> when one says that the idea one has of God is infinite according to its objective being, this does not signify that the virtue of representing in

[64] Regis 1691, pp. 191.
[65] Duhamel 1692, pp. 9–10.
[66] Duhamel 1692, p. 15.

> that idea is infinite, otherwise it would represent God in an infinite and incomprehensible manner, but it signifies only that God represented by this idea is infinite in himself.[67]

Later on Duhamel returns to the issue of whether the idea's virtue of representing is an active representation or a passive one, using Malebranche's account of idea against that of the other Cartesians. Duhamel concludes that ideas, as the action by which we think of the object and not as the object about which we think, cannot provide a legitimate foundation for the Cartesian proposition that everything contained in a clear idea of a thing must truly agree and be attributed to that thing.[68] He also denies Régis' account of ideas "depending on their objects in the same way as they depend on their exemplary causes." Duhamel argues that "ideas do not depend on their objects as on their exemplary causes, because the exemplary cause is that to which the efficient cause intends to have its effect resemble"; and he repeats the point in Latin for emphasis and authority: "*est forma ad cujus simultitudinem producitur effectus ex intentione agentis*." Duhamel continues:

> Now the efficient cause of ideas cannot be an intention to have ideas resemble their objects. For, in order to intend to have ideas resemble objects we must previously know the objects—before, for example, a painter can have his painting resemble the king, he had to have seen the king. Now, before forming ideas, it is impossible to know the objects of which they are the ideas, since it is only by means of the ideas themselves that the objects are known. Thus the objects cannot be the exemplary causes of ideas.[69]

Régis responds to Duhamel generally by referring to his response to Huet. But he also adds some new details. He emphasizes his belief that Descartes never understood "idea" to refer to the object to which we think, but only to the action of the soul by which we think of that object.[70] With respect to the formal and objective being of ideas, Régis multiplies distinctions—between the being and reason of ideas and between their genus and difference, that is, their matter and form:

> There is a great difference between the formal being of ideas and the formal reason of ideas; the formal reason of ideas encompasses two things, their

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[67] Duhamel 1692, p. 15.

[68] Duhamel 1692, pp. 30–33. In this, he follows Huet's argument, in Huet 2003, pp. 155–156.

[69] Duhamel 1692, pp. 34–35.

[70] Régis 1692, p. 4.

> genus and their difference—their genus as their matter and their difference as their form. In this respect the matter of ideas is the property they have to modify the soul and their form is the virtue they have to represent objects.

Régis has a similar view about the genus and difference of the objective being of ideas; it also encompasses a genus and difference, the genus of the objective being of ideas is to make known what is in common between ideas and sensations, and its difference is the property of making known things such as they are in themselves, whereas sensations makes them known only such as they are in respect to us.[71] Régis simply treats the disagreement between him and Duhamel as a terminological: "Duhamel was mistaken, taking the formal being of ideas for the formal reason of ideas, which is something very different, according to the principles of the Cartesians."[72]

Ultimately, Régis contends that Duhamel's "Philosophers and Theologians" can define their terms as they wish. They can understand by "objective being of ideas" the object itself, insofar as it is represented by the ideas. Cartesians are also free to understand by this word the properties ideas have of making their objects known. He even agrees that in the Cartesian axiom that ideas resemble the things they make known, the "resemblance" is unlike that of a painting to its object. Ideas may represent, but "the word representation is equivocal when it is attributed to ideas and paintings."[73] Similarly, Régis agrees that "the exemplary cause properly speaking is that to which the efficient cause intend to make its effect resemble and that, in this respect, ideas do not have true exemplary causes, because they do not at all resemble their objects."[74] So Régis, while agreeing with Duhamel, restates his conclusion but with respect to exemplary cause, improperly and metaphorically speaking.

These exchanges among Huet, Duhamel, and Régis stayed at the surface and were generally unsuccessful in part because, as we have seen before, the critics of Cartesianism pretended that scholastic doctrines were less wide-ranging than they were in actuality and Cartesians freely made use of established scholastic terms, adapting them to their own purposes, without much restraint.

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[71] Régis 1692, pp. 5–6.
[72] Régis 1692, p. 6.
[73] Régis 1692, p. 9.
[74] Régis 1692, p. 15.

CHAPTER FOUR

THE CARTESIAN DESTINY OF FORM AND MATTER AND ITS CRITICS

What happens to the traditional form-matter pair in the Cartesian program? The answer at first sight appears simple. Scholastics saw everything—with the possible exception of the human rational soul between death and the last trump, and of course God—hylomorphically. That is to say, they saw it as matter, itself mere potentiality, informed, or actualized, in such and such ways to produce the nice, tidy variety of things, animate and inanimate, found around us. Within each specific form, matter is the principle of individuation, but always in subordination to a form. Descartes changed all that by making matter independent, and replacing form, here and there only, by separate mind. So most of the erstwhile hylomorphic cosmos becomes just spread-out stuff, with minds dotted here and there as God decrees. This, it seems, is the Cartesian revolution.

When we look a little closer, however, we find a more complicated situation. Take the years 1637–1641, between Descartes' first publication and the first edition of the *Meditations*, as roughly our *terminus a quo*: by then, the "standard," if you will Thomistic, view of form and matter has been significantly modified, so that strict hylomorphism no longer prevails. As Scipion Dupleix wrote in 1603: "There is so much great noise among the Scholastics concerning the establishment of matter, that if I wanted to appease all sides, I would waste too much time."[1] And there are also some strident anti-scholastic voices to be heard, some, but not all, of these proposing corpuscularian themes. So we need first to look at the status of form and matter in the immediately pre-Cartesian literature. Second, we want to examine in Descartes' own writings such passages as shed light on his solution to the form-matter problem, and finally, we will consider the use of the concepts form and matter in the works of some adherents and critics of Cartesianism: given that the gulf between

[1] Dupleix 1990, p. 129.

the scholastics and the *novatores* was not so great, we find here also a variety of compromises as well as some more radically anti-scholastic views.[2]

Before Descartes

Aristotle's doctrine, in *Physics* book I, is that there are three principles of natural things, matter, form and privation. Though the principles are three, privation quickly drops out, being only incidental—"there is a sense in which the principles are two and a sense in which they are three," says Aristotle,[3] and Aquinas echoes: "There are two *per se* principles of the being and becoming of natural things, namely form and matter, and one *per accidens* principle, namely privation."[4] Questions usually arise about the relationship between the two *per se* principles of matter and form and their respective properties. Traditionally, matter and form are inseparable. All substances are informed matter. Form is associated with actuality and matter with potentiality: to be in actuality is to participate in a form and to have potentiality is to have a "power" of acting or undergoing something;[5] in this conception of substance, matter has the potential for receiving forms, whether substantial or accidental. Forms are kinds, or universals, and matter provides the individual substance with its particularity. Thus, matter is the principle of individuation, always subordinate to form, which makes it a this-such, a recognizable entity of such and such a kind. Substantial change, or mutation, that is, generation and corruption, is a change in the very nature of a thing, its acquisition or loss of a substantial form. Substantial forms are said to be indivisible, not capable of more or less, and not possessing contraries, and thus they cannot be acquired successively and piecemeal. Short of substantial change,

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[2] The thesis, then, is not that the seventeenth century brand of scholasticism directly influenced Descartes' formulation of his philosophy, but that, at least, it prepared the way for the acceptance of Cartesianism (and for the eventual attempt at reconciliation). The thesis could be taken as a more general version of the one Vincent Carraud proposes with respect to Ockhamism and the reception of Cartesianism by Arnauld, in "Arnauld: From Ockhamism to Cartesianism," Ariew and Grene 1995, pp. 110–128.

[3] Aristotle, *Physics* I, 190b28–30. In fact, privation is needed only for substantial change, and so drops out of consideration for most of the *Physics*. It is commonly dropped by Cartesians, even those who still pay obeisance of a sort to form-matter explanation; see e.g. Rohault.

[4] Aquinas 1953, I, lectio 13.

[5] Toletus 1589, III, chap. 1, text. 3.

motion, in contrast, occurs successively between contraries; motion must pass from one contrary as the term from which (*a quo*) to the other contrary as the term to which (*ad quem*). Since only forms in the categories quantity, quality and *ubi* or place, have contraries or positive opposite terms, scholastics conceive of three kinds of motion: augmentation and diminution (in the category of quantity); alteration (in quality); and local motion (in place). A being moves, then, by virtue of the successive acquisition of qualitative or quantitative forms or of places. The association of matter with potentiality suggests that prime matter would be pure potentiality or nothing. In contrast, the association of form with actuality suggests that an ultimate form, or pure actuality, might subsist by itself.

The questions typically discussed in conjunction with these doctrines concern whether matter is a substance, whether potency is the essence of matter, whether matter is not capable of being generated or corrupted, whether matter is disposed to receiving the form, whether matter or form is the cause of corruption,[6] whether some forms preexist in matter, in what way form arises from matter, whether forms can be outside matter,[7] and, ultimately, whether there can be any prime matter separate from forms.[8] There is much agreement and disagreement in the answers given to these questions. One can point to almost universal agreement among late scholastics concerning the negative answer to the question of whether forms are generated from matter. Although late scholastics usually repeat the phrase: "form results from the potentiality of matter, that is, from the natural aptitude of matter to receive various forms in

[6] For example, Toletus 1589, quaest 13, "An materia sit substantia," quaest. 14, "An potentia sit de essentia materia," quaest. 16, "An materia sit ingenerabilis et incorruptibilis," quaest. 17, "An materia appetat formam," quaest. 20, "An materia sit cause corruptionis, an forma"; Eustachius a Sancto Paulo 1629, pars III: Physica, Book I, disp. 2, quaest. 2, "Quid sit materia, et quare sit admittenda," quaest. 3, "Quaenam et qualia sit potentia materiae," quaest. 4, "Quaenam sint praecipuae proprietates materiae"; Abra de Raconis 1651, Tertia pars, Physica, Tractatus de Principiis, disputatio secunda, art. 3, memb. 5, "Utrum materia sit pura potentia Metaphysica," memb. 6, "Utrum materia sit pure potentia physica." Many of these issues are discussed in detail by Dennis Des Chene (1995).

[7] For example, Toletus 1589, quaest. 19, "An aliquid formae praefuerit in materia"; Eustachius a Sancto Paulo 1629, quaest. 6, "Quomodo ex materia nascantur formae," quaest. 7, "Quomodo ab agente producantur formae," quaest. 9: "An formae extra materiam esse possint"; de Raconis 1651, memb. 2, "Utrum potentia materiae ad eius essemtiam spectet," memb. 3, "Ad quas formas se extendat materiae potentia," memb. 4, "Utrum illa materiae potentia prius respiciat formas substantiales, quam accidentales."

[8] For example, Dupleix 1990, chap. 5: "Resolution des argumens qui concluent qu'il n'y peut avoir de matiere premiere separée des formes."

succession," they do not understand it as indicating that form receives its nature from matter.[9] Similarly, seventeenth-century scholastics agree that at least one form can subsist without matter, namely rational soul.[10]

But can matter exist without form? As we shall see, this is a crucial question for Cartesianism, since a positive resolution of this esoteric question might lead one toward a dualistic, as opposed to a hylomorphic, conception of substance. At times, there is sharp disagreement on the answer. According to Aquinas, prime matter is pure potency, or has only potential being;[11] thus prime matter was not brought into being without form, and matter cannot subsist without form.[12] Scotus objects; he holds matter to be a positive entity really different from the reality of form, which can subsist in its own right distinct from form.[13] The motivation for the position seems to have been his wish to preserve God's absolute omnipotence as far as he could. Scotus claims that God can create matter without any form, whether accidental or substantial:

> Every absolute thing that God produces among creatures by the intermediary of a second cause, he can create without this second cause, which is not part of the effect. Now, the form that confers existence on matter is a second cause and is not part of the essence of matter insofar as it is matter. Hence God can create the matter without the form.[14]

Franciscus Toletus knows both positions. In question 13 of his *Commentary on the Physics*, Book I, he discusses whether prime matter is a substance; he details both Scotus' affirmative reply to the question and Aquinas' negative answer—that prime matter is pure potency—in order to side with Aquinas. Toletus' own doctrine is that prime matter is imperfect in itself.[15] Toletus then discusses whether matter can exist without

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[9] See, for example, Dupleix 1990, book II, chap. 2; Eustachius 1629, III.1.2, quaest. 6–7. See also Sennert 1659, book I, chap. 3. Sennert goes a step further than the usual textbook writer. He accepts the standard account, that neither matter nor form are generated, only the compound of matter and form, but when he comes to the scholastic phrase that forms are drawn out of the aptitude or potentiality of matter, he says that he hears the sound of the words, but that his mind hears nothing. Ultimately he accepts Toletus' rejection of the opinion that there was something of form in matter before its introduction therein.

[10] Support for this position comes from *De Anima* III, chap. 5, concerning the active intellect.

[11] Aquinas 1964–1976, I, quaest. 7, art. 2.

[12] Aquinas 1964–1976, I, quaest. 66, art. 1.

[13] Scotus 1639, *Opus Oxoniense*, II, dist. 12, quaest. 1. William of Ockham also holds a similar doctrine.

[14] Scotus 1639, *Opus Oxoniense*, II, dist. 12, quaest. 2.

[15] Toletus 1589, quaest. XIII: An materia sit substantia, fol. 34 verso.

form. He refers to Aquinas' thinking that that would be impossible, since it would imply a contradiction,[16] and to Scotus' doctrine that it can be done by supernatural means (but without giving references to Scotus). He concludes that he sides with Aquinas, that there cannot be any matter in act without a form. Against Scotus he again argues that matter is imperfect in itself.[17] Others, such as Théophraste Bouju, also followed the Thomist line about the reality of prime matter.[18]

On the other hand, Eustachius a Sancto Paulo's doctrine differs from Toletus'. As usual, there is no difficulty about forms existing without matter in the case of the rational soul.[19] The main problem arises with respect to matter's existing without any form. Eustachius supports a variant of Scotus' doctrine, though without citing sources, thus without naming Scotus, or mentioning Aquinas' doctrine that prime matter is pure potency: "Although matter cannot be produced nor annihilated by any natural agent, God can create or annihilate it … can strip naked all forms, substantial and accidental, from matter, or create it naked, without form, ex nihilo, and allow it to subsist by its own power in such a state."[20] This looks, *a tergo*, like a lead-in to Cartesian dualism; it is certainly a weakening of the traditional close linking of matter to form. Moreover, Charles François d'Abra de Raconis agrees; he quotes both Thomas Aquinas and Duns Scotus, says that matter is an incomplete substance, but maintains that God can create matter without substantial form.[21]

Scipion Dupleix puts into relief the disagreement between Thomists and Scotists:

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[16] Toletus 1589, fol. 35 recto: "Sanctus Thom. I. p. q. 66. ar. 1. & quodlibeto 3. arg. 1."

[17] Toletus 1589, fol. 35 recto.

[18] See Bouju 1614, vol. I, pp. 315–316 (chap. 6: Que la première matière est pure puissance passive, et comment); pp. 319–320 (chap. 11: Comment la première matière est moyenne entre l'estant et le non estant); p. 322 (chap. 15: Comment la forme donne l'estre au composé); pp. 326–327 (chap. 23: Que la nature et forme naturelle ne se trouvent jamais séparées naturellement l'une de l'autre); pp. 329–330 (chap. 26: Réfutation d'une prétendue puissance objective en la première matière, et de l'acte objectif qui luy respond); pp. 330–331 (chap. 27: Rejection de l'acte entitatif ou objectif, que quelques uns ont estimé estre en la première matière); and p. 331 (chap. 28: Réfutation de l'opinion que la première matière peut estre naturellement sans la forme).

[19] Eustachius a Sancto Paulo 1629, pars III: Physica, Book I, disp. 2, quaest. 9: "An formae extra materiam esse possint," pp. 22–23.

[20] Eustachius 1629, quaest. IV: "Quaenam sint praecipuae proprietates materiae," pp. 16–17.

[21] Abra de Raconis 1651, Tractatus de Principiis, disp. 2, memb. 4, "Utrum materia sit pura potentia metaphysica," pp. 35–39.

> Thus matter deserves the name of substance because it subsists by itself and is not in any subject. This reply is based on the Philosopher's doctrine, but it does not satisfy everyone, particularly Saint Thomas Aquinas and his followers, who hold that such matter is not in nature, and cannot be in it, and even that this is so repugnant to nature that God himself cannot make it subsist thus stripped of all form. But this opinion is too bold, too mistaken, and as such it has been rejected by Scotus the Subtle [Doctor] and by several others who convicted Saint Thomas by his own words.[22]

It is interesting to note that Dupleix argues against Aquinas' doctrine of prime matter by analogy to what is required in the sacrament of the Eucharist.[23] For his purpose, Dupleix only needs to argue against the Thomists that God is able to create matter without form, but he goes further. He asserts that matter subsisting without form "is not repugnant to nature and still less to divine power, which is infinite and above everything in nature." He adds that "even though matter is not found separated from forms, it is nevertheless something distinct and separate from form in essence, and it even precedes form when one considers the generation of natural things."[24] The fine line Dupleix wishes to draw is plainly exhibited when he considers the creation of matter and form. He states that there is never any matter without form in nature but that we can conceive matter without form without in any way upsetting the natural order:

> in the same way that we ordinarily consider the virtues, vices, colors, dimensions and other accidents outside their subject, even though they are never separated from it, [we can consider] substances without having any regard to their accidents, which can be elsewhere than in them. That is why the ancient Pagans did not recognize that God created this matter as well as the forms at the beginning of the world, and thinking instead that it was something separate from forms, they imagined a chaos, a confused and inform mass corresponding to this prime matter, from which they made all things arise.[25]

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[22] Dupleix 1990, p. 131.

[23] "[Saint Thomas] accorde bien que Dieu peut faire que l'accident subsiste en la nature hors de son sujet: comme mesme tous les vrays Chretiens croyent que tous les accidens du pain sont au S. Sacrament de l'Eucharistie sans le pain: et les accidens du vin sans le vin: bien qu'il semble y avoir beaucoup plus de repugnance en cecy qu'a faire subsister la matiere sans forme: d'autant que la matiere n'a pas besoin d'aucun sujet ny de suppost, estant elle mesme le sujet et le suppost de toutes autres choses naturelles: et que l'accident ne peut naturellement subsister sans sujet." Dupleix 1990, pp. 131–132.

[24] Dupleix 1990, p. 132.

[25] Dupleix 1990, p. 130.

Dupleix then cites verses of Ovid about chaos and lack of order at the creation and even suggests that Moses himself followed this "natural order," representing prime matter at the beginning "as the principle of all created things" by the words darkness (*tenebre*), waters (*eaux*), abyss (*abysme*), and void (*vuide*).[26] But Dupleix's doctrine is clear: matter can exist without form naturally and by supernatural action; we can conceive it thus; but it simply does not so exist, given that it was created simultaneously with form. Still, it could!

If we jumped forward to the second half of the seventeenth century, we would find, even by then, that not all philosophers accepted the Cartesian position on these questions. Schoolmen were still disputing the same issues as Toletus versus Eustachius or Dupleix. And not all textbook writers went as far as Dupleix. Some just accepted the reality of matter as a miracle—for example, René de Ceriziers argued that there can be no form without matter and no matter without form naturally, but added, "however, one must not deny that God can conserve matter without any form, since these are two beings that can be distinguished, that no more depend upon one another than accident upon substance, the former being separated from the latter in the Eucharist."[27] This compromise solution seems to have been unstable, so that by 1665 the Jesuit Pierre Gaultruche argued against the Thomists (*contra Thomistas*) about prime matter.[28] However, not everyone gave up the Thomist doctrine of matter. Although Scotists such as Claude Frassen seem to have had the best of the argument, and Thomists and Jesuits such as Pierre Barbay and Jean Vincent needed to opt for a middle ground, some Thomists resolutely maintained their position.[29] For example, the Dominican Antoine Goudin wrote:

> it can be asked whether God by means of his omnipotence could create matter without its having a form. Scotus asserts it, as do some authors outside of Saint Thomas' school; Saint Thomas and all the Thomists deny it . . . It seems that matter cannot exist without form even by means of God's absolute power. That is what Saint Thomas states (III quodlib. art. 1). God himself cannot make it that something exist and not exist. He cannot make something that implies a contradiction and, consequently, he cannot make matter be without form.[30]

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[26] Dupleix 1990, p. 131. One can find the same creation story of simultaneous matter and form in Sennert 1659, book I, chap. 3, and then again, book IX, chap. 3.

[27] De Cerizier 1643, chap. 3, pp. 51–52.

[28] Gaultruche 1665, vol. 2, Physica Universalis, p. 27.

[29] Frassen 1686, pp. 36–41; Barbay 1676, *Physica*, pp. 64–72; Vincent 1660, vol. 2, pp. 74–77.

[30] Goudin 1727 [1668], vol. II, quaest. II, art. 4, p. 77; 1864, vol. 2, p. 131.

To return to the period we were considering: as the dominant scholastic position became somewhat more dualistic than hylomorphic, with matter being endowed with being, another trend—perhaps in the opposite direction—was the shifting of one of the principal functions of matter to form. The principle of individuation became form, instead of matter, with consequent changes in what is meant by form. We can grasp the radical change in position when we read Dupleix's exposition of form in his *Physique*. The question Dupleix wishes to answer is why there is not a prime form common to all matter, as there is prime matter which is common to all forms. His answer is that

> form is not only that which gives being to things, but also that which diversifies and distinguishes them from one another. Thus, nature, which is pleased with diversity and variety, cannot allow there to be a form common to all matter, as there is a matter common to all forms; if there were only a single form, as there is a single matter, all things would not only be similar, but also uniform and even unitary.[31]

Dupleix's discussion of the problem in his *Métaphysique* is exemplary. He points out that there are three main opinions about the principle of individuation, that of the Thomists, of another group he does not identify, and of the Scotists. Thomists think the principle of individuation is *signate* matter, which they understand in a variety of ways: matter limited to a certain quantity by its dimensions; a composite of matter and quantity; or the power and aptitude of matter to a certain limited quantity.[32] Dupleix points out that the Thomists have a difficulty with the principle of individuation for non-corporeal substances, such as angels, whose principle is based on their lack of matter (every angel or intelligence must be considered as both universal and individual).[33] The 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."[34] The Scotists reject the other two opinions and maintain that the principle of individuation must be based on an ultimate specific difference (*haecceitas*) for each individual. Dupleix allows that the Thomists (especially those holding the first interpretation) have the authority of Aristotle behind them,[35] but he does not think that they

[31] Dupleix, 1990, p. 135.
[32] Dupleix 1992, pp. 231–232.
[33] Dupleix 1992, p. 232.
[34] Dupleix 1992, p. 232. Cf. Leibniz on the principle of individuation.
[35] "Pour le regard du premier chef consideré en gros et en general sur la matiere, il semble à la verité estre fondé sur la doctrine du Philosophe, lequel establit quelquefois

are right. He agrees that quantity can be a mark of individuation for corporeal substances, but he does not think that it reveals "the proximate and true formal cause of the individuality and unity of the essence of singular things,"[36] since quantity is always an accident and accidents do not operate at the level of essences. He repeats this argument against the second, anonymous opinion; and he dismisses the other groups of Thomists with roughly similar arguments: that specific difference is universal and cannot be both principle of individuation and principle of universality.[37] Dupleix's preferred position is the Scotist opinion 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."[38]

There are similar doctrines in the *Metaphysica* of Eustachius a Sancto Paulo and Abra de Raconis.[39] Another doctrine in the same general direction is that of Franco Burgersdijk in his *Institutionum metaphysicarum* (originally published in Leyden, 1640).[40] Burgersdijk rejects both Scotus' and Thomas' opinions (with Thomas' as the worse one).[41] His own doctrine is that composite substances have both material and formal principles of individuation. With humans, the individuality lies in the rational soul, which is an immaterial form. And, of course, humans can also be differentiated by their accidents.[42]

The Scotist position seems to be the majority position in the seventeenth century. It entails that form is the principle of individuation. This appreciably alters what one means by form; forms are no longer

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l'estre des substances corporelles en la matiere: comme quand il dit au 5. livre de sa Metaphysique que *ces choses-là sont en nombre, desquelles la matiere est une*: Et au livre 7. *que la chose singuliere de la derniere matiere c'est desja Socrates*, c'est à dire, un individu," Dupleix 1992, p. 233.

[36] Dupleix 1992, p. 233.

[37] Dupleix 1992, p. 234.

[38] Dupleix 1992, p. 235.

[39] De Raconis 1651, quarta pars, Metaphysica, tract. 4, sec. 2, 4, brevis appendix, "De unitate singulari et numerica, seu principio individuationis," pp. 76–78; Eustachius a Sancto Paulo 1629, quarta pars, metaphysica, tractatus de proprietatibus entis, disp. 2, de simplicibus proprietatibus Entis, quaest. 4, "Quodnam sit principium unitatis numerica, seu individuationis," pp. 38–39.

[40] Burgersdijk 1657, I, chap. 12, "De Unitate Numerica et formali, deque principio individuationis," pp. 66–75.

[41] Burgersdijk 1657, pp. 71–72.

[42] Burgersdijk 1657, pp. 74–75.

necessarily specific. Thus form is on its way to becoming just the way a particular part of matter is differentiated: ultimately, structure or shape, rather than the organizing principle that makes the thing the kind of thing it is.[43]

So much for the changes in scholastic thought: generally speaking, the strengthening of matter and the weakening of form. At the same time, there were also significant anti-scholastic voices, the *novatores*, who included a variety of physicians and alchemists. Among the former, one can count Sebastian Basso and Daniel Sennert and, among the latter, Etienne de Clave. However much Descartes may have sneered at them, these "innovators" were in fact preparing the way for his "revolution." And, of these, Basso, it is established, is the one whose work Descartes knew.[44]

In humanist fashion, Basso wants to recover the philosophy of the ancients, previous to Aristotle, and in particular atomism. For him, the ultimate constituents of bodies are the minimal particles of matter or atoms. Each atom is homogeneous, a simple body possessing a particular nature that persists in mixtures;[45] when atoms enter into composition, they make up natural minima having their own proper natures.[46] According to Basso, there are four kinds of elementary atoms (other than the ether), coinciding with the four traditional elements. But Basso contests the scholastic doctrine that the four elements can assume new substantial forms and thus can be generated from one another.[47] Indeed, for Basso, all change—generation and corruption, alteration in quality, and augmentation and diminution in quantity—is explicable at the level of the ultimate constituents of matter. Generation and augmentation in quantity are the gathering together of atoms or clusters of atoms. Corruption and diminution in quantity are the dispersing of atoms that were previously united. Alterations in quality result from atoms of one kind being substituted for atoms of another.[48] Thus, for Basso, completely new generation is an illusion; what happens instead is the continuous reorganization of

[43] For a similar movement in the conception of 'idea', from ideas as Forms to ideas as particular images, see chap. 3.

[44] See AT I, p. 25 and the appendix of the 2nd revised edition, AT I, p. 665. See also chapter 5.

[45] Basso 1649, p. 27; see also the resumé, p. 67.

[46] Basso 1649, p. 23.

[47] Basso 1649, p. 118 et seq.

[48] Basso 1649, p. 72.

atoms.[49] Although Descartes was of course no atomist, the transformation of generation into mere change of place or shape will hold also for his world of *res extensae*.

Further, Basso's concept of causation is mechanistic (or, more accurately, proto-mechanistic), not, however, in Democritean fashion, through motion in a void, which he rejects, but through a fifth element, the ether, far more tenuous than the elementary atoms and permeating every kind of object insofar as it fills the gaps between the atoms of the four elementary kinds.[50] It is the cause of the motion of atoms and, in this way, the cause of the mutations of bodies.[51] Yet although the ether is the cause of motion, it is totally inert in itself, and in constant need of being kept in motion by a higher cause. Basso refers to a kind of Platonizing universal form; ultimately, God is the higher cause on which the ether depends, not only for its motion but also for its directing of the motion of the elementary atoms. Although Descartes questions Basso's use of the ether (in the particular context of rarefaction and condensation),[52] the physician's reduction of all kinds of change to the local motion of atoms, with God coming, not from, but into the machine, does seem congenial to the Cartesian view.[53]

Basso's contemporary, Nicholas Hill, published *Philosophia Epicurea, Democritiana, Theophrastica proposita simpliciter, non edocta*, a collection of aphorisms offering an alternative to Aristotle by attempting to resurrect the philosophy of the ancients. In it Hill fiercely attacked certain scholastic uses of forms and developed a view of natural objects composed of conglomerations of solid, indivisible and variously shaped particles. Generation, qualitative alteration, corruption, and local motion are all explained in terms of changing atomic composition, not by an appeal to forms. A form becomes the mere "state and condition of things, resulting from the connection of material principles."[54] Unlike classical

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[49] Basso 1649, pp. 9–10.

[50] Basso 1649, pp. 304, 306.

[51] Basso 1649, pp. 308–309, 387–388.

[52] See Descartes to Mersenne, 8 October 1629, AT I, p. 25.

[53] We should note that Basso's atomism and anti-Aristotelianism make him a heretic for some early seventeenth-century thinkers (and not only for the most conservative ones). Discussing "Gorlee, Charpentier, Basso, Hill, Campanella, Brun, Vanini, et quelques autres," Mersenne complains of their "impertinence" and denounces atomism, that is, the doctrine "qu' il y a des atomes dedans les corps, qui ont quantité et figure"; according to him, "en bout du conte ils sont tous Heretiques, c' est pourquoy il ne faut pas s' estonner s' ils s' accordent comme larrons en foire." Mersenne 1624, pp. 237–238. See chapter 6.

[54] Hill 1619, pp. 13–14, aph. 35.

atomists and unlike some of his contemporaries, for whom ultimate causal explanation is given in terms of primitive motion directed by God, for Hill, God acts directly on the atoms through a force: "The prime force, the efficient, active, universal cause, the simple, absolute essence, the foundation and root of all material power is God."[55]

Like Hill and Basso, Francis Bacon and Galileo uttered various corpuscularian pronouncements, though unlike them neither made atomism a focus of their philosophies. Bacon's atomism was equivocal: he initially propounded some atomist and vacuist notions, but these were later replaced by or subordinated to a Paracelsian pneumatic matter theory. Galileo was somewhat more forthcoming. He developed some notorious atomistic doctrines in his 1623 *The Assayer*. Trying to explicate the proposition "motion is the cause of heat," he advanced a conception of heat opposed to the commonly held one, in which heat is thought as an accident, affection, or quality residing in the heated material. Corporeal substance, Galileo asserted, must be conceived as bounded and possessing a particular size, shape, place, duration, motion or rest, and number. But bodies do not have to be conceived as necessarily conjoined with conditions such as red or white, bitter or sweet, etc. These, Galileo said, "are nothing other than names for something that resides solely in our sensitive bodies."[56] Galileo explained his doctrine with an example of a feather being passed over parts of one's body, with the result that we would feel a tickle. He argued that the tickle would be in us and not in the feather, so that if the sensing body were removed, nothing would remain of the tickle but "an empty name." He concluded the same for qualities normally attributed to bodies such as taste, odor, color, and so on; they have similar existence to the tickle. Galileo continued his analysis by resolving bodies into particles differentiated by their texture and hardness. He did the same for fire, which he said "consists of a multitude of tiny particles of such and such shape, having such and such velocity."[57] Finally, he used the analysis to answer the original problem. The affection called heat consists of the particles of fire penetrating into a body.

> The operation of fire by means of its particles is nothing other than, in moving, it penetrates all bodies by its extreme subtlety, dissolving them quickly or slowly, depending upon the number and velocity of tiny

[55] Hill 1619, p. 28, aph. 110.
[56] Galileo 1890–1901, vol. 6, p. 348.
[57] Galileo 1890–1901, vol. 6, p. 350.

> particle of flame. … But that there is in fire, in addition to shape, number, motion, penetration, and contact, some further quality called 'heat,' I cannot believe.[58]

In Day One of his 1638 *Discorsi*, Galileo reaffirmed his corpuscularianism by talking about how fire goes snaking among the minimum particles of this or that metal. But he also invoked a mathematical atomism in his explanation of one of pseudo-Aristotle's *Mechanical Questions*, dealing with two inscribed equilateral and equiangular polygons moving around a common center. Galileo's solution to the problem seems to have required infinitesimal parts separated by infinitesimal vacua.[59]

Etienne de Clave is another early anti-Aristotelian. Although Descartes does not refer to him in his published correspondence, there is no doubt that he knew of his opinions, since they became notorious—the subject of denunciations by the circle around Descartes—in the middle 1620s (a time when Descartes was in Paris and in contact with Mersenne and others). De Clave, Jean Bitault, and Antoine Villon scheduled a disputation for August 24 and 25, 1624 by posting a broadsheet containing fourteen anti-Aristotelian theses on the streets of Paris. The disputation did not take place. The President of the Parlement saw copies of the theses and prohibited the disputants from sustaining them on pain of death. The Parlement then sent the theses to the Faculty of Theology of the University of Paris (the Sorbonne) to be examined. A few days later, the Sorbonne replied with a censure of some of the theses and, through an *arrêt* of 4 September 1624, the Parlement ordered Villon, de Clave, and Bitaud to leave Paris, never to teach again within their jurisdiction, on pain of corporal punishment.[60] Among the prohibited theses were propositions

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[58] Galileo 1890–1901, vol. 6, pp. 350–351.

[59] Galileo's copuscularianism did not go unnoticed. An anonymous accuser immediately denounced him to the Sacred Congregation for the Doctrine of the Faith for these passages from *The Assayer*. The accuser denounced the analysis of the example of tickling and its implied doctrine as philosophically false: "It is the same as saying: the sight with which I see the light of the sun is in me; therefore the light of the sun is in me" (Redondi, 1987, p. 333). But he reserved his greatest disapprobation for Galileo's corpucularianism, which he equated with the atoms of Democritus. He asserted: "If one admits this philosophy of accidents as true … it makes greatly difficult the existence of the bread and wine which in the Most Holy Sacrament are separated from their substance" (Redondi, 1987, p. 334). He further argued that Galileo's doctrine is inconsistent with the interpretations of the Eucharist propounded by various church councils, including the Council of Trent.

[60] See Garber 1988, pp. 471–486, and 2002.

concerning matter and form, one in particular denying all substantial forms, except for rational soul, along with prime matter; its official condemnation is that "this proposition is overly bold, erroneous, and close to heresy."[61]

There are many extant reports about the event of 1624, including some by Descartes' correspondents, Mersenne and Jean-Baptiste Morin, as well as by others such as J.-C. Frey, Professor of Philosophy at Paris. These reports have little favorable to say about the theses of de Clave, Bitaud and Villon. Mersenne defends Aristotle against their attacks, and dismisses them as charlatans.[62] He goes through all fourteen posted theses,[63] expressing general disapproval. His main argument is that

> if there is no form and no matter, then man has neither body nor soul, something contrary to the belief of the Catholic faith; if there are no other genera and no other species, except for the various mixture of the five substances established by them, man is of the same species as stones, plants, and animals, which is most false.[64]

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[61] "Formae item omnes substantiales (excepta rationali) non minus absurde defenduntur ab Aristotelicis quam materia, cum per eas intelligant substantias quasdam incompletas, unum per se cum materia substantiale compositum constituentes; materia enim e naturali composito sublata, et formas saltem materiali tolli necesse est. CENSURA: Haec propositio est temereria, erronea, et haeresi proxima," Launoy 1656, pp. 310–321. This prohibition was renewed in 1671 and became the basis for condemnations of Cartesianism; see chapter 9.

[62] Mersenne 1625, pp. 100–101.

[63] The anti-Aristotelianism seems to derive from an alchemical and atomistic bent. Here is Mersenne's description of theses 1–8 and 12–14:

> Il me semble qu'elles s'opposoient particulierement à la doctrine d'Aristote, et que les deus premieres nioient la matiere, et la forme: la troisieme se mocquoit de la privation: la 4. et la 5. vouloit que chaque mixte fut composé de cinq corps simples, sçavoir est de terre, d'eau, de sel, de souphre, ou d'huile, et de mercure, ou d'un esprit acide, lesquels la 6. these asseuroit être d'une même espece en tous les individus, de maniere que la diversité de tous les genres, des especes, et des individus ne provenoit ailleurs que du divers mélange de ces principes, qui étoit encore cause selon la 8. these, de toutes les actions, et de tous le mouvemens qui se voyent dans tous les individus sensibles en ce monde … La 12. ôtoit les qualitez virtuelles, et rapporatoit tous les effects qu'on attribuë ordinairement a ces qualitez, au 5 substances qu'ils se mettent en chaque corps: le 13. se mocquoit de toutes les transmutations qui se font entre les élements, et soutenoit que la terre ne peut jamais être changée en eau, ni l'eau en terre, ny l'un des 3. principes en un autre: d'où ils concluent en la 14. qu'Aristote avoit tort de s'être mocqué de ces deus maximes des anciens sçavoir est que toutes choses étoient en toutes choses, et que toutes choses etoient composées d'atomes. (Mersenne 1625, pp. 79–80)

[64] Mersenne 1625, pp. 81–82.

Morin seems to take as basic and beyond question the Aristotelian view that "matter … and form united are the essence of body as such." He then argues that without matter and form, there can be no bodies—there cannot even be a human body for a soul to inform, since the body without its own form is nothing.[65] In a similar vein, working on the lack of parallelism between humans and other animals (humans having rational souls, but animals lacking any substantial form), Frey asks rhetorically: if a donkey is a donkey without the substantial form for being a donkey, then why would a human not be human without the substantial form for humanity? And if a human is formally a human by its substantial form, why would a donkey not be a donkey by its own substantial form?[66]

De Clave's banishment did not prohibit him from subsequently publishing a number of alchemical treatises consistent with his earlier anti-Aristotelian views. However, as becomes evident in the later work, the denial of substantial forms does not entail the denial of form-matter talk. De Clave continued to reject the Aristotelian doctrine of four elements (he denied the element fire),[67] and the doctrine that the elements were the product of permutations of the opposing qualities hot, cold, dry, moist.[68] He held that a primary element can only be derived from a single form and that form could not itself be derived from matter.[69] He denied substantial forms for things such as donkeys, preferring to think of them as composites of primary elements, themselves considered as form-matter.[70] For all the noise de Clave, Bitaud and Villon made, their rejection of form was only partial.

There were also other writers who helped to shatter the traditional reliance on form as an explanatory concept. Two who influenced Adriaan Heereboord, the first Cartesian in Leyden, for example, were the brothers de Boot (or Boate), who published a *Philosophia Naturalis Reformata*

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[65] Garber 2002.

[66] Frey 1628, chap. 27.

[67] De Clave 1641, chap. 1 "Du nombre des elemens Peripatetiques."

[68] De Clave 1641, chap. 13, "Des qualitez elementaires."

[69] "Mais dautant que les proprietez sont plus intrinseques, comme estant dependentes immediatement de la forme, il est raisonnable de commencer par elles … il n'y a aucune apparence de dire qu'elles procedent de leur matiere, puis qu'elle n'a aucune qualité, estant informe voire un estre incomplet, qui ne reçoit aucune resistence, moins encore de perfection, avant que d'estre informée, c'est à dire, avant de la venuë de la forme qui lui donne estre et perfection." De Clave 1641, p. 117.

[70] See Emerton 1984, pp. 60–61.

in Dublin in 1641, and William Pemble, a Fellow of Magdalen College, Oxford, whose *De Formarum Origine* first appeared in 1628.[71] Both these writers raise troubling questions about the meaning of "form." Forms turn out to be neither corporeal substances, nor immaterial substances, nor "temperaments" of substances, and so on. Are they perhaps just accidents of bodies? All this always after having made an exception of the rational soul, of course. We are clearly moving in a decidedly Cartesian direction.

Descartes

If, on various fronts, the way had been prepared for his new program, that is not to deny that Descartes himself made, and encouraged in others, a radical break with the hylomorphic tradition. In his mature work, he unequivocally elevates matter to the rank of substance and emphatically eliminates the various kinds of soul that used to mediate between mere matter and separable mind. There is finite extended substance (which can stretch indefinitely, but is not infinite) and finite thinking substance and God, or infinite spiritual substance, and that is that. Form-matter thinking, even the problem of form and its origin, which people like Pemble or the Boots worried at, seems to have faded from view. In the *Meditations*, his major argument on "first philosophy," he simply does without a form-matter perspective altogether. There is, of course, the one case of our minds' informing our bodies during our sojourn in this vale of tears: this is even, temporarily, a *substantial* form, like those the scholastics had foolishly attached to other bodies. For them, mind had been the only entity separable from matter; for Descartes it is the only substance that does, in our case, function as the form of another substance, the human body, or, if you like, as the substance informing another substance to constitute a complex substance.[72] Over against his insistence on this one, exceptional substantial form, Descartes does indeed attack the notion of substantial form directly on a number of occasions, while in the *Meteors* he remarked that, although he had nothing against the concept, he just didn't need it.[73]

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[71] Arnold and Gerard de Boot 1641; Pemble 1650.

[72] See ATVII, 434; CSM II, 293. See also Grene 1991, pp. 38–39.

[73] "Puis, sçachés aussy que, pour ne point rompre la paix avec les Philosophes, je ne veux rien du tout nier de ce qu'ils imaginent dans les cors de plus que je n'ay dit, comme

In an admonitory letter to Regius, whose statement that man was a being "per accidens" was instrumental in fueling the notorious quarrel between Descartes and the Utrecht theologians, Descartes called Regius' attention to that remark in the *Meteors*. Adjuring him not to use harsh words, he continued:

> I should like it best if you never put forward any new opinions, but retained all the old ones in name, and merely brought forward new arguments … For instance, why did you need to reject openly substantial forms and real qualities? Do you not remember that on p. 164 of my *Meteors*, I said quite expressly that I did not at all reject or deny them, but simply found them unnecessary in setting out my explanations? If you had taken this course, everybody in your audience would have rejected them as soon as they saw they were useless, and in the mean time you would not have become so unpopular with your colleagues.[74]

This piece of advice is revealing for Descartes' own use of traditional concepts, and here, of "form" in particular. Matter, of course, has been officially liberated (except in our case) from its hylomorphic captivity, and reigns as *res extensa* throughout the natural world. Form, on the other hand, seems at first sight to have slipped quietly away. There are of course those passages, chiefly in letters or in the *Replies*, in which, contrary to his own shrewd advice, he explicitly takes issue with the notion of substantial form.[75] However, if we put those to one side, and look at Descartes' use of "form" as such, we find some revealing instances of the technique he had recommended to Regius: turn the old ways to your own use.[76] Let us go quickly through some examples.

To begin with, in the early *Olympica*, Descartes remarks "Every corporeal form acts through harmony."[77] This is not the Descartes we know; it shows us, however, the young Descartes as deeply the product of a scholastic education. This is the kind of thinking he needed to recover from—and he did so brilliantly.

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leurs *formes substantielles*, leurs *qualités reelles*, et choses semblables, mais il me semble que mes raisons devront estre d'autant plus approuvées, que je les feray dependre de moins de choses." AT VI, 239.

[74] AT III, 491–492; CSM, III, 205 (with revision).

[75] For such passages, see Grene 1991, esp. pp. 17–19.

[76] True, in this case we are speaking of a term, "form," not of an opinion, but it was a term that was centrally used in conveying the old opinions and would have been comfortingly familiar to Descartes' readers.

[77] Descartes, *Olympica*, AT X, 218; CSM I, 5.

The unpublished *Le Monde* shows the way he is going. He writes: "Others may, if they wish, imagine the form of fire, the quality of heat, and the process of burning to be completely different things in the wood. For my part, I am afraid of mistakenly supposing there is anything more in the wood than what I see must necessarily be in it, and so I am content to limit my conception to the motion of its parts."[78] And he goes on, not to banish the word "form," but to use it in his own way: to mean shape and size, with local motion as their cause: "the forms of inanimate bodies . . . can be explained without the need to suppose anything in their matter other than the motion, size, shape, and arrangement of its parts."[79] So he continues, throughout the text, to use "form" to mean shape and size, in particular, to refer to the "forms" of his three elements, but also more generally, to the character of mixed bodies, or even of "a quite perfect world."[80]

At the same time, there is one passage in which he seems to be using the term form in a more traditional way, in connection with his introduction of extension as the basic characteristic of matter. The philosophers, he says,

> should . . . not find it strange if I suppose that the quantity of the matter I have described does not differ from its substance any more than number differs from the things numbered. Nor should they find it strange if I conceive its extension, or the property it has of occupying space, not as an accident, but as its true form and essence.[81]

Here we see Descartes struggling with the terminology needed to carry his new conception of nature. Later, in the *Principles*, extension will be labeled the "principal attribute" of matter, and, as we shall see, "form" will unequivocally denote shape and size, the products of local motion. To some one used to scholastic ways of thinking, the notion of "extension," just plain taking up space, as the "true form and essence" of anything is curiously unsettling.

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[78] Descartes, *Le Monde*, AT X, 7; CSM I, 83. In another passage he also explicitly rejects the notion of a "motus ad formam," along with other scholastic conceptions of other than local motions; AT X, 39, CSM I, 94.

[79] Descartes, *Le Monde*, AT X, 25; CSM I, 89.

[80] Descartes, *Le Monde*, AT X, 26, CSM I, 89; AT X, 26, CSM I, 89; AT X, 33, CSM I, 91; AT X, 34, CSM I, 91; AT X, 39, CSM I, 94; AT X, 48, Descartes 1979, p. 79: AT X, 51–52, Descartes 1979, pp. 83–85.

[81] Descartes, *Le Monde*, AT X, 35; CSM I, 92. This passage deserves to be quoted, and studied, more fully than we can afford in the present context.

Where else does Descartes use the concept form? There is a surprising passage in Part One of the *Discourse*, where he is insisting that "reason and sense" are equally present in all men. "Here," he says, "I follow the common opinion of the philosophers, who say there are differences of degree only between the accidents, and not between the forms (or natures) of individuals of the same species."[82] This is following his advice to Regius with a vengeance, using the terminology of his teachers to introduce an argument that will lead in a direction diametrically opposed to theirs.

So far as we have discovered, however, a positive use of "form" occurs again only in the *Principles*, when Descartes has shaken his own ontological terminology into shape. Here, again, it is by no means a central concept, but occurs in two passages, in both of which it has the meaning of figure or size that it had already acquired, to a large extent at least, in *Le Monde*.[83] *Principles* II, 23 tells us: "*All the variety in matter, all the diversity of its forms, depends on motion*." And the explanatory paragraph shows us in a nutshell how satisfactorily Descartes has come to terms with scholastic form-matter talk:

> The matter existing in the entire universe is thus one and the same, and it is always recognized as matter simply in virtue of its being extended. All the properties which we clearly perceive in it are reducible to its divisibility and consequent mobility in respect of its parts, and its resulting capacity to be affected in all the ways in which we perceive as being derivable from the movement of the parts. If the division into parts occurs simply in our thought, there is no resulting change; any variation in matter or diversity in its many forms depends on motion. This seems to have been widely recognized by the philosophers, since they have stated that nature is the principle of motion and rest. And what they meant by 'nature' in this context is what causes all corporeal things to take on the characteristics of which we are aware in experience.[84]

A brief reference to "forms" in the text of *Principles* II, 47, though incidental to Descartes' argument there, is perhaps equally revealing. "By the operation of [the laws of nature] . . ." Descartes tells us, "matter must successively assume all the forms of which it is capable."[85] As Vincent

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[82] Descartes, *Discours de la methode*, AT VI, 2; CSM I, 111.

[83] We are ignoring adjectival or adverbial uses of "formal," "material," "formally," "materially," which of course occur frequently even in the *Meditations*. It would be difficult to speak to scholastic readers, as Descartes was doing, without using such terms; they do not materially (or perhaps we should say "formally"!) affect Descartes' argument.

[84] AT VIIIA, 52–53, CSM I, 232–233.

[85] AT VIIIA, 103, CSM I, 258. Descartes had said the same thing to Mersenne in a

Carraud has pointed out, Descartes is here echoing a statement by Saint Thomas, but with a very different intent, since here, again "form" is simply shape and size, and it is through Descartes' (divinely decreed) laws of (purely local) motion that the "successive assumption" of all forms possible for it will occur.[86] The same words, with a wholly different intent. Did they convince his readers, as he hoped they would? The reactions of those he did not convince would be another story,[87] but let us look briefly, in conclusion, at some of the ways in which Cartesians, or people who came to be Cartesians, in the seventeenth century used, or rejected, the traditional terminology in their work.

Cartesians

We began by considering how, both within and beyond the scholastic tradition, strict hylomorphism had been challenged before Descartes initiated his dualistic program. What did his followers, from the 1640s to the end of the century, do with the form-matter relation? There is no single answer to that question; let us look at a few cases, which range—though not in chronological order—from more to less (or least) retentive of Aristotelian concepts.

Father René Le Bossu believed there was no conflict between the ancient and the modern master; he published a "parallel" of their principles in physics, based largely, admittedly, on the work of Descartes' disciple Jacques Rohault.[88] As he saw the situation, Aristotle had been teaching beginners, and so started with what was obvious to every one, the sensible things around us, and asked what they were made of: thus, the statue, of bronze. For him, the "first" matter is, Le Bossu declares, the proximate matter, of which this thing is made. Descartes, at a more

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letter dated 9 January 1639: "Et ie croy qu'il y continuellement quelques parties de cete matiere subtile qui se ioignent aux cors terrestres, en sorte qu'il n'y a point de matiere en tout l'univers qui ne puisse receuoir successivement toutes les formes," AT II, 485.

[86] Aquinas 1918–1930, III, 22. This is an obscure passage about celestial bodies becoming more perfect by acquiring proper places by analogy to matter acquiring a proper form; there Aquinas says: "thus matter receives successively all the forms towards which it is in potential (sic enim successive materia omnes formas suscipit ad quas est in potentia)." See Vincent Carraud 2007. As Carraud also points out, Leibniz rails against the proposition on a number of occasions (for example, see his *Letter to Molanus*, ca. 1679, in Leibniz 1989, pp. 240–245).

[87] For that story, see chapters 8 and 9.

[88] Bossu 1981. See also Grene 1993.

advanced stage of science, considered the matter common to everything, which is extended substance, and every particular is given a form by the way that general matter is shaped. Their principles are not so different: for Aristotle there are three, privation, matter and form (and Le Bossu offers a unique account of how privation works: it is what is involved when you peel away the form to get at the matter: you deprive the thing of its form!). Descartes, thinking of what constitutes bodies, not of how we know them, needs only two principles: form and matter. Consider also their parallel definitions of matter and form:

> Aristotle: Matter is the proper and immediate subject of which each thing is made; it makes us know the form which is drawn from it. Extension is of its essence, but is not its essence.
>
> Descartes: Matter is an extended substance, which is the common subject of which all material things are made.
>
> Aristotle: Form is what makes each thing be what it is, and makes us know it in particular.
>
> Descartes: The material form is an arrangement of parts of matter; it makes each thing in particular be what it is.
>
> Aristotle: Matter and form are two equally substantial parts of the composite: each being an incomplete substance in purely material beings, composed of body and material soul.
>
> Descartes: Matter and form are not equally substantial, but matter alone is a substance.[89]

At least that is some concession of difference, but in the main it is the same form-matter universe, considered from different stages of the development of scientific knowledge.

Another way to reconcile Descartes and Aristotle was to contrast Aristotle himself (who really was an incipient Cartesian) with the wicked commentators and scholastics who corrupted him. That was how Johannes de Raey managed it: you take Aristotelian passages out of context and read them as a Cartesian.[90]

If they were giving formal academic lectures, however, even would-be Cartesians had to put their arguments into a standard scholastic, that is, more or less Aristotelian, framework. This is characteristic both of Heereboord in Leyden, and of Jean-Robert Chouet, who introduced

[89] Bossu 1981, pp. 284–287.
[90] See Grene 1993, pp. 73–77.

Cartesianism into the academy at Geneva.[91] Heereboord remarked in a letter that, after the Boots, nobody really could justify talk about "forms,"[92] and in his disputed questions, collected under the title *Meletemata*, he made heavy use of Pemble's arguments, arguing defensively that no one could consider that Fellow of Magdalen other than devout and decent.[93] But he could not organize his lectures in so shocking a manner. Chouet had been taught by Gaspard Wyss at Geneva and David Derodon at Nimes, both of whom questioned the doctrine of substantial forms; Derodon was even an atomist. Yet in their formal lectures both Heereboord and Chouet had to follow the traditional format, working their Cartesian, or other innovative, views into the context of the usual scholastic headings, including prominently matter and form.

Cartesians presenting their views outside the academy were not so constrained; yet even they made concessions to form and matter as the principles of physics. In Rohault's *Traité de la Physique*, for example, there are two such chapters. In chapter VI, Rohault introduces form and matter—minus privation—as "the principles of natural things" and, after some chapters on divisibility, motion and rest and other happily material matters, he inserts one on form (chap. XVIII) before proceeding to the elements.[94] It is a rather apologetic chapter, dismissing substantial forms in nature, but allowing some "essential" forms, as liquidity for water, as against "accidental" forms, like coolness in the same case. However, these notions seem to do little work in the treatise as a whole. Somewhat similarly, later in the century, the Cartesian Pierre-Sylvain Régis, in his *Whole System of Philosophy*, gets around to some brief chapters on form—by which he means simply shape—and from there goes straight to vortices.[95] Presumably there were among their readers still enough individuals schooled in scholastic thought, so that they found a little of such discourse politic; there seems no other reason for it. It certainly does very little work.[96]

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[91] Heereboord 1668; for Chouet, see Heyd 1982, esp. chap. 4, pp. 116–144.

[92] See the letter to Colvius of 8 April 1642, excerpted in AT VIIIB, 197. See also Verbeek 1992 and van Ruler 1995.

[93] Heereboord 1680, p. 162.

[94] Rohault 1987, vol. I, pp. 21–22 and 102–105.

[95] Régis 1970, La physique, livre second, chap. 1, "Des Formes des Estres purement materiels en general"; chap. 2, "Examen du 1. Chapitre du 1. Livre de l' ame, dans lequel on pretend qu' Aristote etablit les formes substantielles"; chap. 3, "De la division des Formes materielles en general"; pp. 390–397.

[96] We should note that Régis, in his preface, goes out of his way to assert the compatibility of the Cartesian doctrine of matter and form with the creation story. God

In a work such as Antoine Le Grand's *Entire Body of Philosophy according to the Principles of the famous Renate Descartes*, finally, the situation is again a little different. This was a very popular work, first published in Latin in 1671. The English edition of 1694 seems to be the seventeenth century equivalent of a coffee table book: illustrated "with more than an hundred sculptures," and "Endeavoured to be so done, that it may be of Use and Delight to the Ingenious of Both Sexes."[97] Le Grand's only chapter on form is entitled: "There are no Substantial Forms really distinct from Bodies."[98] Forms do enter into his account of matter, but in a thoroughly Cartesian manner. Here he concedes some agreement between Cartesians and Peripatetics, but turning the "agreement," rather as de Raey did also, in a Cartesian direction. The Aristotelians' "*First Matter*," he declares, is "nothing but an inadequate conception of a *Body*, as it may be conceived by us without any *Figure, Hardness, Softness, Colour*, or any other Modifications, and only as Extended, and consisting of Three *Dimensions*." From this there follow, he continues, four propositions on which both schools agree:

> The *First Proposition*: The First matter is *without form*: For in this, the Notion of *Extension* is abstracted from all Modification, that belong to the *Essence* of a *Body*.
>
> The *Second*: The *Matter* of all *things* is the *same*; for all *Bodies* agree in this first or Primary *Attribute* of a *Body, viz. Extension*, neither is there any distinction between them with relation to the *Matter*.
>
> The *Third*: Every *thing* may be made of every *thing*; or, according to the *Peripateticks*, *Matter* is capable of all *Forms*: For since all *Bodies* agree in *Extension*, all their differences must be from their various Modifications; if therefore there be an *Efficient Cause* sufficient to alter these *Modes*, it may make every thing of Every thing. On this *Proposition* are grounded all those *varieties* which are observed in *Bodies*.
>
> The *Fourth*: A *Body* as such, or the First *Matter*, is *Ingenerable and Incorruptible* …[99]

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created matter in an instant and subsequently informed it: "Nous supposerons donc que la Matiere a esté créée en in instant, mais que l'ornement, c'est à dire, que la disposition, l'ordre et l'arrangement de divers corps qui se sont formez par l'application successive de ses parties les unes les autres, s'est fait successivement en la maniere que nous allons décrire, ou en quelque autre maniere équivalente." Régis 1970, pp. 388–389 (unnumbered).

[97] Le Grand 1972, title page. For more information about Le Grand, see R.A. Watson, Introduction to Le Grand 1972; see also Grene 1993, pp. 80–81.

[98] Le Grand 1972, p. 102.

[99] Le Grand 1972, p. 94.

This is truly a very Cartesian Aristotle; indeed, the third proposition sounds very like Descartes' echo of a Thomistic thesis in *Principles* III, 47. Thus Le Grand seems to be presenting an even purer Cartesian natural philosophy than Rohault or even Régis do. Although he occasionally lapses into more Aristotelian discourse,[100] there is no hint of hylomorphic thinking anywhere.

Some Critics of Descartes

By the second half of the seventeenth century, Descartes' philosophical system had gained a major challenger in the atomism of Pierre Gassendi. Gassendi, in humanistic tradition, attempted a full-scale revival of the philosophy of the ancient atomist Epicurus, but needed to amend some of the seemingly heretical doctrines of Epicurus—in particular the one claiming that atoms, the components of the physical universe, are themselves eternal and uncreated. Instead, for Gassendi, atoms are created substances each endowed with their own motion at creation. The motion is sustained with the concurrence of God. Citing Epicurus and Lactantius, Gassendi indicated that these atoms are not homogenous particles, but indivisible units of matter in "ineffable variety": "In truth Lactantius was not unaware that all atoms were not considered round and smooth; he knew there were also angular and hooked ones."[101] Unlike the divisible, composite bodies formed by atoms, atoms themselves are completely solid and, therefore, their integrity cannot naturally be compromised. Further, atoms do not have forms or qualities other than "size, shape, and weight or motion," but provide explanation for all physical change as products of these essential qualities. Rarefaction, for instance, is explained as a relation between void and atoms: a body becomes less dense as the void space is increased within its internal dimensions. The particular types (in terms of size, shape, weight and quantity of motion) of atoms present explain the unique natural processes of any given composite body. Evaporation of water may result when the atoms and particles that are "smooth, or less angular and hooked, set themselves free and fly away," while the hooked atoms remain.[102] Again with the exception of

[100] Le Grand 1972, p. 322.
[101] Gassendi, 1658, vol. 1, p. 281.
[102] Gassendi, 1658, vol. 1, p. 282.

the human soul, Gassendi believed that his atoms require no immaterial principle to describe secondary causes, and attacked Aristotle and his interpreters on the grounds that matter-form talk contributed nothing to the understanding. "For even though they usually say that form is drawn from matter, still they are saying something that escapes our grasp, as long as they want form to be a real entity distinct from matter; and yet they do not admit that even the slightest particle of matter goes into its makeup."[103]

The differences between the philosophies of Descartes and Gassendi were fundamental. Still, to some critics, Descartes' matter theory looked very much like atomism. As early as 1637, responding to the publication of the *Discourse on Method*, Libertus Fromondus sent Descartes a work against Epicureans and atomists he had written earlier (*Labrynthius, sive De compositione continui*) and provided him with a series of objections against what he saw as his overreliance on atomistic and mechanical principles. Concerning Descartes' account of body in the *Meteors*, Fromondus commented: "This composition of bodies made up of parts with different shapes … by which they cohere among themselves as if by little hooks, seems excessively crass and mechanical."[104]

The Dominican Antoine Goudin spent almost 30 pages of his *Philosophia* arguing against Cartesian principles.[105] He disputed, for example, Descartes' conservation of quantity of motion based on God's immutability. According to Goudin, God can, without inconsistency, augment, diminish, or vary the motions he has given bodies. He also argued against Descartes' molecules as first principle: the principle of things must be something substantial; they must vary according to the variety of things. Extension is not something substantial; neither is shape and motion. Attributes such as these do not really vary from thing to thing; thus extension, shape, and motion cannot be the principle of things. For Goudin the core of his argument was that molecules of Descartes can no more explain the variety animals with sensation and life than can atoms. In fact, though he knew fully well and cited the *Principia* passages against Democritus, Goudin began his discussion of Descartes' principles by referring his reader to his previous criticism on the principles of the atomists; as he said, "Since the principles of Descartes do not differ from

[103] Gassendi, 1658, vol. 1, p. 335.
[104] AT I, 406.
[105] Goudin 1726 [1668], vol. 2, art. 4, pp. 16–44.

those of the atomists in their principal points, they are refuted by the reasons we have just given."[106]

In his prior disputation against the atomists,[107] Goudin argued that there are no atoms, and even if atoms are accepted *per impossibile*, they cannot provide any foundation as first principle. His line of reasoning was that, however small a body, it is always divisible; thus, there are no indivisible bodies, that is, no atoms. He considered the reply that atoms are so small that nature cannot abide a smaller body—they are divisible mathematically, or only by an operation of the mind, but that they are indivisible naturally and in reality. Goudin replied that atoms are different from one another—they have different shapes from one another, one longer, one larger. Nature therefore allows things smaller than some atoms. He asked rhetorically: what would prevent the branch or hook of an atom to be broken into two atoms, since there are such smaller proportions in nature? So there are no atoms; but even if there were atoms, Goudin asserted, they cannot be the principle of all things because they are not sufficient in themselves to explain the generation of sensitive and animate life out of their combinations alone—witness the exception made for humans and the insuperable difficulties with accounts of animals as machines without sensation. Ultimately, atoms and their combination cannot explain differences in kind. Finally, they cannot be reconciled with the mysteries of the faith.

The story we have been sketching, in broad outlines, starts with individuation shifting from matter to form; hence, when Descartes reconceived or eliminated form, individuation loomed as a problem. Descartes' principle of individuation, that is, the one announced in the *Principles of Philosophy*, that "all the variety in matter, or all the diversity of its forms, depends on motion,"[108] seemed clearly insufficient to critics of every kind. Descartes did have one form at his disposal, the rational soul, and in two letters to the Jesuit Denis Mesland on the Eucharist, he developed a two-tiered principle of individuation, one for animate and inanimate bodies and another for human bodies informed by a soul.[109] However, the Cartesians found Descartes' explanations in the Letters to Mesland so theologically sensitive that they did not disseminate them widely. Claude Clerselier did not publish these letters in his three-volume edition

[106] Goudin 1726 [1668], vol. 2, art. 4, p. 16.
[107] Goudin 1726 [1668], vol. 2, art. 3, pp. 10–16.
[108] *Principles* II, art. 23.
[109] See chapter 7.

of Descartes' *Letters*, though he did circulate them in private.[110] Clerselier shared the letters to Mesland with Robert Desgabets, who used them to defend Descartes' account in an anonymous pamphlet (*Considérations sur l'état present*), which was promptly condemned as "heretical and very pernicious." As a result, Desgabets' order, the Benedictines, prohibited him from speaking out publicly on theological matters. The consequence of these actions was that Descartes' only official principle of individuation was the one issued in the *Principles*.

Some Cartesians reacted negatively to what they thought was the inadequacy of Descartes' criterion of individuation. Take, for example, Gérauld de Cordemoy whose fame in part rested on his attempts to extend Cartesian philosophy to the fields of language and communication and his advocacy of Cartesian orthodoxy, such as his defense of the doctrine of animal-machines and the consistency of Cartesianism with Genesis;[111] above all, Cordemoy is known for the views he propounded in the 1666 *Le discernement du corps et de l'ame*, which expounded Cartesian physics. In the work, Cordemoy offered a variation of Cartesian mechanical philosophy—everything in the physical world is explained in terms of the size, shape, and motion of particles—but one that required atoms and the void. He rejected the indefinite division of body and the Cartesian identification of space and extension. He distinguished body and matter, matter being an assemblage of bodies, and claimed that bodies as such were impenetrable and could not be physically divided or destroyed. These views were intended as an answer to his criticism of the Cartesian principle of individuation of bodies as shared motion. According to the principle, a body at rest between other bodies would have to constitute a single body with the other bodies, even though we have a clear and natural idea of a body at rest between other bodies. Cordemoy proposed that shape, rather than motion, distinguishes the indivisible atoms.

In 1685, Leibniz commented upon Cordemoy's atomist solution to the Cartesian problem of individuation; although he appreciated Cordemoy's criticism of Cartesianism, Leibniz thought Cordemoy had not gone far enough with his solution. As Leibniz said,

> 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

[110] They were first published in 1811, and then, in a better edition, in Bouillier 1868.
[111] Cordemoy 1668.

> 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.[112]

This Leibnizian doctrine has its roots in an essay from 1676 entitled *Meditatio de Principio Individui*. There Leibniz also 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."[113] 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."[114]

You can see Leibniz making use of his principle of individuation in the 1686 *Discourse on Metaphysics*. Leibniz claims that God chooses the perfect world, one made up of individuals with actions and passions, since actions and passions properly belong to individual substances (§ 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

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[112] Leibniz 1923–, vol. 6.4, p. 1799; also Leibniz 2001, p. 279.
[113] Leibniz 1923–, vol. 6.3, p. 491; also Leibniz 1992, pp. 51–53.
[114] Leibniz 1923–, vol. 6.3, p. 491; Leibniz 1992, p. 51.

and Porus"; so we can say that from all time in Alexander's soul there are vestiges of everything that has happened to him and marks of everything that will happen to him and even traces of everything that happens in the universe (§ 8). Among the propositions to which Leibniz is committed is the claim that no two substances can resemble each other completely and differ only in number—*solo numero*. In an earlier draft Leibniz had added: "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."[115] Now, all of this is aimed squarely at Descartes' theory of matter and its consequent principle of individuation. And, according to Leibniz, the inadequacies of Descartes' theory of matter could not be resolved by atomist moves.

Leibniz's return to a more robust notion of form, or simple unity, seems to solve a problem inherent in Descartes' mechanism. If a body is infinitely divisible, and nothing beyond size, shape or motion of a body could be used to describe it, there would be no ultimate way to make it, or its parts, the thing it is. Leibniz assumes that a simple (substantial) unity, in essence a form, could be used to solve the problem. If a body is to be real, at some point it must contain something that unifies it as such. This formal atom would be a something like the rational soul of a human. As he says about ten years later,

> Hence, it was necessary to restore, and, as it were, to rehabilitate the *substantial forms* which are in such disrepute today, but in a way that would render them intelligible, and separate the use one should make of them from the abuse that has been made of them. I found then that their nature consists in force, and that from this there follows something analogous to sensation and appetite, so that we must conceive of them on the model of the notion we have of *souls*.[116]

This brings the circle back to infinitely divisible matter with forms fulfilling the function of individuation.

Cordemoy's atomism was an attempt to answer this problem within a broadly Cartesian framework. Leibniz demolished Cartesian atomism, re-establishing scholastic substantial forms and individuating notions or *haecceties*. Thus a *haecceity*, an individuating form, comes to be proposed as the element needed to individuate bodies, something that was missing from the official Cartesian matter theory.

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[115] Leibniz 1923–, vol. 6.4, p. 1541.
[116] Leibniz 1875–1890, vol. 4, pp. 478–479.

These are a few examples of both pre- and post-Cartesian discussion of form and matter. As we mentioned earlier, scholastic approaches also persisted throughout the century. However fateful the ultimate outcome for the hylomorphic perspective, the way to it was complicated and sometimes devious. By Descartes' time, matter was already struggling for independence of the form for which it used to long. Descartes endorsed that independence by assigning extension to it as its principal, indeed, its only essential, attribute.[117] At the same time he intensified the transformation of form into mere shape or size, and of course separated off mind as the only immaterial finite substance from any but a temporary task of informing body. Some form-matter talk lingered on, even among his followers, but, except for the persistence of a minority scholastic position and Leibniz's talk of the reestablishment of substantial forms in metaphysics, it was as good as over.[118]

[117] But see also Des Chene 1995 for scholastic precedents for that move.

[118] Scholastics—and members of religious orders, in this case, Jesuits and Minims—such as Fabri and Maignan discarded substantial forms: Honoré Fabri (1666) and Emanuel Maignan (1653).

CHAPTER FIVE

DESCARTES, BASSO, AND TOLETUS: THREE KINDS OF CORPUSCULARIANS

There is a general consensus that one of the more important changes in seventeenth century philosophy is the movement from what is variously called scholasticism, naturalism, or animism (what the Aristotelians hold) to what is variously called the mechanical philosophy, corpuscularianism, or atomism (what the moderns hold): "of central importance to the history of the physical sciences in the seventeenth century and beyond was the revival of the ancient atomistic doctrines of Democritus, Epicurus, and Lucretius."[1] This revival is understood as the attempt to explain the characteristic behavior of bodies in terms of the size, shape, and motion of the small particles that make them up; it is usually accompanied with the elimination of sensory qualities such as heat and cold, color, and taste. Given that atomism was rejected by Aristotle, the emergence of the mechanical philosophy appears to entail the rejection of scholastic philosophy. Historians and philosophers do seem to agree on these points:

> Throughout the scientific circles of western Europe during the first half of the seventeenth century we can observe what appears to be a spontaneous movement toward a mechanical conception of nature in reaction to Renaissance naturalism. Suggested in Galileo and Kepler, it assumed full proportions in the writing of such men as Mersenne, Gassendi, and Hobbes, not to mention less well known philosophers. [One can add Descartes, Boyle and Newton to the list].[2]

Even the latest history of the "scientific revolution" accepts this phenomenon and its accompanying demarcation into two camps, the Aristotelians and the moderns, in order to argue that

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[1] Garber 1992, p. 117.

[2] Westfall, 1971, pp. 31–32. Westfall argues (from a Newtonian perspective) that the conjunction of mechanism and corpuscularianism was detrimental to the scientific revolution, which needed to detach corpuscularian matter theory from mechanical or mathematical theory of motion (chap. 2).

> the superior intelligibility, and therefore the explanatory power, of the mechanical philosophy was more limited than its proponents claimed. Adherents' *conviction* that mechanical accounts were globally superior to alternatives, and more intelligible, has to be explained in historical rather than abstractly philosophical terms.[3]

Indeed, it has been argued that the central philosophical and methodological problems of early modern philosophy were not posed by Galileo's mechanics or Copernican astronomy, but by the so-called corpuscular or mechanical philosophy:

> One of the most persistent, and philosophically disturbing, features of most sciences of the 17th century was the radical observational inaccessibility of the entities postulated by their theories. As numerous scholars have shown, it was the epistemological features of this type of theory which occasioned much of the philosophizing of the 17th and 18th centuries.[4]

Now, it happens that Descartes would not have fully agreed with these characterizations. In *Principles* IV, article 202, "The philosophy of Democritus differs from my own just as much as it does from the standard view of Aristotle and others,"[5] Descartes explains the relations between his philosophy and those of Aristotle and Democritus in a symmetrical fashion. In the preceding article, Descartes had already claimed that there are particles in each body that are so small they cannot be perceived by the senses. That claim is the only point of agreement between his philosophy and that of Democritus: "It is true that Democritus also imagined certain small bodies having various sizes, shapes and motions, and supposed that all bodies that can be perceived by the senses arose from the conglomeration and mutual interaction of these corpuscles." Surprisingly, Descartes also presents the claim as a point of agreement between his philosophy as that of Aristotle. Descartes first puts aside the possible objection that the rejection of Democritus' philosophy might have been based on the fact that it "deals with certain particles so minute as to elude the senses, and assigns various sizes, shapes and motions to them." According to him, "no one can doubt that there are in fact many such

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[3] Shapin 1996, p. 57.

[4] Laudan 1981, "A Revisionist Note on the Methodological Significance of Galilean Mechanics," p. 23.

[5] Of course, the *Principles* has to be put into context as a teaching text, a work which Descartes hopes might be used in the schools; for that reason, Descartes is surely minimizing the differences between himself and Aristotle and maximizing the differences between himself and Democritus in the *Principles*. See Ariew 1996.

particles"; thus, he gives four other reasons for the rejection of Democritean atomism: (i) Democritus supposed his corpuscles to be indivisible; (ii) he imagined a vacuum around the corpuscles; (iii) he attributed gravity to these corpuscles; (iv) either he did not show how things arose only from the interaction of corpuscles or his explanations were not entirely consistent. Descartes affirms the first three reasons as valid: he himself rejects the indivisibility of corpuscles, demonstrates the impossibility of vacuum, and argues that there is no such thing as gravity in any body taken on its own. He then leaves to others the question of the fertility and consistency of his results. He ends the article with the pronouncement that he rejects "all of Democritus' suppositions, with this one exception [of the consideration of shapes, sizes and motions]," and that he also rejects "practically all the suppositions of the other philosophers." Thus, it is clear to Descartes that his method of philosophizing has no more affinity with the Democritean method than with any of the others. Again, the only relation that holds between his philosophy and Democritus', according to Descartes, is "the consideration of shapes, sizes and motions." But Descartes also asserts that he shares this consideration with Aristotle and all other philosophers: "as for the consideration of shapes, sizes and motions, this is something that has been adopted not only by Democritus but also by Aristotle and all the other philosophers." Thus, according to Descartes, the important differences are then the actual principles he uses—his "suppositions"—not any basic epistemological differences dealing with mechanism as opposed to naturalism.

The sharp separation between the scholastic and mechanical or corpuscularian philosophy can be challenged on other grounds. The second half of the seventeenth century also saw the rise of "Peripatetic atomism," which, according to the general consensus, is an oxymoron. But that is the title of a philosophy text by Casimir of Toulouse;[6] it is also the

[6] Casimir de Toulouse was a Capuchin monk (born circa 1633 and died in 1674). His main philosophical work, the six volume textbook *Atomi peripateticae* (1674), was an attempt to combine atomist and Aristotelian perspectives. Casimir allied himself with Gassendi, rejected substantial forms, and insisted that the building blocks of natural bodies were atoms, differentiated by their size, shape and motion. He argued for *vaculoae*, or gaps, surrounding atoms at all levels of matter, including subtle matter. He even proposed that animals could be explained in terms of the shape and motion of atoms. His work created some controversy within the Catholic Church and, by 1680, its volumes 2–6 were placed on the *Index* with the notation that they should be corrected: *donec corrigantur*.

attitude adopted by the Jesuit Honoré Fabri and others who introduce corpuscularian principles and explanations into scholastic philosophy.[7]

Instead of demarcating between the scholastics and the moderns, it would better to take Descartes' lead and to investigate intellectual relations holding between various philosophers. It might turn out that we would affirm Descartes' judgment that his philosophy differs as much from atomism as it does from scholasticism; or better, turning the judgment around, we might discover that Descartes' philosophy has as much or more in common with scholasticism than it does with atomism. Thus, I propose to look at the contrasts Descartes draws between his philosophy and that of the early atomist, Sebastian Basso, "one of the most influential authors among the early corpuscularians,"[8] and the one he might have drawn with those of contemporary scholastics such as Franciscus Toletus.

Mersenne and Descartes on Basso

Basso's reputation seems assured by the publication of his book, *Philosophiae naturalis adversus Aristotelem*,[9] which was cited by his more famous contemporaries, Mersenne and Descartes, among others.[10] Because of it, as early as 1624, Mersenne ranks him among the atheists. In *L'impiété des Deistes*, after having discussed such "despicable" authors as Charron, Cardano, Machiavelli, Bruno, the "accursed" Vanini, "and similar rogues," Mersenne talks about the work he is writing against them:

> I do not want to spend much time on this subject, since I expect to refute everything these authors stated so inappropriately in the Encyclopedia I am preparing in the defense of all truths and against all sorts of lies, in which I will examine more diligently what has been advanced by Gorlaeus, Charpentier, Basso, Hill, Campanella, Bruno, Vanini, and a few others.[11]

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[7] See Blum 1999. See also Thorndyke 1941–1958, vol. VII, chap. 23, for a discussion of Etienne Natalis, another Aristotelian corpuscularian, and Fabri.

[8] Meinel 1988, p. 182.

[9] Basso 1649 [1621]. For more details about Basso's life and times, see Lüthy 1997.

[10] Also Isaac Beeckman, Joannes Magnenus, the Boates, and others. Frey 1628, chap. 17, is entitled "Villonii theses et cum ipso Clavius, Garassus, et Bassonis, cribantur." Frey does discuss Garasse, Villon and de Claves, and in previous chapters he discussed Ramus, Campanella, Gassendi, Telesio, Patrizi, Bacon, and others as failed critics of Aristotle but, unfortunately, he forgets to say anything about Basso.

[11] Mersenne 1624, pp. 237–238. We should note that Bruno and Vavini were burned at the stake and that Campanella was imprisoned for more than two decade by the Catholic Church; we should also note that the "atheists" and "rogues" were not all atomists.

Mersenne proceeds to gives examples of the "impertinence" of these authors. He complains specifically about the adherence of Charpentier and Gorlaeus to the principle that "all things are made and derived from nothing" and that of Gorlaeus and Hill to atomism, that is, to Hill's "Epicureanism" and to the doctrine "that inside bodies there are atoms which have quantity and figure." Mersenne has nothing substantial to say about Basso, other than having placed him in such disreputable company; according to him, "ultimately, they are all heretics, which is why we should not be surprised that they agree, being all as thick as thieves." A year later, in *La vérité des sciences*, he ranks Basso again in roughly the same company, but this time it is as an anti-Aristotelian:

> Franciscus Patrizi has tried to discredit Aristotle's philosophy, but he made no more progress than Basso, Gorlaeus, Bodin, Charpentier, Hill, Olive, and several others, who raise monuments to Aristotle's fame through their writing, since they are not able to strive high enough to bring down the flight and glory of the Peripatetic Philosopher, for he transcends everything of the senses and imagination, and they grovel on the ground like little worms: Aristotle is an eagle in philosophy and the others are like small chicks who wish to fly before they have wings.[12]

The two early Mersenne references to Basso do not engender much confidence in the claim that Mersenne read Basso—that he read anything more than the title of the work. However, there are also indications in Mersenne's correspondence that he was acquainted with some of the contents of Basso's work. Indeed, he discussed certain of his doctrines with Descartes.

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[12] Mersenne 1625, pp. 109–110. Mersenne's point of view has found modern proponents. In *A History of Magic and Experimental Science* (Thondyke 1941–1958), Lynn Thorndyke asserts:

> The publication in Geneva in 1621 by Sebastian Basso of twelve books of natural philosophy against Aristotle testifies as much to the abiding influence and even dominance of the Stagirite as it does to the existence or success of opposition to his teachings. … Professedly at least Basso's own treatise is not a step forward to modern science but a step backward to the natural science of Aristotle's predecessors. Actually he deals with roughly the same set of topics and problems as do the Aristotelian works of natural philosophy and their subsequent commentators. And while professing to 'restore the abstruse natural science of the ancients,' Basso cites and depends upon his immediate predecessors like Zabarella and Piccolomini a great deal. Or he finds it advisable to refute and attack Scaliger, Toletus, and the Conimbricences. In other words, his book … is more in the nature of a critical commentary upon the Aristotelian philosophy as developed during the medieval and sixteenth centuries than it is a new departure in the direction of modern science. (VI, pp. 386–387.)

Basso was reasonably well-known to Descartes, who, like Mersenne, listed him with Bruno and Vanini, among others. In the only place where Descartes mentions Basso by name, he ranks him among the *novatores*—the innovators: "Plato says one thing, Aristotle another, Epicurus another, Telesio, Campanella, Bruno, Basso, Vanini, and all the innovators (*novatores*) all say something different. Of all these people, I ask you, who is it who has anything to teach me, or indeed anyone who loves wisdom?"[13] But this passage is not the only place in which Descartes gives his opinion of Basso's philosophy. Descartes had written to Mersenne on 8 October 1629: "As for rarefaction, I am in agreement with this physician and have now made up my mind about all the foundations of philosophy; but perhaps I do not explain the *aether* as he does."[14] According to the editors of Descartes' works, the person in question was perhaps Villiers, a physician from Sens,[15] but this identification was corrected as a reference to Basso by the editors of Mersenne's correspondence.[16] Thus, with Descartes, we finally have specific comments about the contents of Basso's philosophy.

Another probable reference to Basso is contained in an addition to Descartes' correspondence, the letter to Huygens of 28 March 1636. A few days before the letter, on the 23rd of March, Huygens had offered Basso's *Philosophiae Naturalis adversus Aristotelem* to Barlaeus, who refused it, since he already owned a copy. In the letter itself, Descartes thanks Huygens for a book he just sent him:

> The book which you did the favor of sending me yesterday is truly a recent blessing, for which I very humbly thank you. I do not know whether I dare say this to you, since you have had the patience to read it, but I am persuaded that my reveries will not be insufferable to you, for, if I remember, it is only good for destroying the opinions of Aristotle, and I seek only to establish something, so simple and manifest, that the opinions of all others would agree with it.[17]

Assuming, what is probable, that Descartes was speaking of Basso in all these passages, what do they tell us about Descartes and Basso? We must first note that there was a change of mind in Descartes about Basso. Initially, in October 1629, Descartes agreed with him about rarefaction,

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[13] *To Beeckman*, 17 October 1630, AT I, 158.
[14] AT I, p. 25.
[15] AT I, p. 30.
[16] Mersenne 1933–1988, vol. 2, pp. 302, 307–308; cf. the appendix of the 2nd revised edition, AT I, p. 665.
[17] AT I, pp. 602–603.

but disagreed about the ether. Then, a year later, we have the identification with the *novatores* in the context of an ill-tempered letter to Beeckman concerning what anyone can teach another. Basso does not have anything to teach Descartes, any more than anyone else (unless he can convince him by his reasons). Finally we have the disavowal of Basso: he is good only for destroying Aristotle's opinion, Descartes denying that he shares this intent, claiming that he seeks only to establish something so simple and evident that everybody would agree with it. However, in order to answer the question fully, we need to recall the doctrines of Descartes and Basso on the subject of rarefaction and the ether; this requires us to discuss also their views on corpuscles and the void. But above all, we need to compare these doctrines with those of the Aristotle of the scholastics at the start of the seventeenth century, Aristotelians such as Eustachius a Sancto Paulo, Scipion Dupleix, and perhaps the early Daniel Sennert,[18] but especially Toletus and the Conimbricences, authors constantly cited by Basso, and whom Descartes remembers reading in his youth.[19]

Some Novelties in Late Scholasticism

For a late (or post-Renaissance) scholastic, there are two kinds of mutation, substantial (or generation and corruption) and accidental (or motion). Generation and corruption are changes in the substance of a thing: the substance acquiring or losing a substantial form. Substantial forms are said to be indivisible, not capable of more or less, and not possessing contraries, and thus they cannot be acquired successively and piecemeal. Motion, in contrast, occurs successively between contraries; motion must pass from one contrary as the term from which (*a quo*) to the other contrary as the term to which (*ad quem*). According to its Aristotelian definition, "the actualizing of what is in potentiality insofar as it is in potentiality,"[20] motion is an imperfect actuality, the actuality of a being whose potentiality is being actualized while it still remains in potency for further

[18] Eustachius a Sancto Paulo 1629; Dupleix 1990; Sennert 1618 (English Trans. 1659); de Raconis 1651.

[19] Toletus 1589. Conimbricenses 1592. For more complete bibliographic information on these and other such commentaries, see Lohr 1988. For the reference in Descartes' correspondence to his remembering Toletus and the Coimbrans, see *To Mersenne*, 30 September 1640, AT III, 185.

[20] For example, Dupleix 1990, III, chap. 4, p. 187.

actualization. In this terminology, in general, to be in actuality is to "participate in a form"; thus, an actuality is "an accidental or substantial form, in succession or permanently." Moreover, to have potentiality is to have a "principle of acting, or undergoing something."[21] A being moves, then, by virtue of the successive acquisition of qualitative or quantitative forms or of places. For example, water becomes hot by the acquisition of heat, which it has the potential for acquiring. Forms in the categories quantity, quality and *ubi* or place, have contraries or positive opposite terms. Thus, true motion is only in those three categories, which entails that there are three kinds of motion: augmentation and diminution (in the category of quantity); alteration (in quality); and local motion (in place). But since a thing cannot both be in actuality and potentiality at the same time with respect to the same form, no object undergoing change can be the active source of its own change or motion; rather, it would have to be moved by an agent already possessing the actuality it itself lacks. Water, for example, cannot be the active cause of its own heating, whereas fire can be the cause of the water's heating, given that fire is actually hot and can turn the water's potentiality for heat from potency to act. That which moves, the agent that introduces a form, must possess the form or actuality; that which is moved has the power or potentiality for receiving the form: "in physical change, all these are found: an agent, a patient …, and furthermore an acquired form, and a way or medium by which it is acquired."[22] The thing which moves and the thing which is moved are therefore not the same, resulting in the principle that everything which is moved is moved by some other thing. Another consequence of the definition of motion is that rest is opposed to motion; it is the privation of motion in the thing which is naturally capable of motion and, inasmuch as motion is made to accomplish rest, it is also said to be the end or perfection of motion. However, living things are moved as well by an internal principle of motion, and the elements, that is, the simple bodies, are carried to their natural places by their forms, which tend to their natural places (the natural place of earth being in the center of the universe, surrounded, in order, by the natural places of water, air and fire).[23]

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[21] Toletus 1589, III, chap. 1, text. 3: "esse in actu est participare aliquam formam … Esse actum est esse aliquam formam accidentalem vel substantialem, successivam, aut permantentes … Esse autem potentiam, est esse principium agendi, aut patiendi aliquid."

[22] Toletus 1589, III, chap. 3, quaest. 1.

[23] See also Dupleix 1990, III, chap. 1–15, pp. 173–228; Sennert, 1618, I, chap. 8, pp. 23–29 (1659, I, chap. 9, pp. 43–46).

An important change in the Aristotelian theory of motion was the adoption of *impetus* theory by the late scholastics, including Toletus, who (along with Julius Scaliger) was usually cited as the authority in favor of *impetus* by textbook authors in the seventeenth century.[24] These authors, usually Jesuits, credited John Buridan, Albert of Saxony, Scaliger, and Domingo de Soto with the doctrine, thereby giving a sketch of its line of descent. *Impetus* was an attempt to solve a difficulty in the Aristotelian theory of motion: the continued lateral motion of a projectile. Aristotle argued not only that everything in motion is moved by something else, but also that the mover must be in contact with the moved thing. In the case of projectile motion, the only thing in contact with the moving object is the medium through which it moves (usually the air). Aristotle's solution was that the mover of the projectile gives the air immediately surrounding it the power to move the projectile further and that this power is passed on through the medium with the projectile. Scholastics such as Buridan rejected this solution and proposed instead that, when a projectile is thrown, the mover transmits an *impetus* to it which then continues to act as an internal cause of its continued motion. Buridan treated the *impetus* as a quality inherent in the moving body, proportional both to the quantity of matter of the moving body and to its speed. He believed *impetus* to be a quasi-permanent quality and, consequently, he inferred that, once the moving body was set in motion, it would tend to continue to move under the direction of the *impetus* until some counteracting cause or resistance intervened.[25]

A second major change in late Aristotelianism was the theory of *minima naturalia*, generally discussed in the context of rarefaction and condensation, or change of quantity. As a rule Aristotle was strongly anti-atomist. He thought the continuum could be divided indefinitely. However, he also uttered the obscure assertion that "neither flesh, bone, nor any such thing can be of indefinite size in the direction either of the greater or of the less."[26] This comment took on a life of its own.[27] By the seventeenth century, the resulting doctrine entailed that there were intrinsic limits of greatness and smallness for every sort of living thing.

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[24] See de Raconis 1651, pp. 247 et seq.

[25] Buridan 1509, VIII, quaest. 12.

[26] *Physica* 187b18–21.

[27] For a history of *minima naturalia* from Averroes to Toletus, see Duhem 1913–1958, vol. 7, pp. 42–54 and 1908–1913, 2eme séries, pp. 11–15. There is also an account in van Melsen 1960, I, chap. 2, pp. 58–81.

For example, some argued that since every natural body has an actually determined substantial form, every natural body must have a determinate assortment of accidents and its quantity must be limited to some particular range. Moreover, they asserted limits even for the four basic elements (earth, air, fire, water), which have no determinate magnitude of themselves and intrinsically; the elements might be augmented indefinitely, if there were matter enough, and their division can be continued indefinitely. They do have an extrinsic limitation, however, with respect to prime matter: there may not be enough prime matter to sustain a form and the amount of prime matter is finite. Moreover, elements cannot be condensed or rarefied, that is, they cannot have their quantity changed indefinitely, without being corrupted. For example, earth cannot be as rarefied as fire, and fire cannot be as condensed as earth; when air is condensed too much, it is turned into water, and water overly rarefied is turned into air.[28] Thus, for a late scholastic, rarefaction and condensation, that is, augmentation and diminution in quantity, could result in generation and corruption, under appropriate circumstances. There is, then, a natural minimum of any given element, which is to say that late scholasticism could countenance a kind of atomism. This doctrine of a natural minimum became a bridge between Aristotelian and alchemical theories of matter.

Daniel Sennert, Professor of Medicine at Wittenberg, provides a good example of a corpuscularian alchemist working within a scholastic tradition of *minima*.[29] Sennert was a prolific author of works in natural philosophy, chemistry, and medicine. His books went through numerous editions, with several of them being translated into English. In his mature work Sennert announced his aim as the correction of Aristotle by reason and experience.

> For neither would I be of those number of rash innovators, whether Paracelsians or Chymists, or how ever otherwise called, who endeavor wholly to banish from the Schools the ancient philosophy, which is come to us chiefly from the Writings of Aristotle: nor yet would I be reckoned amongst them who are not ashamed in this Age of ours publickly to profess, that they had rather err with Aristotle and Galen, than speak the truth with any later author.[30]

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[28] Toletus 1589, I, cap. 4, quaest. 10–11; Sennert 1618, I, chap. 5, pp. 15–16 (1659, I, chap. 5, pp. 27–29); de Raconis 1651, pp. 370–377.

[29] Newman 2006 is an excellent exposition of early modern alchemy centered around Sennert and his influence on Boyle.

[30] Sennert, 1659, p. 413.

The changes Sennert wished to make are particularly evident in the third discourse, "Of Atomes and Mixtures"; there Sennert develops the notion that the matter constituting bodies is composed of particles that can be divided again into their original minimal form. Like other chemists, he uses chemical operations to argue that there are atoms in nature.

> And although those Atomes be so exceedingly small; yet the essential forms of things remain in them entire, as was lately said, and experience it self does witness. For if Gold and Silver be melted together, the Atomes of the Gold and Silver are so mingled together, that no sense can discern the one from the other. Yet both of them do retain their forms entire. Which appears hereby in that if you put *Aqua fortis* upon the said Mass, the Silver melts and turns into the Liquor, but the Gold remains in the form of a Powder.[31]

Sennert's atoms are of two kinds. First are those from which all things are made, that is, the four Aristotelian elements each with its own form. They are the smallest things in nature. Sennert argues that the particles of fire are the smallest atoms, that they are more subtile than the atomes of earth, and "that they diffuse not themselves beyond their Natural bounds."[32] He constructs an argument on analogy with light, which he claims has a *minimum naturale*:

> though there is not a smallest in quantity, yet Light hath a smallest in Nature, that is to say, so smal a Light that it cannot be smaller without perishing. After which manner there are also the smallest among Natural Bodies; which if they be any more divided they lose their form and essence.[33]

Sennert even argues that this view is consistent with the division of the continuum to infinity:

> Now those disputes against Atomes concerning the infinite division of that which is continued of indivisible Lines, are disputed not from Natural but Mathematical Principles. For the question is not here … whether a thing continued be perpetually divisible Mathematically? but, whether or no Nature in her Generation and resolution of Bodies does not stop at some smallest Bodies, than which there are not, nor can be any smaller.[34]

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[31] Sennert 1659, pp. 453–454.
[32] Sennert 1659, p. 454.
[33] Sennert 1659, p. 454.
[34] Sennert 1659, p. 454.

The second atoms, which Sennert specifically identifies with the principles of the chemists—such as quicksilver, vitiol, sulfur, and salt—are the first mixtures, or second-order corpuscles composed out of the atomic elements. These are rarely divided but other compound bodies normally resolve into them. "For there are (in the second place) Atomes of another kind besides the Elementary (which if any man wil term first mixt bodies, he may do so as he please) into which as similar parts other compounds are resolved."[35] Sennert's hierarchy of particles enables him to recover the alchemical tradition as a middle-level theory within a broadly Aristotelian framework of the four elements differentiated at the basic level by their natures.

A third major change concerned Aristotle's denial of the void, and specifically, motion in the void. Aristotle concluded against the atomists that motion is impossible in the void, using an argument deriving from his principles of motion. A body moving by impact moves in proportion to the force exerted on it and in inverse proportion to the resistance of the medium in which it is situated. Since a void would provide no resistance, the body "would move with a speed beyond any ratio"[36]—but such instantaneous movement is impossible. Scholastics attempted to soften this and similar arguments, not so as to accept the existence of the void, but so as to accept its possibility, that is, to argue that God could create a void.[37] As a consequence, there were numerous discussions of Aristotle's argument about the impossibility of motion in the void, many of them prompted by an internal criticism of Aristotle's position; in particular, it was noted that, in his system, the heavens have a determined speed of rotation but are not slowed down by the resistance of any medium. If one applied Aristotle's reasoning about the impossibility of motion in the void to the heavens, then the heavens would have to rotate with a speed beyond any ratio. On the other hand, rejecting

[35] Sennert 1659, p. 451.

[36] *Physics* 215b21–22. Aristotle also argued that the void is impossible, if it is thought to be a place with nothing in it, that is, a location actually existing apart from any occupying body (*Physics* IV, chap. 6–7).

[37] Although attacks on Aristotle's views about the void preceded the condemnations of various propositions in 1277, they gained theological inspiration from them (see Schmitt 1987 for the influence of Philoponus in the views of Toletus and the Coimbrans, among others). Among the relevant condemned propositions were "That God could not move the heavens in a straight line, the reason being that he would then leave a vacuum," and "That he who generates the world in its totality posits a vacuum, because place necessarily precedes that which is generated in it; and so before the generation of the world there would have been a place with nothing in it, which is a vacuum."

Aristotle's reasoning might lead one to postulate an internal resistance to motion, thus invalidating the conclusion that a body would move with a speed beyond any ratio in the void (that is, instantaneously).[38] A reading of Aristotle that became standard in the seventeenth century was that he denied motion in the void, in contradiction to other ancients, only because they did not posit any other cause for the duration of motion than the resistance of the medium; according to this reading, Aristotle would agree that motion in the void would not be instantaneous and, although vacuums do not naturally occur, they are not impossible supernaturally. The same conclusion was also reached in disagreement with Aristotle. For example, Toletus understood Aquinas as holding against Aristotle that motion in the void would not be instantaneous and supported Aquinas' position.[39] Other textbook writers, such as Dupleix, also denied Aristotle's argument against the impossibility of motion in the void, asserting that the speed of the motion would not be due just to the resistance of the medium, but also to the weight and shape of the moving body.[40]

In sum: unlike what might have been expected, late Aristotelianism countenances a kind of corpuscularianism. Its theory of motion also includes a feature that looks similar to the principle of inertia. Moreover, voids are no longer completely impossible and motion is possible in the void. However, late scholasticism also reinforces the account of mutation as change of form, whether it is the acquisition or loss of a substantial form in generation and corruption, or the successive acquisition or loss of accidental forms or places in motion.

Basso on Atoms, the Ether, the Void, and Rarefaction and Condensation

The structure of Basso's work is clear.[41] Basso alternates exposition and criticism of Aristotle with exposition of what he calls the philosophy of the ancients, that is, of Aristotle's predecessors, by which he means Plato,

[38] This conception was developed by Thomas Aquinas, among others. See Duhem 1985, chap. 9.

[39] Toletus 1589, IIII, quaest. IX. Eustachius a Sancto Paulo agreed, calling motion in the void extremely probable, (1629, Physica, tract. III, 2nd disp., quaest. 4–5).

[40] Dupleix 1992, IV, chap. 10.

[41] In this section I am in basic agreement with the recent literature on Basso: Kubbinga 1984, Meinel 1988, Nielsen 1988, and especially Lüthy 1997.

Empedocles, and especially Democritus.[42] The philosophy he wishes to recover is atomism. Rejecting the matter-form debates altogether, he proposes that matter makes up its own natural *minima* by arrangement of homogeneous and incorruptible atoms; these "retain their differences when conjoined."[43] According to Basso, the ultimate constituents of bodies are the minimal particles of matter he calls "atoms." These atoms are smaller than the invisible internal organs of the tiniest animals;[44] they are preexistent, incorruptible, and limited in number.[45] They were created by God at the beginning of time[46] and, setting aside the possibility of their annihilation by God, they are indestructible.[47] As we have said, each atom is homogeneous, a simple body possessing a particular nature that persists in mixtures; when atoms enter into composition, they make up natural minima having their own proper natures.[48] According to Basso, there are four kinds of elementary atoms (other than the ether), coinciding with the four scholastic elements.

For Basso, all mutations—generation and corruption, alteration in quality, and augmentation and diminution in quantity—are explicable at the level of the ultimate constituents of matter. Generation and augmentation in quantity are the gathering together of atoms or clusters of atoms; corruption and diminution in quantity are the dispersing of atoms that were previously united. Alterations in quality result from atoms of one kind being substituted for atoms of another:

> Infinitely varied parts can be composed in many ways from these primary particles, which are so different among themselves; it is not difficult to understand that by the subtraction or addition of any particle, or by a variation in the arrangement of parts, some parts can be easily converted into the nature of others.[49]

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[42] I cite the 1649 edition; we should note that the subtitle is *In quibus abstrusa veterum physiologia restauratur, et Aristotelis errores solidis rationibus refelluntur*.

[43] Basso 1649, p. 27; see also the resumé, p. 67: "quod ex primis illis qua constituebant, rerum particulis, ita res omnes componi assererent, ut in composito propriam naturam retinerent."

[44] Basso 1649, pp. 14–15.

[45] Basso 1649, pp. 7–8.

[46] Basso 1649, p. 13: "cum agimus de atomis, censemus eas a Deo creatas, quod fuit praemonendum."

[47] Basso 1649, pp. 112–113.

[48] Basso 1649, p. 23.

[49] Basso 1649, p. 72.

Thus, for Basso, completely new generation is an illusion; what happens instead is the continuous reorganization of atoms.[50] Basso attempts to disprove the scholastic doctrine that the four elements can assume new substantial forms and thus can be generated from one another.[51] Rebutting this doctrine is particularly important to him since, for scholastics, it contrasts with the doctrines of Democritus about the incorruptibility of atoms.

Basso introduces the ether as a fifth element into the world of atoms, in part to explain rarefaction and condensation, and in part to explain why atoms move.[52] The ether is material and it consists of atoms.[53] It is far more tenuous than the elementary atoms; it permeates every kind of object insofar as it fills the gaps between the atoms of the four elementary kinds.[54] It is the cause of the motion of atoms and, in this way, the cause of the mutations of bodies.[55] Atoms of the four elementary kinds do not possess motive power; they are put into motion solely by something external, namely, the ether.[56] Basso's concept of causation is proto-mechanistic. He does not consider the possibility that atoms may have their own principle of motion.[57] Given that Basso does not envision a principle of inertia and does not mention the late scholastic account of *impetus* (despite the fact that it is discussed by Toletus), introducing empty space into the universe would have unwelcome consequences. The empty space would disrupt the continuity of the ethereal motion. As a result, Basso rejects the void: nature abhors a vacuum.[58]

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[50] Basso 1649, pp. 9–10: "Hinc, monstrant quomodo et ex corruptione nihil de novo generetur: sed tantum earundem partium quarum facta erat copulatio, fiat resolutio …"; pp. 215–216: "in materialibus discrepare videantur, in eo tament concordabant, quod, cum nihil ex nihilo fieri constantes assererent, negarent cujus quam generationem aliud esse, quam principiorum praexistentium diversam compositionem."

[51] Basso 1649, p. 118 et seq.: "Certum est autem, ni detur forma substantialis, non dari mutationem substantivam, qualem isti volunt: sed generationem esse nihil aliud quam quod veteres voluerunt."

[52] Basso credits the Stoics for having discovered the ether, or *Spiritus* (1649, p. 300: "En tibi Stoici clari manifestarunt"), though he also maintains anachronistically that Democritus had atoms moving in the ether, in opposition to Aristotle's report that Democritus defended the existence of the void (1649, p. 305).

[53] See, for example, Basso 1649, p. 220; pp. 382–384.

[54] Basso 1649, pp. 304, 306.

[55] Basso 1649, pp. 308–309, 387–388.

[56] See Basso 1649, pp. 300 et seq.

[57] Basso 1649, pp. 8, 10.

[58] Basso 1649, p. 300: "vacuum … a quo natura abhorret"; p. 311: "vacuum, a quo Natura abhorret."

As long as he denies the void, Basso cannot have recourse to the atomist explanation of rarefaction and condensation as changing ratios of atoms to void. And since he also repudiates the Aristotelian explanation of the phenomenon as change of qualitative form, he is compelled to use the ether. According to Basso, the phenomenon occurs when "all similar natural minima are diminished" with the result that "the object becomes condensed, and when their quantity is increased, the object becomes rarefied."[59] For these natural minima to increase, the ether needs to interpose itself between the atoms of the body; in this way the gaps between the elementary atoms grow wider as the volume of the body increases: "by penetrating into the parts of air it separates them from one another, occupying a greater place."[60] Condensation is simply the reverse of this process.[61]

Since, for Basso, the atoms of ether do not penetrate or pass through the elementary atoms, but permeate only the interstices existing between the elementary atoms,[62] even when the elementary atoms form a compound, the ether is an external principle of motion; the atoms of ether do not become constituent parts of compound bodies[63] and, thus, do not play the role of an internal principle. Moreover, the ether is continuous insofar as any atom of ether is always adjacent to some other ethereal atom and participates in the motion which is shared by all ethereal atoms. It is the link that unifies the various particles. It moves every elementary atom according to its own aptitude.[64] Given that part of the aptitude of an atom is having a proper place, each kind of atom has its proper place. Basso is a geocentrist.[65] Thus, the atoms of earth belong at the center of the universe, surrounded, in order, by the regions of water, air, and fiery atoms.[66] Though the ether is the cause of motion, it is totally inert in itself. It is in constant need of being kept in motion by a higher cause. God is the higher cause on which the ether depends, not only for its motion but also for its directing of the motion of the elementary atoms. The ether is always dependent on God's continually infusing motive force as well

[59] Basso 1649, pp. 293–294.
[60] Basso 1649, p. 300.
[61] Basso 1649, p. 301.
[62] Basso 1649, pp. 304 et seq.
[63] Basso 1649, p. 308.
[64] Basso 1649, pp. 300–303, 307–309.
[65] Basso 1649, p. 279.
[66] Basso 1649, pp. 279–280.

as directing its motion to its proper ends: "By means of this spirit God moves the single elements not differently than they would move if this motive power were innate in them."[67]

Basso, then, is a kind of Democritean atomist (as opposed to a *minima naturalia* theorist): his atoms are indestructible and do not transmute into one another. However, he is a rare kind of atomist, who denies the void, filling his universe with an ether that does not combine with other atoms. His atoms provide him with a decidedly nonscholastic theory of change: all change is due to the local motion of atoms. Rarefaction and condensation is not the acquisition or loss of a qualitative form; the ether simply inflates or deflates a body. But Basso's universe is inert. Its primary cause of motion is God, who imparts motion to the ether; the ether, in turn, moves the various particles.

Early Descartes (1629–1633) on Corpuscles, Rarefaction, and Subtle Matter

Unlike Basso, Descartes is not an atomist.[68] His matter is indefinitely divisible: "every body can be divided into extremely small parts … It is certain that it [the number of these small parts] is indefinite."[69] But like Basso, Descartes uses atomist modes of explanation; he explains the visible by the invisible—macro-phenomena by reference to micro-phenomena; as Descartes says in *Le Monde*, not only the four qualities called heat, cold, moistness, and dryness, "but also all the others (and even all the forms of inanimate bodies) can be explained without the need of supposing for that purpose anything in their matter other than the motion, size, shape, and arrangement of its parts."[70] So, like Basso, Descartes does not need substantial forms and does not explain mutation as change of form, whether substantial or accidental. He finds no "forms" other than the ones he has described quantitatively.[71] He even makes fun of the scholastic definition of motion, complaining that its "words are so obscure" that he is compelled to leave them in Latin because

[67] Basso 1649, pp. 284, 307 et seq.
[68] For more on these topics, including contrasts with Descartes' later views, see Garber 1992.
[69] *Le Monde*, chap. 3, AT XI, p. 12.
[70] *Le Monde*, chap. 5, AT XI, p. 26.
[71] *Le Monde*, chap. 5, AT XI, pp. 26–28.

he "cannot interpret them."[72] For Descartes, the only motion is local motion; hence he states:

> The philosophers also suppose several motions that they think can be accomplished without any body changing place, such as those they call *motus ad formam, motus ad calorem, motus ad quantitatem* … and a thousand others. As for me, I know of none except the one which is easiest to conceive …, the motion by which bodies pass from one place to another.[73]

God is the cause of motion in Descartes' universe[74] and, because of his immutability, the first law of motion is "that each individual part of matter always continues to remain in the same state unless collision with others forces it to change that state."[75] If a part of matter has a certain size, it will remain that size, unless something else divides it or changes it in some way; if it is moving, it will continue to move, unless something else retards it; and if it is at rest, it will stay at rest until something else drives it away. For Descartes, rest is a quality of matter just as motion is; it is not a privation of motion.[76]

Since Descartes, like Basso, is also against the void[77] (though for very different reasons), their explanations of rarefaction and condensation also agree:

> The corpuscles which enter a thing during rarefaction and leave during condensation, and which can penetrate the hardest solids, are of the same substance as visible and tangible bodies; but you must not imagine that they are atoms … Think of them as an extremely fluid and subtle substance filling the pores of other bodies.[78]

However, in most respects, Descartes and Basso do differ about the nature and function of that subtle fluid. For Descartes, all the elements are quantitatively differentiated—differentiated by shape, size, and motion—and, therefore, all of them are transmutable into one another.[79] Thus, the

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[72] *Le Monde*, chap. 7, AT XI, p. 39.
[73] *Le Monde*, chap. 7, AT XI, pp. 39–40.
[74] *Le Monde*, chap. 7, AT XI, pp. 37–38, 46–47.
[75] *Le Monde*, chap. 7, AT XI, p. 38.
[76] *Le Monde*, chap. 7, AT XI, p. 40.
[77] *Le Monde*, chap. 4, AT XI, pp. 16–23.
[78] *To Mersenne*, 15 April 1630, T I, pp. 139–140; see also *To Mersenne* 25 February 1630, AT I, 119, for the same account, using the analogy of the sponge.
[79] As Descartes will say, "matter passes successively through all forms it is capable of assuming (la matiere doit prendre successivement toutes les formes dont elle est capable)," *Principles* III, art. 47 and *To Mersenne*, 9 January 1639, AT II, p. 485.

ether is not any different than any other element. There is, however, an aspect of Descartes' subtle matter that does resonate with what Basso says about his ether. Descartes notes that his first and second elements do not enter into composition with his third element:

> But we should note that, even though there are parts of these three elements mixed with one another in all bodies, nonetheless, properly speaking, only those which (because of their size or the difficulty they have in moving) can be ascribed to the third element compose all the bodies we see about us … We may picture all these bodies as sponges; even though a sponge has a quantity of pores, or small holes, which are always full of air or water or some other liquid, we nonetheless do not think that these liquids enter into its composition.[80]

Finally, in contrast with Basso, God is the cause of the motion of all matter for Descartes, not just the cause of the motion of the ether; Descartes' world, unlike Basso's, is not inert.[81] Motion, as Descartes says, is a quality of matter; it is preserved by God in his continual recreation.

The contrast can be made more explicit if one considers motion in the void. Descartes agrees with the late Scholastics and disagrees with Aristotle and Basso in holding that motion is possible in the void. For Descartes, the state of a body would not change in the void;[82] for a late scholastic, an *impetus* would not be corrupted in the void. In contrast, according to Aristotle, motion in the void would be instantaneous and, thus, impossible; and for Basso, a gap in the universe would prevent the ether from exercising its activity.

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[80] *Le Monde*, chap. 5, AT XI, pp. 30–31.

[81] Obviously neither Descartes' world nor Basso's is alive in the sense that they are filled with souls or forms (as Leibniz's world will be). In comparison with such a world, both of these would be deemed inert. For God as the cause of motion in Descartes' philosophy, see Garber 1992, chap. 9, esp. pp. 273–292.

[82] It should be noted that Descartes' rejection of the void is even sharper than the scholastics', Descartes looking more like Aristotle than the Aristotelians. In *Principles* II, art. 18, Descartes argued for the impossibility of empty space, both in and out of the world. Thinking of a vessel, its concave shape, and the extension that must be contained in this concavity, he asserted: "it would be as contradictory of us to conceive of a mountain without a valley, as to conceive of this concavity without the extension contained in it, or of this extension without an extended substance." In fact, he decided that if God were to remove the body contained in that vessel and did not allow anything else to take its place, the sides of the vessel would thereby become contiguous. However, even though Descartes thinks the void is impossible, he does not think that motion would be impossible in the void if, *per impossibile*, there were a void. Interestingly, Descartes defined void as "a space filled with matter that neither increases not diminishes its motion," *To Mersenne*, 15 November 1638, AT II, 442.

So far, we can confirm that Descartes' account of rarefaction does agree with Basso's and his account of the ether generally does not. Thus, at the level of theoretical explanation, there is both continuity and discontinuity between Descartes and Basso's philosophies—as there is between those of Toletus and Descartes. However, when Descartes made his statement comparing his philosophy with Basso's, he also intimated that there were significant discontinuities between the two philosophies at a deeper level, that of the reasons for the theoretical explanation, or of the foundations for the theory. We should recall that Descartes also asserts that he has made up his mind "about all the foundations of philosophy." A few months later, Descartes told Mersenne that for the last nine months he had worked on nothing other than his short treatise on metaphysics, establishing knowledge of God and the self, the conditions for discovering the foundations of physics by this means.[83] It was in this very same period that he wrote his letter to Beeckman denying that Beeckman or any of the innovators had anything to teach him. According to Descartes, the person who can teach him "is the person who can first convince someone by his reasons, or at least his authority."[84] Clearly Basso would not be convincing to Descartes either because of his reasons or because of his authority. The reason Descartes gives for developing his accounts is that they seem to follow from the foundations of his philosophy. The basic principle of Descartes' metaphysics is the real distinction between mind and body. Body is simply extension. As a result, Descartes sets aside the scholastic apparatus of forms and qualities, with the consequence that all change must be grounded in change of place; the Aristotelian account of motion must therefore make way for a new account of local motion, where motion "is a mode of a thing and not some subsisting thing."[85] This perspective, together with some considerations about God as the ultimate cause of motion, suggest to Descartes his first law of motion or

[83] *To Mersenne*, 15 April 1630, AT I, 144: "Or j'estime que tous ceux a qui Dieu a donné l'usage de la raison, sont obligés de l'employer principalement pour tacher a le connoistre, & a se connoistre eus-mesme. C'est par la que i'ay tasché de commencer mes estudes; et ie vous diray que ie n'eusse sceu trouver les fondemans de la Physique, si je ne les eusse cherchés par cete voye. Mais c'est la maniere que j'ay le plus estudiee de toutes, & en laquelle, graces a Dieu, ie me suis aucunement satisfait; au moins pense-je avoir trouvé commant on peut demonstrer les verités metaphysiques, d'une façon qui est plus evidente que les demonstrations de Geometrie."

[84] *To Beeckman*, 17 October 1630, AT I, 158.

[85] As Descartes will say in *Principles* II, art. 25: "ac esse duntaxat ejus modum, non rem aliquam subsistentem."

principle of inertia for all extended things. Descartes would not be swayed at all by the kinds of considerations that were important to Basso: the re-establishment of the philosophy of the Ancients who were eclipsed by Aristotle, the consequent defense of atomism, and thus the need to reject decisively substantial forms and real generation.

This brings us to a final difference between Descartes and Basso, a difference in tactics or rhetoric. Perhaps because of the condemnation of Galileo in 1633, Descartes was more cautious than Basso about openly criticizing Aristotle. As he said, he did not seek to criticize Aristotle, but only to establish something so simple and manifest, that the opinions of all others would agree with it. This is consistent with his own advice to Regius, which he followed for most of his life:

> you should refrain from public disputations for some time, and should be extremely careful not to annoy people by harsh words. I should like it best if you never put forward any new opinions, but retained the old ones in name, and merely brought forth new arguments. This is a course of action to which nobody could take exception, and yet those who understood your arguments would spontaneously draw from them the conclusions you had in mind.

As part of that advice, Descartes cited himself as an example about what to say concerning the scholastics' substantial forms; he asked of Regius: "why did you need to reject openly substantial forms and real qualities? Do you not remember that … I said quite expressly that I did not reject or deny them, but simply found them unnecessary in setting out my explanations?"[86] As one can see, Descartes was not the kind of person who would have written a book entitled *Exercitationes paradoxicae adversus Aristoteleos* (like Gassendi), or even *Philosophiae naturalis adversus Aristotelem* (like Basso).

[86] *To Regius*, January 1642, AT III, 491–492. Descartes did not always keep his on advice about the denial of substantial forms. When the authorities at Louvain wanted to condemn some Cartesian propositions, including Descartes' denial of substantial forms (see chapter 10), they could not find the rejection of the doctrine in the *Principles*, but were able to cite a passage from *Replies VI*, sec. 7.

CHAPTER SIX

SCHOLASTICS AND THE NEW ASTRONOMY ON THE SUBSTANCE OF THE HEAVENS

In March 1610 Galileo Galilei published the *Sidereus Nuncius*. The work contained an account of the astronomical discoveries he made, using a spyglass he fashioned for himself based on a Flemish toy; it described mountains on the moon, plus more stars than ever seen before, and the motion of four moons around Jupiter. But Galileo was not done making discoveries with his spyglass. In August of the same year, he wrote a letter describing the odd shape of Saturn, which appeared to have two lateral stars accompanying it,[1] and, by the end of December, responding to a query from his follower Benedetto Castelli, he recounted the changes in Venus from a small round object to a larger one, and then to a waning and waxing crescent. Castelli had asked, at the beginning of the month, whether Galileo had looked at Venus through the spyglass because, as he put it, given Copernicus' system, "in which they both believed,"[2] Venus must be revolving around the sun, and, therefore, it ought to exhibit phases like those shown by the moon. Thus, to be added to the novelties of the *Sidereus Nuncius*, were the "handles" of Saturn, the phases of Venus (and Mercury), and, ultimately, the newly observed sunspots. All of these phenomena were to be made public by Galileo in his 1613 *Letters on Sunspots*, in which he also argued that they are evidence for the theories of Copernicus and the Pythagoreans—something he had not done in the *Sidereus Nuncius*.

The traditional view in the history of science is that these astronomical observations made by Galileo circa 1610 (following Copernicus' mathematical speculations) precipitated the scientific revolution in the seventeenth century. The new astronomy required a new physics. There is much to be said for the traditional view, but it should also be noted that it does not make much sense of either the scholastics' or Descartes' activities: if the new astronomical observations were so decisive for the new

[1] Galileo 1890–1901, vol. 5, p. 410.
[2] Galileo 1890–1901, vol. 5, p. 481.

science, then the scholastics were simply irrational in maintaining the old science and Descartes' project was marginal at best for the new one. Descartes does not seem to be driven by the new astronomy; on the contrary, his physics appears to flow from metaphysical-theological contemplations. As early as 1630, Descartes wrote to Mersenne telling him that for the past for nine months he had worked on nothing other than his metaphysics, establishing knowledge of God and of the self, the conditions for discovering the foundations of physics:

> I think that all those to whom God has given the use of reason have an obligation to use it principally so as to know him and to know themselves. That is the path I tried to take when I began my studies; and I can say that I would not have been able to discover the foundations of physics had I not looked for them along that road.[3]

Although we do not have the text of this "lost metaphysics," we can be fairly sure that it would not have been very much different from the later metaphysics we do know. Given the perspective of the self as the only form, Descartes thinks of matter as extension, differentiated by degrees of motion and size. His radical mechanistic explanations and his (astonishing) astronomical speculations are an outgrowth of these principles; as a consequence we get matter distinguished only quantitatively, motion as change of place, vortices, etc. (See Figure 1). Even such phenomena as sunspots are explained according to Descartes' parsimonious metaphysics. In *Principles* III, Descartes accounts for sunspots with an analogy of scum bubbling up to the surface of a liquid. Novas are then stars whose sunspots become so dense as to be concealed from our view; planets (such as the earth) and comets are stars whose spots have hardened into a crust—the latter moving with high speed and the former slowly, thus remaining at a fixed distance from the center of its vortex. Descartes' project, then, while it is not inconsistent with the expected general pattern, does not fit it very well.

According to the traditional view, furthermore, debates of the scholastics are simply dismissed. Here is a typical pronouncement:

> The arguments brought forth against [Galileo's] new discoveries were so silly that it is hard for the modern mind to take them seriously. Galileo did not bother to reply to them in print, though he often answered many of them in his personal correspondence with his friends, often quite

[3] AT I, 144.

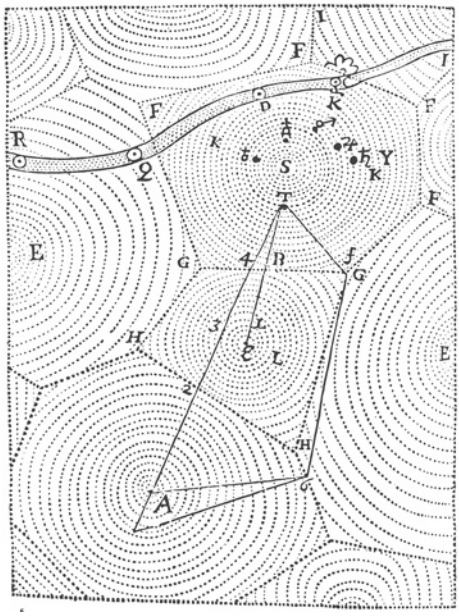

Figure 1. Our neighborhood, according to Descartes (1632)

> amusingly … One after another, all attempts to cleanse the heavens of new celestial bodies came to grief. Philosophers had come up against a set of facts which their theories were unable to explain. The more persistent and determined adversaries of Galileo had to give up arguing and to resort to threats.[4]

Thus, the schoolmen were bookish philosophers who failed to grasp some obvious facts, constructed silly arguments, and ultimately resorted to threats. Moreover, for confirmation of the view, one can always point to the story about Cesare Cremonini who refused to look through Galileo's telescope. That ostrich-like story does capture the imagination. It is made

[4] Drake 1957, pp. 73–74. Feyerabend notoriously argued the inverse of Drake thesis, contending that such resistance was warranted: "[Galileo] offers no theoretical reasons why the telescope should be expected to give a true picture of the sky. … Nor does the initial experience with the telescope provide such reasons. The first telescopic observations of the sky are indistinct, indeterminate, contradictory and in conflict with what everyone can see with his unaided eyes. And the only theory that could have helped to separate telescopic illusions from veridical phenomena was refuted by simple tests," 1978, pp. 99, 121.

worse because of Cremonini's position as chief philosopher at Padua in 1610, "the leading Aristotelian in Italy, and perhaps in Europe" until 1631.[5]

Another story might help. Less than a year after Cremonini's refusal to look into Galileo's telescope, on 4 June 1611, the Jesuit College of La Flèche held the first memorial celebration of the death of Henry IV. Henry le Grand, the patron of La Flèche, had his heart sent to be buried at La Flèche the previous year, with all appropriate pomp. The students, including even the young René Descartes, composed and performed verses in French and Latin for the memorial. The compositions were published for posterity as *Lacrymae Collegii Flexiensis* (*The Tears of the College of La Flèche*). One of the French poems from the collection had the unlikely title, "Concerning the death of King Henry the Great and on the Discovery of Some New Planets or Wandering Stars Around Jupiter, Noted the Previous Year by Galileo, Famous Mathematician of the Grand Duc of Florence."[6] The sonnet has little literary merit, but in it the reader is treated to the image of the sun revolving around the earth, taking pity on the sorrow of the French people for the loss of their King, and offering them a new torch: the new stars around Jupiter. It combines a pre-Copernican, naive, poetic view of the sun with an announcement of Galileo's discovery the previous year of the moons of Jupiter. The news of Galileo's telescopic observations obviously traveled very fast; the students of La Flèche, and by inference, their Jesuit teachers, seem to have had no objection to the telescope. They even praised its use and Galileo's results. To be sure, it also seems that the students might not have been made aware of the significance of the observations, that is, their possible use as evidence for the Copernican point of view.

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[5] Drake 1978, pp. 162, 446. Not to excuse Cremonini, but Galileo also set about to hold exhibitions of the newly discovered phenomena and not all of these turned out perfectly well. At times, the guests at the displays were not able to see the novelties—or anything at all, for that matter—with their spyglasses.

[6] "La France avait déjà repandu tant de pleurs / Pour la mort de son Roy, que l' empire de l' onde / Gros de flots ravageait à la terre ses fleurs, / D' un déluge second menaçant tout le monde; // Lorsque l' astre du jour, qui faisait la ronde / Autour de l' Univers, meu des proches malheurs / Qui hastaient devers nous leur course vagabonde / Lui parla de la sorte, au fort de ses douleurs; // France de qui les pleurs, pour l' amour de ton Prince, / Nuisent par leur excès à toute autre province, / Cesse de t' affliger sur son vide tombeau; // Car Dieu l' ayant tire tout entier de la terre / Au ciel de Jupiter maintenant il esclaire / Pour servir aux mortels de céleste flambeau." *Sur la mort du roy Henry le Grand et sur la descouverte de quelques nouvelles planettes ou estoilles errantes autour de Jupiter, faicte l' année d' icelle par Galilée, célèbre mathématicien du grand duc de Florence*, in Rochemonteix 1899, t. I, pp. 147n–148n.

It is well known, but perhaps not well enough appreciated, that the Jesuit mathematicians of the Collegio Romano accepted most of Galileo's astronomical observations. In fact, as early as November 1610, the Jesuit mathematicians at the Collegio Romano had constructed their own spyglass and were making independent observations.[7] Initially skeptical, they were in a position to answer some wide-ranging queries about Galileo's observations by the head of the Collegio, Cardinal Roberto Bellarmine, within a week of his request.

On April 19, 1611, Bellarmine wrote to the Jesuit mathematicians asking whether they could validate Galileo's observations, saying that he himself had seen some very wonderful things concerning the Moon and Venus through a spyglass. Bellarmine asked whether they could confirm "the multitude of fixed stars invisible with the naked eye, … that Saturn is not a simple star but three stars joined together, … that the star of Venus changes its shape, waxing and waning like the Moon, … that the Moon has a rough and uneven surface," and "that four movable stars go around the planet of Jupiter."[8]

The Jesuit mathematicians, Christopher Clavius, Christopher Grienberger, Odo Malcote, and Giovanni Paolo Lembo, responded in the affirmative on April 24, agreeing that, using the spyglass, more stars can be seen than ever before, there are "handles" to Saturn, phases of Venus, and moons around Jupiter. However, they did not think that mountains on the moon could be observed using the telescope. They granted the great inequality of the Moon's surface, but added, "Father Clavius thinks it more probable that the surface is not uneven, but rather that the lunar body is not of uniform density and has rarer and denser parts."[9] The Jesuits' acceptance of Galileo's observations was almost complete. In fact, Clavius, the author of an important and extremely popular scholastic textbook in astronomy, *Sphaera*, was even moved to include a brief account of the Galilean novelties in the ultimate edition of his work, published that year:

> I do not want to hide from the reader that not long ago a certain instrument was brought from Belgium …. This instrument shows many more stars in the firmament than can be seen in any way without it … and when the moon is a crescent or half full, it appears so remarkably fractured and rough that I cannot marvel enough that there is such unevenness in

[7] See Leitão 2003, Gorman 2003, and Feingold 2003.
[8] Galileo 1890–1901, vol. 11, pp. 87–88.
[9] Galileo 1890–1901, vol. 11, pp. 92–93.

> the lunar body. Consult the reliable little book by Galileo Galilei, printed in Venice in 1610 and called *Sidereus Nuncius*, which describes various observations of the stars first made by him.

Clavius didn't stop there, discussing also Galileo's unpublished observations concerning Venus and Saturn:

> Far from the least important of the things seen with this instrument is that Venus receives its light from the sun as does the moon, so that sometimes it appears to be more like a crescent, sometimes less, according to its distance from the sun. At Rome I have observed this in the presence of others more than once. Saturn has joined to it two smaller stars, one on the east, the other on the west. Finally, Jupiter has four roving stars, which vary their places in a remarkable way both among themselves and with respect to Jupiter—as Galileo Galilei carefully and accurately describes.[10]

Clavius finished his discussion with a programmatic stance, saying that the new astronomical observations should be accounted for within the received astronomical theory: "Since things are thus, astronomers ought to consider how the celestial orbs may be arranged in order to save these phenomena." Unfortunately, Clavius died that year, so the task of reconciling Aristotelian astronomy and the celestial novelties was left to others.

Although Clavius was willing to make changes to his astronomical theory to accommodate Galileo's observations, his reluctance to admit the existence of mountains on the moon showed that he treated the matter as a conclusion, not as a direct observation. Briefly, the argument is that, in the context of scholastic theories of the transmission of solar light by the moon, the appearance of mountains on the moon could have been caused by the rarefaction and condensation of the lunar matter, resulting in the differential transmission of the solar light, and not by the alleged rough surface of the moon reflecting the solar light.[11] I will return to this issue.

The Galilean observations seem to have traveled far. In Paris, during 1614, Théophraste Bouju published *Corps de toute la philosophie*, a basic philosophy textbook advertized in its subtitle as "all of it by demonstration and authority of Aristotle (*Le tout par demonstration et auctorité d'Aristote*)"; in it one finds Bouju asserting that the moon "appears with this variety and deformity in it which is not in the other stars, as the Dutch

[10] Clavius 1611–1612, vol. 3, p. 75; trans. Lattis 1994, p. 198.
[11] See Ariew 1984 and 2001.

lenses clearly show."[12] The Galilean novelties also made their way to Louvain. In 1615, Libertus Fromondus, a future correspondent of Descartes, was a young professor of philosophy. That year he was asked to preside over some *quodlibetal* exercises. Fromondus published his contribution to the discussions in 1616 and inserted an astronomical fantasy, *Peregrinatio Caelestis*, in the publication.[13] As he said in the preface to the work, he wanted to give his students a taste of the wonders that he and others had seen through the telescope; Fromondus regretted that he did not have as good an instrument as Galileo's, which allowed him to distinguish the triple system of Saturn, and with which Fromondus speculates he might have discovered more and more curious things. In his fantasy, a guardian spirit (*Genius*) riding the winged horse Pegasus took a dreaming Fromondus up to the heavens. There, Fromondus observed the rough surface of the moon, the sunspots, the phases of Venus, and the moons of Jupiter. He then noticed Saturn's triple system and referred to Galileo as having first made the discovery (citing at length from a letter of Galileo of November 1610) and he mentioned the Milky Way with its many stars—more stars than ever seen before—first seen through the telescope. In the process, Fromondus disputed the Aristotelian theory of elements and the existence of the sphere of fire. He allowed that the moon might be covered with water. And because of the existence of supra-lunary comets, he rejected the mechanism of solid spheres, epicycles and eccentrics, in favor of a fluid ethereal substance. In his fantasy, Fromondus made a number of statements approving of the Copernican system and the hypothesis of a plurality of inhabited worlds, which he thought consistent with Copernicanism.[14] Still, though only flirting with the Copernican hypothesis, Fromondus showed himself to be well acquainted with the Galilean celestial novelties.

Before moving to a discussion the Galilean celestial novelties and their relation to traditional astronomy and cosmology, we should briefly note the steps taken by the Catholic Church, in 1616, with respect to Copernican astronomy. On February 24, 1616, the Holy Office prepared an assessment of two propositions attributed to Copernicus: (i) The sun is at the center of the world and completely devoid of local motion; (ii) The earth is not at the center of the world, nor motionless, but moves as a whole and also with diurnal motion. The Church asserted,

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[12] Bouju 1614, vol. I, pp. 388–389 (chap. XLII: De la lune).
[13] Fromondus 1616.
[14] Monchamp 1892, pp. 34–43; Van Nouhuys 1998, pp. 240–245.

of the first proposition, that it is "foolish and absurd in philosophy, and formally heretical since it explicitly contradicts in many places the sense of the Holy Scripture, according to the literal meaning of the words and according to the common interpretation and understanding of the Holy Fathers and the doctors of theology," and with respect to the second, that it "receives the same judgment in philosophy and that in regard to theological truth it is at least erroneous in faith."[15]

The examination of the two propositions were conducted specifically with Galileo in mind, since the very next day Cardinal Bellarmine "was ordered to call Galileo before himself and warn him to abandon these opinions; and … should he not acquiesce, he is to be imprisoned." The record shows that Bellarmine warned Galileo on February 26 and Galileo "acquiesced to the injunction and promised to obey." The order was given for the edict to be published on March 3 and, on March 5, Copernicus' work was placed on the *Index of Prohibited Books*: "the Congregation has decided that the books by Nicolaus Copernicus (*On the Revolutions of Spheres*) … be suspended until corrected."[16]

The news of these events took a while to travel to Louvain. Fromondus became aware of the condemnation of Copernicus at the end of 1618, having been informed of it by his medical school colleague Thomas Feyens (or Fienus); Fromondus complains about his lack of precise knowledge of the condemnation. He writes: "But what did I recently hear from you about the Copernicans, most honorable person [Feyens]? That one or two years ago the most holy Paul V had them condemned? Until now I had not yet heard about this, nor I imagine, had any of those very learned and Catholic men in Germany and Italy, who, like Copernicus, are supposing the earth to rotate."[17] The Church's condemnation of Copernicus would need to be taken into account by the Catholic, Jesuit-educated Fromondus and his ilk.

The stories depicted so far do not favor the image of the ostrich. Rather, the Aristotelians in the seventeenth century seem to have been in the position of people who have seen their favorite theories belied by observations. The question before them: could small modifications save their theories? Or did one have to make major overhauls? The Aristotelians' story is not often told from that perspective, a perspective in which late

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[15] Finocchiaro 1989, p. 146.
[16] Finocchiaro 1989, pp. 147–149.
[17] Fromondus 1670, p. 50. Monchamp 1892, pp. 46–47; Van Nouhuys 1998, pp. 294–295.

scholasticism reacts to celestial novelties, makes adjustments to its theories, that is, changes and survives. It is the story I wish to tell, using the writings of seventeenth century schoolmen, followers of Aristotle, at Jesuit or Parisian colleges, but also at collegiate institutions such as Louvain. The topics I will treat involve celestial matter, especially lunar and solar spots, and comets.

But first, it should be pointed out that from this perspective, unless the Collegio Romano Jesuits truly did not understand the implications of what they were admitting, one can infer that Galileo's observations could be directly accommodated within Aristotelian cosmology. This is not an insignificant result, since at least one of these observations, that is, the phases of Venus, is often given as a definitive observation for Copernicanism.[18] A little-known representation of the world clearly confirms this result. There is a schematic drawing of the whole universe in a mathematical textbook written by Jacques du Chevreul, an Aristotelian who taught mathematics and physics at Paris in the 1620s.[19] Du Chevreul's picture is a representation of a three-dimensional (or solid) eccentric-epicycle geocentric model, in the general tradition of Aristotle and Ptolemy. It can be readily shown that the solid eccentric-epicycle model was very fashionable during the first half of the seventeenth century. It was the model taught in his *Sphaera* by Christopher Clavius, who taught an entire generation of Jesuit teachers of mathematics.[20] The model lasted well into the second half of the seventeenth century; there is a nice picture of a solid eccentric-epicycle for the system Sun-Mercury-Venus in Jean-Baptiste de la Grange, *les principes de la philosophie* (1682).[21] Moreover, it was also

[18] See Ariew 1987b.

[19] Du Chevreul 1623, p. 257. Du Chevreul was born in Coutances in 1595 and died in Paris in 1649. He was associated with the University of Paris and the Collège Harcourt, except for the two years before his death, when he was Professor of Philosophy at the Collège Royal. The son of a magistrate, he studied humanities and philosophy, and received a Master of Arts from Paris (1616). He continued his education in the higher faculty of theology and was awarded the degree of Bachelor of Divinity in 1619. Du Chevreul began teaching at Harcourt in 1620. During his lifetime, he held various administrative academic offices, including those of rector and principal. He must have taught mathematics early in his career, but he was teaching philosophy by 1622. According to his manuscript lecture notes conserved at the Bibliothèque Municipale de Cherbourg, du Chevreul taught Logic and Ethics in 1623–1624, 1625–1626, and 1633–1634; he taught Metaphysics and Physics in 1628–1629 and 1634–1635. Although he did not publish his philosophy lectures, he did publish two mathematical texts, *Arithmetica* (Paris 1622) and *Sphaera* (Paris 1623, 1640, and 1649).

[20] See Lattis 1989.

[21] De la Grange 1682.

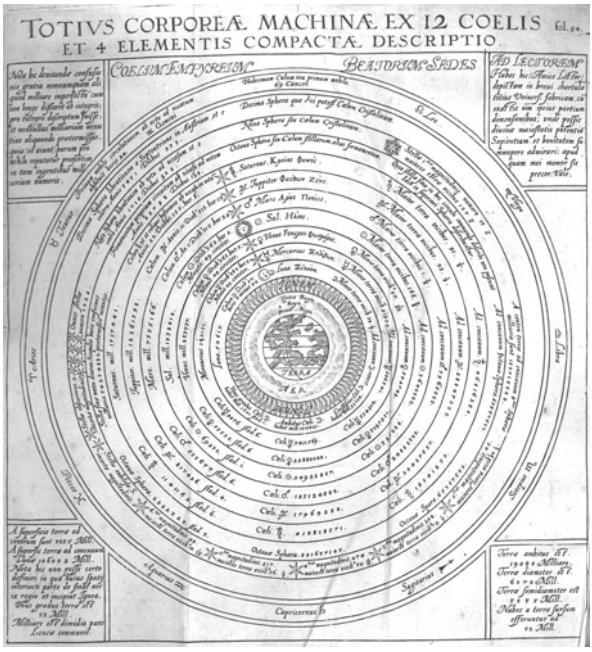

Figure 2. The universe, according to Eustachius a Sancto Paulo (1609)

the model represented in Eustachius a Sancto Paulo's immensely popular *Summa philosophica quadripartita*, a Paris textbook published in 1609 and republished about 20 times until 1648[22] (see Figures 2 and 3).

Thus, du Chevreul's overall structure was faithful to the pre-Galilean Aristotelian image, that is, he depicted a geocentric three-dimensional epicyclic-eccentric spherical universe. But du Chevreul's representation of the world also made the minimal corrections required by Galileo's observations. In response to the phases of Venus, du Chevreul had Venus and Mercury revolving around the sun; moreover, Jupiter was given four moons and Saturn was given two (consistently with the Jesuit account of Saturn). None of du Chevreul's modifications seem to have required any significant changes in the traditional view (see Figure 4). I return to du Chevreul below.

[22] Eustachius a Sancto Paulo 1609, II, p. 96. Eustachius' diagram can be found in Clavius' *Sphaera*, but as a theory of the sun. See Lattis 1989, p. 384.

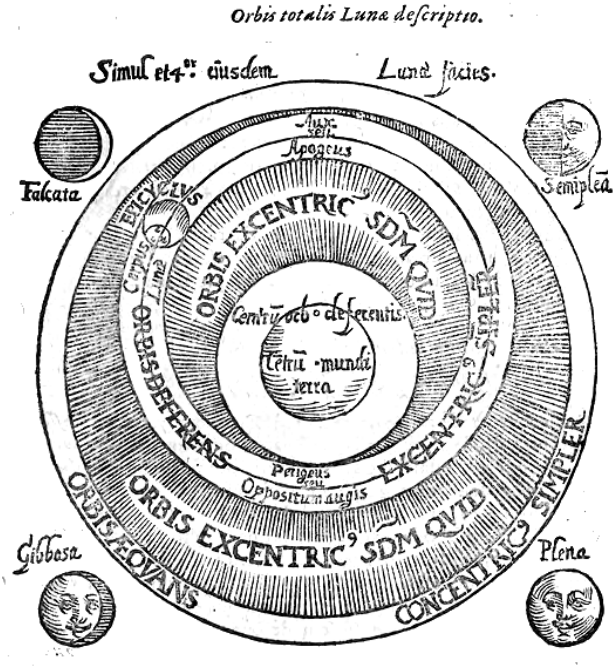

Figure 3. Our neighborhood, showing eccentrics and epicycles, according to Eustachius a Sancto Paulo (1609)

Sunspots and Moonspots (the Man on the Moon)

We can also add that du Chevreul had "sunspots" revolving around the sun. Sunspots were not discussed in the exchange between Bellarmine and the Collegio Romano mathematicians. But they seem to have caused no fundamental problem for the schoolmen, having been widely interpreted, in France, as small planets going around the sun. From du Chevreul to the Provencal astronomer, Jean Tarde,[23] to the Jesuit mathematician, Pierre Bourdin,[24] to Descartes' acquaintance, Charles Sorel,[25] sunspots were thought of as small planets, like Mercury. According to

[23] See Baumgartner 1987.

[24] "La figure F represente certains astres qui tournent autour du soleil et que d'aucuns appellent, les taches du soleil, ainsi qu'il se dira cy-après," Bourdin 1661, p. 128.

[25] "L'on a decouvert qu'il y en avait [des astres] au dessous du soleil, lesquels faisoient paraistre en luy comme des taches. Il est vray que l'on a remarqué qu'ils faisoient leur

the accepted theory, that would simply make them denser parts of celestial spheres around the sun. As the Dominican, Antoine Goudin put it:

> It could be asked what are the spots that obscure the sun. I've already said, they seem to be a denser part of the celestial spheres which, when nearing the sun, following unknown revolutions, become interposed between us and the star and obscure its brilliance with their passage; Mercury has been taken for a sunspot in this way for a long time.[26]

However, even if the sunspots had not been thought of as small planets rotating around the sun, but genuine spots on the sun itself, they still would have caused few problems, since they could have been treated in the manner of moon spots, that is, denser parts of the celestial body itself. As René de Ceriziers explained in *Le philosophe français*: "We can gather from this small discourse that if there were spots on the sun or stars similar to the spots on the moon, they would arise only from the diversity of their parts,"—by which he meant their density and rarity.[27]

There is a full exposition of the problem in Goudin's *Philosophie*, an influential late seventeenth century textbook with at least a dozen editions and even a definitive nineteenth century Latin edition and French translation. The problem, according to Goudin, is as follows:

> Spots are produced and disappear in the sun itself; they have sometimes been seen in such quantity that the star became obscured by them, something which lasted a whole year … And now, as recently observed, spots are produced on that star, less sensible no doubt, but more numerous and similar to smoke or to a dark fog, and this cannot be explained without substantial alteration of the star.[28]

But Goudin, as an Aristotelian, cannot accept substantial alteration in the heavens. So the problem is particularly difficult; he first rehearses the traditional answer, but must reject it:

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revolution tout autour, tellement qu'ils prennent quelquefois le dessus. Il y peut en avoir encore en beaucoups d'autres endroits que les yeux des hommes ne peuvent descouvrir: mais tant des uns que des autres, il semble que l'on ne scauroit rapporter la vraye cause de leur rang, puisque nous ne pensons pas qu'ils se cedent rien l'un à l'autre dans leur situation," Sorel 1634, p. 69.

[26] Goudin 1726 [1668], vol. III, p. 54; 1864, p. 85. Goudin also confesses that he has not been able to see the sunspots himself since they were exceedingly rare at the time.

[27] De Ceriziers 1643, p. 194.

[28] Goudin 1726 [1668], vol. III, p. 40; 1864, p. 63.

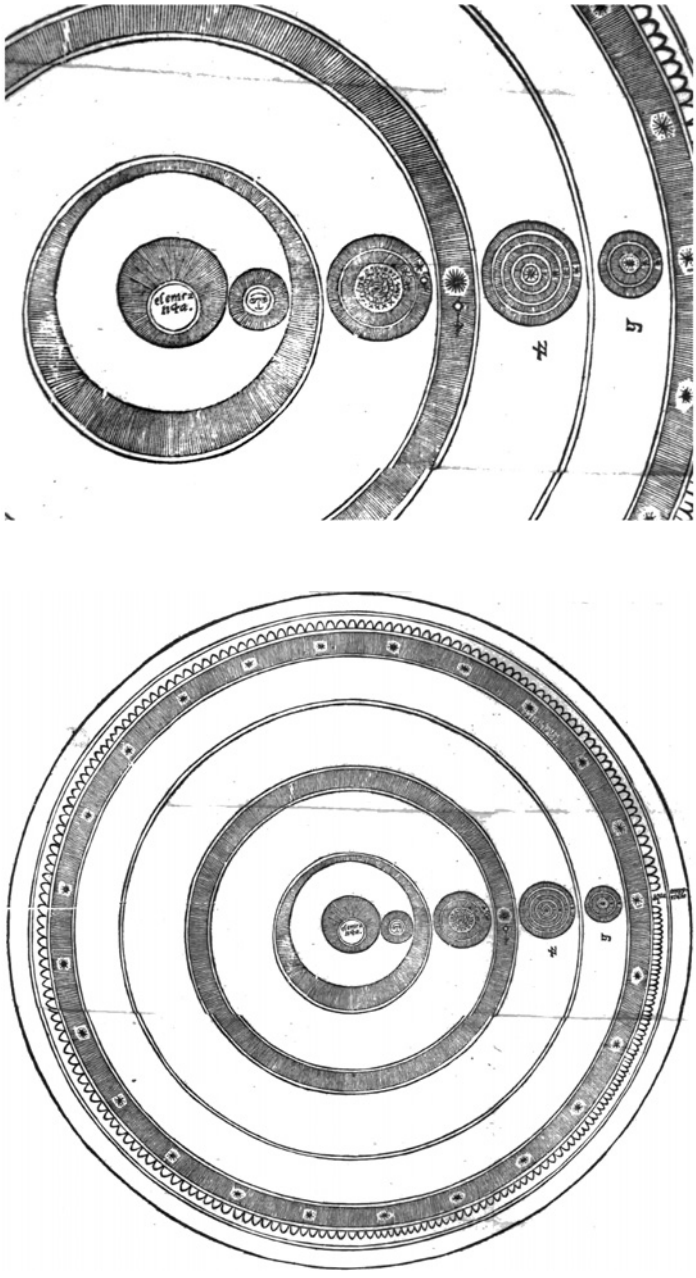

Figure 4. The universe according to Jacques du Chevreul (1623)

> Assuredly, the argument derived from the motion of the sunspots is not unworthy; there are sunspots disappearing when advancing from the borders to the middle of the disk; others appearing instantaneously in the middle; and then another having been seen alone expanding into several. Perhaps the causes of these phenomena are in the bodies not on the sun or in the upper heaven, but in the sublunary air; perhaps also they are condensed exhalations that, in some way, follow the motion of the star … but this hypothesis cannot explain the spots observed recently, since it has been practically demonstrated that they are very near the sun.

Goudin argues instead for a version of the doctrine that sunspots are small stars around the sun:

> We must therefore say that these spots are denser portions of the celestial spheres near the sun, which, following a determined path, are encountered with the sun and sometime reunite and sometime separate, then show us one, then another of their faces. Allowing us to see them at times, then disappearing; they first seem to us a single spot, then several separated spots, and these apparent spots grow or diminish according to the combinations of these spheres, all of this being nothing more than a certain number of optical effects … One easily conceives that the heavens proximate to the sun, such as those of Venus or Mercury or others nearer still, can have certain parts that are more opaque, and that when these parts meet with the sun, they can show it to us covered by spots, in the way that less experienced eyes saw Mercury. But the doctrine that the sun lets some smoke, fog, scum, ashes, or other such things escape—and all that in order to explain the spots seen there and the fact that these productions remain so long attached to that luminous star—is something I cannot understand.[29]

For Goudin it is difficult to account for the spots, given that they appear and disappear. He explains them as optical illusions, combinations of denser portions of the celestial spheres in motion near the sun; he tells us that Mercury had once been mistaken as a sunspot. He seeks an explanation, a piecemeal adjustment of his Aristotelian theory, but he rejects any explanation involving substantial change in the heavens, which would be a denial of the fundamentals of his Aristotelian cosmology. This explains why the theory of sunspots as small stellar objects lasted so long; as late as 1705, one can find in the *Philosophia universalis* of Jean Duhamel: "It is probable that the sunspots are nothing other than small planets revolving around the sun."[30]

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[29] Goudin 1726 [1668], vol. III, pp. 40–41; 1864, pp. 63–64.
[30] Duhamel 1705, vol. 5, p. 45.

As de Ceriziers and Goudin show, the problem of sunspots can be reduced to the problem of lunar spots. And the theory of lunar spots was one of the theories that seventeenth century scholastics did not think needed much change. Following Clavius' suggestion, du Chevreul handled the lunar spots as rarefactions and condensations of the celestial matter,[31] as did all Parisian textbook writers during the first half of the seventeenth century (that is, all of the ones I have consulted). The doctrine lasted well into the second half of the seventeenth century. One can find in the *Cursus Philosophia* of the Jesuit Vincent that "the spots are the parts of the moon that are denser or rarer."[32] One can even find the doctrine at the start of the eighteenth century in Jean Duhamel's *Philosophia Universalis*: "It is probable that the spots of the moon derive their origin from the inequality of density and rarity of the parts of the moon."[33] The account they all accepted predated Galileo's 1609–1611 observations, as the following passage from the most popular French-language textbook of the seventeenth century, Scipion Dupleix's *La physique* (1603), made clear:

> Aristotle's commentators, after having made a precise inquiry, almost all defend Averroes' opinion that the moon has some parts which are thicker than others, and that they receive more light from the sun than the thinner parts to the extent of their thickness (for by itself the moon is opaque and dark). It then happens that we see clearly some of the parts and not the others. This resolution seems to me the best, given that none more appropriate has been found.[34]

Théophraste Bouju, who in 1614 held that there is no sphere of fire and no absolute division between the sublunary and superlunary world—who, as we have seen, even referred to the telescope as evidence for his point of view—continued to maintain the standard theory for the propagation of light.[35] His general theory was that heaven and the stars

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[31] Du Chevreul 1623, pp. 166–168.

[32] Vincent 1660, vol. 3, p. 319; see also Pierre du Moulin 1644, II, chap. 6 and 7: "Les estoiles tant fixes qu' errantes ne sont autre chose qu' une partie du ciel plus espaisse que les autres parties. Car le reste du ciel est diaphane et transparent: Mais les estoilles par leur epaisseur arrestent la lumiere du soleil comme miroers, et nous la renvoyent … Quant aux taches qui paraissent en la lune, elles ne sont autre chose que parties du corps de la lune moins espaisses que le reste, et qui n' arrestent point les rayons du soleil. Comme quand un miroer en certains endroits n' a point d' argent vif en derriere."

[33] Duhamel 1705, vol. 5, p. 46.

[34] Dupleix 1990, p. 442.

[35] Bouju 1614, vol. I, chap. XVIII: Que l' element pretendu du feu n' est point, pp. 405–408.

do not have their own light, but receive the light of the sun differentially on account their density and rarity.[36] His lunar theory followed from the general theory; he accounts for the lunar spots by the "fact that light does not reflect against the parts on the moon which are rarer than others, given that these parts lack the thickness to stop and retain the light." In this way, Bouju could maintain a fairly standard theory for the spots on the lunar surface: "the cause of this defect [the variety and deformity in the moon which is not in the other stars] might be that the moon is close to the lower bodies, in which obscurity and deformity dominate."[37] Lest anyone accuse him of giving up too much Aristotelian doctrine, Bouju was careful to uphold the (de facto) incorruptibility of heaven:

> Since it does not appear to us … that the sun is of another matter than the other lower bodies, its incorruptibility must arise from its more excellent form than theirs or because contrary agents which can corrupt and alter it do not rise up to it, although it is corruptible with respect to its nature, in the manner of air and other elements.[38]

As with sunspots, the lunar spots are explained without having to resort to substantial change in the heavens. However, Bouju, possibly under some Stoic influence, had accepted a version of Aristotelianism in which there can be substantial change in the heavens, at least in principle; for most Aristotelians, substantial change in the heavens would not have been acceptable. Fortunately, even if one admitted that the spots on the moon could only have been accounted for by postulating mountains, one did not have to accede to there being substantial change on the moon.

That is a point Goudin wanted to make. Unlike many other Aristotelians, Goudin accepted the conclusion that the spots were to be interpreted as mountains on the moon:

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[36] Bouju 1614, vol. I, pp. 374–375 (chap. XXIII: De la lueur du soleil, et de la lumiere qu'il communique aux autres corps): "Tellement que tout le corps du ciel et les estoilles n'ont aucune clarté qui mérite de nom de lumière que par le seul bénéfice du Soleil: non toutefois en une mesme manière, ains diversement: car les autres la reçoivent comme un vase ou un mirrouer, duquel à cause de son espoisseur, elle est réfléchie et renvoyée: et eux en deviennent lucides: parce que leur parties estant espoisses, elle ne les peut pénétrer. Et quant au reste du ciel, elle y est receue comme en un moyen transparent, qui la porte, duquel elle n'est point réfléchie, à cause de sa transparence et rareté: comme il se connoit la nuict que le ciel n'est veu que par la clarté des estoilles."

[37] Bouju 1614, vol. I, pp. 388–389 (Chap. XLII: De la lune).

[38] Bouju 1614, vol. I, pp. 380–381 (chap. XXXI: Comment le ciel peut estre et n'estre pas incorruptible).

> This opaque substance, which is properly lunar substance and different from the essentially lucid celestial substance, even though it has the form of a globe, is not however perfectly smooth on its surface; it has some parts which are depressed and others which are elevated, as if they were valleys, canyons, mountains, and hills.[39]

But he prepared an explanation whereby the moon overall would be polished and spherical, with a transparent substance in between the seeming mountains and valleys:

> Since absolute void is not possible, we must believe that this unequal surface is equalized by a transparent substance that allows everything to be seen and everything to be illuminated by the rays of the sun. No telescope has been able to tell us if this substance is fluid or if it is solid in accordance with the Peripatetic idea. But nothing prevents us from considering the globe as spherical in the sense that the inequality of its surface would be corrected by distinct and solid parts, in truth, but ones that are completely diaphanous and fill the voids left over by the opaque part.[40]

Still, after due deliberation, Goudin accepted the conclusion that the spots on the lunar surface are best explained as shadows caused by mountains on the moon: "These fleeting spots that vary according to the position of the sun are shadows projected by the parts that jut over the less elevated ones."[41] All the while, however, Goudin understood that the mere existence of mountains on the moon did not require the postulation of substantial change in the heavens, and thus did not require the abandonment of Aristotelian cosmology:

> The proof of the incorruptibility of the lunar body and of its difference from the elements that surround it results from all these phenomena. Let us prove it. Even though we see a variety of mountains and valleys on the body of the moon, we do not, however, see any alteration, any change, apart from the changes produced by shadow and light; now, if some alteration were produced there as with us, we should be able to see it, since we see the change resulting from shadow and light so clearly that, for a given point, with a strong enough telescope, we can observe in half an hour the decreases and increases of light and shade. Therefore, there is only a succession of light and shade on the lunar globe; thus the lunar globe is a body whose essence is different than ours.[42]

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[39] Goudin 1726 [1668], vol. III, pp. 61–62;1864, vol. 3, p. 96.
[40] Goudin 1726 [1668], vol. III, p. 62; 1864, vol. 3, p. 97.
[41] Goudin 1726 [1668], vol. III, p. 62; 1864, vol. 3, p. 98.
[42] Goudin 1726 [1668], vol. III, pp. 63–64; 1864, vol. 3, pp. 99–100.

One can conclude that Galileo's astronomical observations from circa 1610 seem to have posed no serious problem for the Parisian textbook writers of the seventeenth century. The Parisians accepted the observations made by the telescope. They made the modifications of their theories required by the observations. They changed their theories of Venus and Mercury. They added stars around Jupiter and Saturn. They attempted to accommodate the observations of sunspots and moon spots, from the treatment of sunspots as stellar objects and their explanation as rarefactions and condensations of the celestial matter around the sun, to their reduction to the same status as that of lunar spots. Finally, they grappled with the issue of lunar spots, from the rejection of their status as an anomaly that needed a new explanation, to their acceptance as a new phenomenon that needed only a slight change in Aristotelian cosmology.

Comets

We have not yet discussed another astronomical observation often given for the demise of the Aristotelian traditional view—comets. Comets do seem to provide a powerful argument against the heterogeneity of the sublunary and supralunary regions of the world.[43] The standard view is that the new star of 1572, and Tycho Brahe's measurement of the parallax of the comet of 1577 concluding that the comet was in the heavens, and thus to be incompatible with the existence of the "crystal" spheres, epicycles, and eccentrics of the Aristotelians, had dealt a heavy blow to the traditional view of the immutability and perfection of the heavens.[44] This

[43] See Barker and Goldstein (1988). As I have said above, Fromondus, in his fantasy, disputed the Aristotelian theory of elements and the existence of the sphere of fire and, because of the existence of supra-lunary comets, he also rejected the mechanism of solid spheres, epicycles and eccentrics, in favor of a fluid ethereal substance (similar but not identical to a Stoic *pneuma)*. Thus, in 1615, Fromondus accepted a cosmology like the one adopted by Tycho Brahe. I should specify that Fromondus accepts a fluid ethereal substance in the heavens, but he is clear in his rejection of Stoic or Tychonic *pneuma*, which he thinks is the result of mixing up corruptible and incorruptible substances. See Fromondus 1670, p. 4, and Meinel 1988b.

[44] See, for example, Gaukroger 2008, pp. 99, 171. The "crystal" spheres are a rhetorical move by Tycho. Aristotelians accepted solid spheres for the epicycles and eccentrics of their planetary heavens. A crystal sphere is traditionally postulated as the ninth sphere, above the firmament of fixed stars, representing the Biblical water above the firmament. Tycho could have no argument that places his comet above the firmament, crashing through the crystal sphere; rather his argument would be that the lack of measurable parallax of the comet would place it above the sphere of the moon, whose parallax is measurable.

view was appreciated at the time, as can be seen in a student thesis from circa 1622. In a series of theses about Copernicus and the new astronomy, there is a very brief discussion of the observational consequences of the Tychonic system, though without Tycho being named; among the consequences are: "Comets and new stars would be generated and would move in the heavens above the moon."[45] But Tycho Brahe's parallax measurement was neither universally accepted nor without conceptual difficulties. As Dupleix explained,

> Since comets are elevated very high into the region of air and are moved and shaken by the celestial bodies that carry them, the elementary fire, and the upper air, and also because they look like true stars, because of their flame, several ancient philosophers, and even Seneca and the common people ignorant of this matter still, take comets to be true stars. But this ignorance is too crass, given that stars are all in the heavens and comets are in the region of air below the moon, as is demonstrated by astronomical instruments [note in the margin: Regiomontanus, *de Cometis*].[46]

Dupleix's reference to Regiomontanus, a marginal note on his comment about astronomical instruments, indicates that, some decades after Tycho's measurements, some scholars still preferred Regiomontanus' earlier parallactic measurements concluding that comets are sublunary.[47]

As Dupleix implies as well, the question of the composition of the heavens and the nature and location of comets was a standard dispute between the Stoics, such as Seneca, and the Aristotelians. As with most everything Stoic, fluid heavens could also be incorporated into Aristotelianism; cosmologists like Fromondus would not be alone if they brought some Stoic elements into Aristotelian philosophy. The aforementioned Bouju had argued as an Aristotelian, two years before Fromondus, that there is no sphere of fire and no absolute division between the sublunary and superlunary world, but Bouju upheld the de facto incorruptibility of heaven; he posited some kind of ethereal substance in the heavens, and even accepted, in principle, the possibility of substantial change in the heavens, with the Stoics, but he maintained a standard Aristotelian account of comets:

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[45] "Sententia Copernici de motu terrae circa solem omnes apparentias non saluat, & habet alia incommoda. Si terra constituatur centrum circulorum quos luna, sol, & stellae fixae conficiunt, sol vero eorum quos reliqui planetae, facile omnia defendentur. Mars nonnunquam terris propior quam sol apparet." Borbonius circa 1622.

[46] Dupleix 1990, pp. 423–424.

[47] For more on Regiomontanus' measurements, see Jervis 1985.

> The fire of which the comets are enflamed and of which they burn is slow and moderate; comets are not raised up on account of the weight of their matter, but they move from east to west in accordance with the motion of heaven, although they do not do so with regularity. The height of their motion is less than that of the planets and other stars; it demonstrates that they remain in the middle region of the air, in the same way as do those lights in the form of stars which seem to fall from heaven, which are only meteors, of the nature of comets, and not true stars, being generated and corrupted almost in the same instant.[48]

However, Bouju accommodated other novel astronomical phenomena, such as novas; he stated:

> We have seen in our time, during 1572, a new star appearing in Calliope and lasting two years. In the beginning this star seemed to surpass Venus in size and clarity and two months later it decreased in these respects, such that it no longer seemed to exceed a star of the third magnitude; it kept this quantity for the duration of two years, when it disappeared. It cannot be said that this star was in the air where comets usually happen, because it appeared in the same way to all who saw it, in whatever region it was, and it always moved from east to west like the other stars; this could not happen if it were located only in the middle region of air, the place of comets.[49]

Bouju showed himself to be open to the possibility of comets moving well above the region of air, something he accepted for the nova of 1572, but he did not think he had enough evidence in 1614 to claim that any comet resided there.

Questions such as the nature and location of comets had not been definitively decided by 1618, a year marked by a succession of three comets visible to the naked eye, culminating in the great comet of 1618. These events resulted in the publication of multiple treatises about comets by numerous observers, not the least being those of Fromondus, of the Jesuit Horatio Grassi, and of Galileo, responding to Grassi, in defense of his own position, as elucidated by his disciple, Mario Guiducci.[50]

Fromondus wrote his treatise on the great comet of 1618 as a response to a dissertation on that comet which he requested from his colleague Feyens; he then proceeded to publish the two treatises together. Feyens' treatise used his observations of the comet to dispute the Aristotelian theory of comets as burning terrestrial vapors and reworked arguments

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[48] Bouju 1614, vol. I, pp. 600–601 (I. Phys. XI, chap. XII: Des Comettes).

[49] Bouju 1614, vol. I, p. 381.

[50] There were very many treatises published on the Comet of 1618. See Drake and O'Malley 1960, Monchamp 1892, pp. 44–45, and Navarro-Brotons 2007.

from Seneca to support the view that comets belonged to the genus of heavenly bodies, thus placing comets above the sphere of the moon. Ultimately, Feyens used the observations of Tycho Brahe and Galileo to argue against both the existence of solid planetary spheres and the incorruptibility of the heavens. Consistently with the Church Fathers and Scriptures, Feyens adopted the view that there are three heavens: the fluid planetary heaven delimited by the solid firmament of the fixed stars, above which is located the Empyrean, that is, the resting place of the blessed.[51]

Fromondus received Feyens' treatise very favorably, even claiming (ironically) that as a result, one can see that the comet foretold the death of a Prince, namely, Aristotle, whose theory of comets as meteorological phenomena the Peripatetics needed to bury.[52] And Fromondus' treatise, like that of Feyens, systematically argued against the Aristotelian theory. Fromondus' work is composed of eight chapters: a descriptive first chapter about the great comet of 1618, regarding its appearance and motion, and five subsequent chapters consisting of arguments about various aspects of that comet. In these chapters, Fromondus argues that the comet of 1618 is not a fiery exhalation: because of (i) the height of such exhalations, (ii) the nature of fire, (iii) its lack of scintillation, (iv) its motion, and (v) its tail. The treatise ends with a chapter about the distance and magnitude of the comet and another, extremely short chapter, about whether comets presage other events on earth.

The interesting thing is that the five arguments are alike in that they are all basically Aristotelian arguments employed to attack an Aristotelian conclusion: Fromondus uses some entrenched Aristotelian principles against the Aristotelian conclusion that comets are terrestrial exhalations. In the argument about the height of terrestrial exhalations, Fromondus argues that such exhalations would have to rise beyond the maximum height for terrestrial exhalations, to where comets are usually observed, and in the process would become extremely subtle and rare. But then, according to Peripatetic theory, they would have also become incapable of being observed on earth.[53] Moreover, if comets were fiery exhalations, they could not last as long as they did, because of the "volatile and dissoluble nature of fire."[54] And if comets consisted of fire, they would

[51] Monchamp 1892, pp. 54–56; Van Nouhuys 1998, 253–276.
[52] Fromondus 1670a, p. 31.
[53] Fromondus 1670a, p. 39.
[54] Fromondus 1670a, p. 41.

scintillate. Fromondus thus places comets in the genus of planets, which shine with "calm and quiet luster," as opposed to the fixed stars, which "scintillate and vibrate as fires."[55] This leads him to an interesting discussion of the hypothesis that the stars and some planets rotate around their axes, causing some of the scintillation, with such phenomena as sunspots, the phases of Venus, and moons around Jupiter and Saturn brought into play for or against the hypothesis—which, in the end, he leaves undecided.

Fromondus' stronger arguments come in the next two chapters. He agrees with Feyens that the comet of 1618 followed a circular path, but also gives it its own proper motion. A circular path, or a segment of a great circle, instead of an up and down motion, would indicate that the comet's motion was like that of the heavens, not like that of a "fluctuating fire in the changeable, unstable airy regions."[56] Finally, for Fromondus, the comet's tail cannot have consisted of fiery exhalations more subtle than those forming the head of the comet, because, as he observed, the comet's tail is always pointing away from the sun. According to Peripatetic principles, as wielded by Fromondus, an exhalation or fire should either be seen pointing toward the sun, because that is the side that would be rarified by the heat of the sun, or upward, because of the tail's rarity, as compared with that of the comet's head.[57] Anti-solarity, or the dependence of the comet's tail on the sun, indicates to Fromondus that the comet is a kind of lens refracting the solar rays in different directions away from the sun, depending upon the density of the comet's head.[58]

Having, from his own perspective, demolished Aristotle's account of comets based on the Aristotelian theory of elements and their motions, Fromondus proceeded to construct a new account of comets. For Fromondus, superlunary comets counted against the solid spheres and for Feyens' (and Tycho's) fluid planetary heavens. Fromondus rehearsed a possible Copernican plurality of worlds explanation of comets as planetary exhalations arising from planets viewed as systems of elements, on analogy with the elements around our earth,[59] but rejected the hypothesis for a simpler one, in which comets originate out of ethereal matter.

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[55] Fromondus 1670a, pp. 42, 44.
[56] Fromondus 1670a, p. 45.
[57] Fromondus 1670a, p. 47.
[58] Fromondus 1670a, p. 48.
[59] Fromondus 1670a, p. 54.

Comets, then, are formed through condensation or rarefaction of celestial ether, coagulated for various lengths of time; they are like planets wandering above the sphere of the moon, describing a circular motion.[60]

Fromondus' account of comets fit reasonably well that of Tycho's, though the reasons he gave for his account were different: Fromondus understood that he was not able to make sufficiently accurate measurements of the comet's parallax, or lack thereof; however, he also thought that if the comet was sublunary, he should have been able to discern some measure of parallax.[61] One can see as well that Fromondus accepted fully all of Galileo's novel observations, but, even though he might have been tempted by the Copernican hypothesis, in the end he did not think that those observations, or his own observations of the comet of 1618, were evidence for it.

Not all scholastics took the route followed by Fromondus and Feyens; that is, not all the scholastics who accepted the novel astronomical observations adopted some kind of Tychonic system, as it is often asserted. For example, as we have indicated, du Chevreul accepted the new astronomical observations, but rejected the Copernican system. He also rejected Tycho's solutions, maintaining a more traditional Aristotelianism.

In his treatise, Du Chevreul discusses the method of parallax in general, and the issue of the parallax of comets,[62] but does not decide the question fully.[63] Du Chevreul adopts a probabilistic language on questions about the matter of the heavens and its incorruptibility. He inserts a disputation with the "neoterics" who claimed that the heavens are corruptible, on the basis of such astronomical phenomena as new stars (that is, novas) and comets. In his replies, again couched in probabilistic language, he denies the conclusiveness of the moderns' observations and of their parallactic measurements. He then follows tradition in dividing the stars into fixed and wandering stars. Du Chevreul tells us that Plato, Aristotle, and all others to the present generation observed seven wandering stars or planets: Saturn, Jupiter, Mars, the Sun, Venus, Mercury, and the Moon. But he also asserts that Galileo, that preeminent mathematician, discovered four planets circling around Jupiter and two new planets concentric to Saturn. Thus, du Chevreul counts thirteen planets

[60] Fromondus 1670a, p. 56.
[61] Fromondus 1670a, p. 50.
[62] Du Chevreul 1623, pp. 47–51.
[63] See du Chevreul 1623, pp. 83–85.

agreed by all, that is, six new ones on top of the seven classically known ones. He further multiplies the count by noting that others add another thirty new planets circling about the Sun, namely Jean Tarde's Bourbon stars.[64]

The discoveries acknowledged by du Chevreul entail modifications in the doctrine of the number of the heavens. According to Aristotle and the Aristotelians, the number of heavens, distinguished by their different motions,[65] is at least eight; instead, du Chevreul counts only five planetary heavens: those of Saturn, Jupiter, Mars, the Sun, and the Moon.[66] Missing in this count are the heavens for the new planets and those of Venus and Mercury. Du Chevreul asserts that, as shown by the optical tube, Mercury and Venus circle around the Sun, that is, they can be found above, below, and next to the Sun. Thus, the center of their orbs must be the Sun; any other arrangement would require the interpenetration of orbs, causing a vacuum—and this is impossible in nature. According to du Chevreul, only the astronomers of his generation, using an optical instrument that can detect more stars in the Milky Way and other parts of the firmament, can see that Venus and Mercury are located next to the Sun, above, and below it. Venus and Mercury thus orbit the Sun as the Moon orbits the Earth, within the Sun's heaven.[67] The situation is similar to that of Galileo's stars around Jupiter and the two "planets" circling Saturn. The same is true for the thirty Bourbon planets or "shadows" around the Sun. Du Chevreul's five heavens are, in order: 1) That of the Moon. 2) Of the Sun, consisting of the Sun itself in the middle of its heaven, surrounded by the Bourbon stars, Mercury and Venus. 3) Of Mars. 4) Of Jupiter surrounded by the four Medicean stars. And 5) Of Saturn, in the middle of which Saturn sits, with two concentric orbs or satellites.

It is not difficult to see that du Chevreul is the legitimate heir to Clavius: he has managed to accept the observations made by Galileo in 1610–1613 with the assistance of the telescope, but does not regard these phenomena as evidence for either the Copernican or the Tychonic system. This is made quite clear in his chapter on eccentric and epicyclic orbs. There, he argues for the necessity of eccentrics and epicycles and formally rejects Tycho's view of the universe. He asserts that Mars cannot

[64] Du Chevreul 1623, pp. 80–85.
[65] Du Chevreul 1623, p. 136.
[66] Du Chevreul 1623, p. 152.
[67] Du Chevreul 1623, pp. 153–154.

be below the Sun, as Tycho would have it, because that would make the heavens permeable and go against the appearances.[68] Further, in his section on the matter of the world, he denies the kind of language the followers of Tycho used, that the stars wander in the heavens like fish swimming in water.[69] Tycho's measurement of the parallax of the comet of 1577 did not settle the matter for du Chevreul; it did not require him to think of the planetary heavens as liquid and permeable. In his lectures on Aristotle's *Meteorology*, he continued to claim that comets are sublunary flames.[70]

Scholastics were not the only ones to have rejected Tycho's parallactic measurements and his fluid heavens. One might even count Galileo and his disciple Guiducci among Tycho's opponents. Horatio Grassi, a Jesuit astronomer, wanted to argue against Aristotle based on the lack of observable parallax for the comet of 1618. Galileo and Guiducci disputed his findings, contending that one cannot use the parallax of a comet to calculate its location: "Whoever wishes the argument from parallax to bear upon comets must first prove that comets are real things."[71] For Galileo and his disciple, parallax is a valid method only when one has a real and permanent object; for example, one cannot use the parallax of a rainbow to calculate its location. Thus, the parallax of a comet (or its lack of parallax) cannot give us its supra-lunary location and is not evidence for concluding that the Aristotelians are wrong (or for concluding further that there is an imperfect terrestrial object in the heavens) unless, of course, we had previously accepted comets as objects whose nature is terrestrial, and not meteorological phenomena or mere appearances. Galileo in 1623 proposed that comets are luminous reflections of atmospheric exhalations, an account similar to the one he had proposed in 1606 and similar to the Aristotelian account; quoting Galileo: "The substance of the comet … may be believed to dissolve in a few days, and its shape, which is not circularly bounded but confused and indistinct, gives us an indication that its material is more tenuous than fog or smoke."[72]

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[68] Du Chevreul 1623, pp. 153–154.
[69] Du Chevreul 1623, p. 72.
[70] Du Chevreul 1624, Ms. Cherbourg 23, fol. 547.
[71] Galileo, *Il saggiatore*, in Drake and O'Malley 1960, pp. 186–187. Galileo is quoting from a debate between his student Mario Guidicci and Grassi, supporting Guiducci against Grassi.
[72] Drake and O'Malley 1960, p. 229.

It is interesting to note that scholastics such as Fromondus rejected Galileo's account defending Aristotle, and argued for the Anti-Aristotelian view that some comets are supra-lunar. Fromondus included a substantial discussion of comets in Book III, *De Cometis* of his *Meteorology* (1627, with a second edition in 1642). There Fromondus repeated the arguments from his shorter 1618 tract, with a few interesting changes. Clearly, there is a difference between writing a dissertation on a particular comet and writing a book about comets in general in the context of a treatise on Meteorology. The discussion in Fromondus' book III is divided into four parts: chapter 1, on the place in which comets are generated, with arguments about parallax and whether comets are celestial or sublunary; chapter 2, on the matter of comets, whether they are drawn from celestial or from terrestrial and aqueous matter; chapter 3, on the formal, efficient, and final cause of comets, with a single article about whether comets presage events on earth; and chapter 4, on the properties of comets, including arguments about the tails of comets, their light, their motion, magnitude, and duration. Given that Fromondus is talking about comets generally, he argues that some comets are celestial but also allows that some are sublunary. Thus there are two kinds of comets: those generated in the heavens, that share the motion and matter of the stars, and others that are sublunary and drawn from terrestrial elements.

Still, in his chapter on the location of comets, Fromondus is clear that many comets have a smaller degree of parallax than that of the moon; thus comets move among the stars.[73] This leads to Fromondus' critique of the parallactic views of Scaliger, Rothmann, Claramontius, and Galileo. In fact, Fromondus describes in detail the argument by Galileo and his disciple Guiducci against the use of parallax for measuring the distance of comets. As he explains it, positional visual phenomena such as parhelia, halos, and rainbows are to be located below the heavens next to us but evince no measurable degree of parallax. Comets, then, could have no measurable parallax and still be some kind of terrestrial exhalations in the sublunary region. Fromondus understands that this is the conclusion of Guiducci and Galileo, but he rejects it. He notes that comets are not visual phenomena but lucid bodies like stars, and that they frequently move

[73] Fromondus 1670b, chap. 1, art. 1: Cometa quidam caelestes sunt, ex minima quorundam parallaxi, p. 100.

from place to place, from South to North *and vice versa*—that which a mere positional appearance could not do.[74]

Fromondus revisits the opinion of Guiducci and Galileo that comets are terrestrial exhalations in his second chapter, on the matter of comets. Against their view, he repeats his analysis from 1618 that such exhalations climbing so high would become so rarified that they would become invisible.[75] Moreover, in his fourth chapter, on the motion of comets, Fromondus argues that terrestrial exhalations do not have the lengthy motions exhibited by comets; if Galileo and Guiducci were right, the proper motion of comets above the moon would measure only one or two degrees of arc for the whole of their duration.[76]

Fromondus argues against Galileo and Guiducci on three separate occasions. Interestingly, on one occasion he singles out an argument as belonging to Guiducci alone, that the curvature of the comet's tail is caused by refraction. Fromondus dismisses this explanation, arguing that if this were so, the comet's tail would be more curved at the horizon, where greater and more vapors are in abundance. Fromondus asserts that such a phenomenon was not observed for the comet of 1618 or for earlier comets. He had obviously considered seriously Galileo's views and those of Guiducci—well enough to reject them—and well enough to be able to differentiate between them.

While Fromondus was more confident in 1627 that their lack of parallax indicated that comets were celestial, indecision about the parallactic argument and Tycho's measurement of the parallax of the 1577 comet continued. Parisian textbooks from the period do not seem to have integrated the debate between Grassi and Galileo into their discussions, except perhaps to the extent that they seem genuinely undecided about whether comets are sublunary or supralunary. François Le Rées, in his *Cursus Philosophicus*, had a long discussion of comets and parallax, pro and con Aristotle, including Tycho's observations, finally concluding for Aristotle—barely. He argued that new stars are comets. He did not resolve the question of parallax, but merely discussed various options he seemed to think were all ultimately consistent with Aristotelian principles, if not Aristotle's actual doctrine about comets being fiery exhalations. In order

[74] Fromondus 1670b, chap. 1, art. 2: Argumentum Parallaxeos frustra eludunt Scaliger, Claramontius, Galilaeus, pp. 103–104.

[75] Fromondus 1670b, chap. 2, art. 4: Non omnium caeestium Cometarum materiam, esse terrestres halitus, pp. 126–129.

[76] Fromondus 1670b, chap. 4, art. 4: De Motu Cometarum, pp. 155–156.

of preference, the possibilities were: comets could lack parallax and be above the moon, not in the upper region of air; they could be old stars; or their parallax could be observed, consistently with Aristotle's opinion that they are sublunary fiery exhalations.[77] In Louis de Lesclache's 1651 textbook, under the topic of "fires which form mainly in the higher region of air, like comets, and which happen only infrequently," Lesclache wrote, "The difficulties that philosophers have in discovering the place of comets must not occupy the minds of those who seek knowledge of natural things in order to acquire knowledge of God."[78] Others took an even more conservative view. René de Ceriziers discussed various opinions concerning comets, including the possibility that comets are engendered in the heavens but are corruptible, that they are exhalations attracted by the sun, and that they are wandering stars having different motions above and below the heavens than the planets (requiring the hypothesis of fluid heavens, which he rejected).[79] De Ceriziers asked: "But why would we not see comets ordinarily, if they were stars? Why would they not have the shape of other stars?" and in 1643 he concluded, "Let us believe with the Philosopher that comets are exhalations that are ignited in the upper region of air."[80]

But the denial of superlunary comets seems to have been waning by mid-seventeenth century. For example, one can read in the textbook of the Protestant, Pierre du Moulin, in 1644: "Aristotle holds that comets are fiery exhalations; but the astronomers of this time have observed that a comet was above the moon. If that comet was a fiery exhalation, it would have always kept its tail behind it, in the manner of a torch, which when carried always keeps its flame behind it. And the fact that it was seen by so many in so many countries demonstrates its great height."[81] Du Moulin, like Fromondus, invoked anti-solarity to argue that

[77] Le Rées 1642, vol. II, part 2, pp. 14–26. Le Rées' possibilities had been previously discussed by Jean Crassot in his 1618 *Physica*. Thus Parisian indecision about comets preceded the debate between Galileo and Grassi.

[78] Lesclache 1651, p. 68, table xi of the physics.

[79] De Ceriziers 1643, pp. 363–364: "Pour les comètes, certains ont cru qu'elles s'engendroient dans le ciel, ils avouent par la corruptible: d'autres qu'elles se formoient des exhalaisons que le soleil attiroit jusques-là. Appolonius tient que ce sont des astres vagabonds, qui se montrent et se retirent à divers temps, ayant leur mouvement du haut du ciel en bas à la différence des autres planettes qui tournent, ce qui suppose les cieux liquides."

[80] De Ceriziers 1643, pp. 363–364.

[81] Du Moulin 1644, IV, chap. 3, pp. 103–104. By 1644, du Moulin no longer resided at Paris (which he did from 1599 to 1620), but at Sedan.

some comets are not fiery exhalations. Du Moulin, however, expected the moving fiery exhalations to point away from their direction of motion and not to point away from the sun. He also constructed an argument about the distance of comets based on their being visible at many places at the same time; this is obviously a common-sense way of getting the parallax arguments across. Du Moulin, like Fromondus, concluded that there are two kinds of comets, sublunary fiery exhalations à la Aristotle, and celestial objects: "I believe that both opinions are true and that there are two kinds of comets. The comets of the first kind are miraculous and celestial and above the moon; and consequently they are more meaningful."[82] By the second half of the seventeenth century, one can find a number of Aristotelians accepting comets as celestial objects, as indicated by the following student theses from Jesuit colleges: "Both the form and matter of comets are celestial; thus a comet is a star, not a fire"; and "Comets are celestial; in truth they are planets."[83] One can even find the successor to the two comets theory, in which both kinds of comets are non-miraculous, in the fashion of Fromondus:

> It must be said that there seem to be two kinds of comets: some are permanent bodies placed in heaven, appearing and disappearing with respect to us; others are only meteors produced by terrestrial exhalations, appearing in the highest regions of air and being ignited there. Proof of the first part. Most of the comets recently observed are certainly higher up than the moon. Now, there cannot be any new production in this part of heaven, as needed for the second opinion. Therefore, these are permanent bodies.[84]

As all the Parisian textbook writers seem to have indicated in their own ways, there turned out to have been no difficulty with comets being stars, except that if they were stars, they could not have become sublunary. As far as I can tell, no one ever suggested (nor could they have lived to

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[82] Du Moulin 1644, IV, chap. 3, p. 104. Brockliss (1987) argues that dismissal of anomalous physical phenomena as miraculous was a standard move at the time (p. 375). See also Théophraste Renaudot's conférence on comets, in which three out of four speakers are concerned with the signification of comets, their portending the death of a great personage. There is a discussion of some of the conférences (including the one on comets) in chap. 2 of Sutton 1995, pp. 19–40, but the author seems to consider the views represented in the conférences as heretical.

[83] Bonaviolensis 1657. And de la Vigne 1666. One can find a similar theory in de la Vigne's thesis: "II. Coeli tres numero et specie distincti; figura rotuindi sunt; natura corruptibiles, si Empyreum excipiamus: liquidum praeterea Firmamentum. Eorum materia est eadem sublunariu."

[84] Goudin 1726 [1668], vol. III, p. 197; 1864, vol. 3, p. 317.

suggest) that a comet crossed the division between the sublunary and supralunary world. On the other hand, if a comet, seen as a star, had a path that carried it across the celestial spheres, then a revision of the solid eccentric-epicycle model would be called for. One might be led to adopt a Tychonic or semi-Tychonic system on account of comets, a path taken by many Jesuits.[85] Ultimately, the Tychonic system was also taken up as a modification of a general Aristotelian point of view. Still, an Aristotelian would prefer the hypothesis of solid heavens, as Goudin amply demonstrated:

> It seems more probable that the heavens are solid. First objection. The solidity of the heavens cannot be accounted for given the facts observed recently. The improvements of the telescope and the serious studies of our astronomers have made this hypothesis incapable of being sustained. For example, we notice that Mars appears at times higher and at times lower than the sun; that Venus and Mercury revolve around the sun and are at times below it, at times above it, and at times to its side; that there are satellites around Jupiter et de Saturn; that the sun and Jupiter rotate on their axes, etc.

[85] As late as 1651 one can find Paris writers denying the Tychonic system and defending what they called a semi-Copernican system (the earth rotating on its own axis, but not revolving around the sun—in other words, a return to the speculation of Nicole Oresme). See Garnier 1651. For similar kinds of arguments, using observations to conclude for fluid heavens, see Schofield 1981. See also Bourdin 1646, a single volume in which two small cosmological treatises are bound together: *Sol flamma* and *Aphorismi analogici*. In these works, Bourdin argued that the sun is a blazing fire, a position inconsistent with the Aristotelian theory of the heavens, as Bourdin knew quite well (pp. 1–3: "auctores, et argumenta sententia negantis [Aristoteles]") and supported by such innovators as Descartes. He even referred to Descartes as someone who holds the position: "novissime a Renatus des Cartes solem docet esse flammam" (p. 5). Bourdin's basic argument is that the sun is a body on which there are sunspots and small torches, as the telescope rendered evident. Thus the sun is corruptible matter, not incorruptible ether as Aristotle had it ("sol est corpus; in quo sunt eiusmodi maculae, et faculae, ut patet ex telescopio, et parallaxi, quae docet haec omnia non distare a sole; ergo sol est corruptibilis," pp. 7–9; "atqui sol paret flamma (ut patet rescipiendi per telescopium; quo, ut docet Scheiner lib. 2 *Rosa Ursina*, cap. 4. deprehenduntur in sole multa flammae signa)," pp. 14–16). In the *Aphorismi analogici*, such considerations compelled Bourdin to adopt a Tychonic or semi-Tychonic cosmology. He moved from an explanation of sunspots on analogy with foam bubbling up from the sea, to there being three regions of stars and planets, to magnetic phenomena affecting both the earth and the heavens (Explicantur maculae solis exemplo spumarum maris, pp. 44–46; Distinguuntur stellae et planetae in tres partes seu regiones, pp. 49–50; De influxu magnetico mundi tum caelesti tum terrestri, pp. 50–52; De terminis fluxus magnetici mundi, pp. 52–53). But, however, he rejected the Copernican hypothesis, claiming that the earth stays still. (Terra quies probatur primo, pp. 65–66).

> Reply. Saint Thomas tells us to refer to the experts with respect to such questions; if the phenomena observed by the astronomers really do seem in opposition to the solidity of the heavens, we would no doubt abandon our conclusion; but in the midst of so many people who yell so loudly, we are still allowed to listen to some very renowned astronomers, among whom is Giovanni-Domenico Cassini, Director of the Royal Observatory, eminent light of astronomical science, and these tell astronomers us that, until now, none of the observed phenomena are contradicted by the hypothesis of solid heavens.[86]

But Goudin, like many others in the second half of the seventeenth century, was ultimately able to accept the hypothesis of fluid heavens:

> The heavens can be fluid and continue to be incorruptible. It is not impossible for a fluid body to be incorruptible: the air, water, and blood of the Blessed after the Resurrection, as well as their vital and animal spirits, will be fluid, in the same way that ours are now; yet they will be incorruptible.[87]

All the features of our discussion of comets within a late Aristotelian context, suitably modified, can be recovered in a pamphlet on the comet of 1664–1665, written by Jacques Grandamy, a Jesuit teaching at the College of Clermont in Paris. Grandamy argued that comets, being located above the moon, have to be of the same kind as the stars and other celestial bodies; and while he acknowledged the Aristotelian tradition of comets as sublunary exhalations, he did not give much credence to it:

> The matter of this comet is celestial, the same as that of planets and stars, since it is as celestial as they are, having been born in the heavens and having its motion there, as we will show in what follows. However, at times, some have seen comets in the air and lower than the moon, as some have wanted to assert, but which I do not guarantee.[88]

The problem remained how to distinguish the seemingly corruptible comet from the incorruptible celestial bodies:

> But I cannot and must not give to the comet in question here, which is born and resides in the heaven, any matter other than the one which it has in common with the stars and the planets, which likewise have their domain in the celestial region, with this difference, however, that the fixed and wandering stars have been made from the beginning of the world from a celestial matter which was liquid and fluid, and have received from their Author a proper consistence in order to eternalize their duration and to receive light better and to reflect it more clearly. Instead, comets are made

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[86] Goudin 1726 [1668], vol. III, p. 43; 1864, vol. 3, pp. 68–69.
[87] Goudin 1726 [1668], vol. III, p. 41; 1864, vol. 3, pp. 66.
[88] Grandamy 1665, chap. 1. De la matiere de la Comete, p. 1.

> with the same celestial matter somewhat condensed, as needed to reflect the light it receives and to transmit it partially. This celestial light is not so rarefied that it cannot send to us the light it receives nor so thick that the rays of the sun cannot penetrate it.[89]

Grandamy's choice of cosmology, his liquid and fluid heavens, was considered Tychonic by him, something he indicated by referring to the authority of modern authors (and to the Church Fathers[90]):

> I assume here according to the ancient opinion of the saintly Church Fathers and the most certain philosophy of the modern authors, that the whole mass of the celestial machine between the firmament and the heaven of the moon is composed of a liquid and fluid matter, which is easy to move and clear and transparent; that comets and other lesser bodies whether old or newly formed appear in this matter, and that they are moved as the fish in the ocean or the birds in the air. This appears manifest by the birth, the course, and the loss of comets and even of certain stars, which have sometimes appeared anew and disappeared afterwards; this allows us to judge that several other bodies are formed in the same manner, have their course, and disappear in this vast region of the heavens, without our perceiving it. The four satellites of Jupiter, which were unknown for all antiquity, and which only the use of the telescope have allowed us to know in our days, sufficiently show this truth by their errant motion.[91]

Grandamy's adoption of a modified Tychonic cosmology should not prevent us from seeing that he was most keen to place his explanation of comets and his fluid heavens into a general Aristotelian framework, in the manner of Fromondus. Having explained comets as celestial objects, Grandamy then explained that the changes comets underwent were not substantial changes but accidental changes, in keeping with the Aristotelian thought that there is no generation or corruption of any substance in the heavens:

> Besides the birth and the destruction of these comets, neither the condensation nor the rarefaction of the celestial matter prove that there occurs any generation or corruption of a substance, but only an accidental

[89] Grandamy 1665, chap. 1, pp. 1–2.

[90] See chap. 1 for the 1642 thesis of the Jesuit Jean Tournemine, which includes the statement that "Apostolic authority teaches us that there are three heavens. The first is that of the planets, whose substance is fluid, as shown by astronomical observations; the second is the firmament, a solid body as its name indicates; and the third is the empyrean, in which the stars are specifically distinct from the heavens." This semi-Tychonic position is being defended in part on the authority of the Church Fathers, something Cardinal Bellarmine argued in Bellarmine 1984. See also Grant 1987.

[91] Grandamy 1665, chap. 1, p. 2.

> alteration, as the one occurring between flowing and iced water, or between milk and blood and clotted milk and blood, and finally between soft juices and liquids and the same things when they have hardened. For it is the same substantial form which is in the whole mass of the heaven, and in each of its parts, solid as well as fluid; and the substance of the stars is not different from that of the rest of heaven, in the same way that knots in wood do not have a different matter from the rest of the wood, and metals and diamonds and pearls have the same matter and the same substantial form before and after their being hardened.[92]

Grandamy's Aristotelian conclusion was reiterated in his second chapter, "De la forme de la Comete":

> Therefore, in this way our comet has the same matter and the same substantial form as the rest of heaven and all of its parts, as have the fixed and wandering stars. In this way it is only an accidental form that distinguishes them from the planets, and this form consists in that it is composed of a head and of a tail and that it has a motion which is proper to it.[93]

In fact, Grandamy kept the standard view of the transmission of sunlight, that it depended upon whether the celestial body transmitting the light was more or less rarefied; he even applied the account to the tail of comets:

> The tail is a work of light and a rough and imperfect image of the sun; for the sun, like an excellent painter, paints its light in as many places as it has or can bring its rays. All the rays and all the species of light are as many images of the sun, more or less perfect, according to the diversity of the bodies in which they are encountered, which are mirrors representing their objects in different ways according to their diverse shapes and according to whether they are more or less polished or more dense or more rarefied.[94]

Grandamy used his "optical" theory of comets to refute any opponent who might have argued that comets are fiery exhalations above the sphere of the moon, in the heavens:

> In fact, there are three reasons that prove manifestly that the tail of the comet is only the effect of the light of the sun penetrating the head of these same comets and illuminating the heavens beyond it from behind. For first the tail of the comet is always opposed to the sun in a direct line, the head always being between the sun and the tail of the comet on the same line … In this way one can refute the opinion of those who believe that there is

[92] Grandamy 1665, chap. 1, p. 2.
[93] Grandamy 1665, chap. 2, pp. 2–3.
[94] Grandamy 1665, chap. 2, p. 3.

> a fire in the heavens which forms the matter of the exhalations of comets and their tails … This opinion does not explain why, in many cases, the tails of comets are constantly opposed to the sun, nor why often they turn in an instant from east to west.[95]

One can find Grandamy's general theory as late as 1705 in Jean Duhamel's *Philosophia universalis*. In his first conclusion Duhamel asserted that it is probable that some comets are exhalations in the highest region of air,[96] but in his third conclusion he also asserted that some comets can be celestial globes that reflected the sun's rays by means of their density.[97] In his fourth conclusion he asserted that some comets can be wandering stars that appear and disappear.[98] In his last conclusion he speculated that the mechanism for the formation of these celestial comets was that they were formed from collections of wandering stars which were insensible and which had previously evaded our senses.[99] Duhamel's mechanism for the formation of comets was different from Grandamy's, but the basic intuition was the same, that comets would be explained as changeable celestial phenomena, but not as the corruption and generation of celestial substance. Duhamel had previously argued that those comets higher than the moon can have been generated and corrupted in appearance and with respect to us but not physically and with respect to themselves. They were collections of stars; thus the generation of comets was nothing more than the aggregation of stars, and their corruption was nothing other than their separation.[100] The Aristotelian theory of comets, suitably modified, seems to have been extremely resilient.[101]

Fromondus, du Chevreul, Bouju, *et al.* all accepted Galileo's novel observations but did not accept the Copernican or Tychonic systems. Fromondus seems to have flirted with Copernicanism, but clearly, he had to take into account the fact that the Catholic Church had decided against

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[95] Grandamy 1665, chap. 2, pp. 4–5.
[96] Duhamel 1705, vol. V, p. 138.
[97] Duhamel 1705, vol. V, p. 139.
[98] Duhamel 1705, vol. V, p. 139.
[99] Duhamel 1705, vol. V, p. 140.
[100] Duhamel 1705, vol. V, p. 31. Ironically, the scholastics' principles seem to require them to explain celestial novelties by means of a mechanistic philosophy; thus the revolution seems ultimately to be an application of celestial mechanic to the physical world, rather than, as it is usually thought of, the application of terrestrial physics to the celestial world.
[101] These conclusions are likely to be confirmed for other portions of the Aristotelian theory under attack and in other socio-political contexts. See Reif 1962 and 1969; also Brockliss 1995.

it; moreover he had fundamental Aristotelian commitments motivating him to reject it as well. All of these thinkers made significant modifications to their Aristotelianism to accommodate the astronomical novelties. Du Chevreul accepted Venus, Mercury and sunspots as moons of the sun, together with moons of Jupiter and Saturn, all within a modified Aristotelian system of eccentrics and epicycles; Bouju rejected the Aristotelian theory of elements and the sphere of fire on Aristotelian grounds and Fromondus and Grandamy corrected Aristotle's account of comets based Aristotelian principles, making room for super-lunary comets. The changes Fromondus, du Chevreul, Bouju, *et al*. made were different from one another, but all of them could be said to use Aristotelian principles they deemed more fundamental to deny Aristotelian tenets they regarded as secondary. While all of them could be thought as normal scientists—in this case, Aristotelians—they all made changes that went well beyond what could be described as the articulation of the Aristotelian paradigm (or exemplar)[102] or as part of the sequence of theories in the Aristotelian "research programme." They all could be said to have fundamentally altered their paradigm or changed part of the core of their research programme. But that's what Aristotelians (Cartesians, Newtonians, etc.) accomplished with regularity throughout the seventeenth century.[103]

We have seen the Aristotelians make modifications of their cherished theories in order to account for Galileo's celestial observations. But, it could be said, although the Aristotelians did not look quite like ostriches refusing to see the obvious, for a very long time they did maintain

[102] This criticism of Kuhnian change resembles that of Laudan 1984, in which Laudan argues that one could hold some of theory, method, or values constant and make changes in the other; but this account is more basic, since it suggests that one can make seemingly revolutionary changes in theory without any corresponding changes in method or values—and, in fact, that this happens fairly frequently (all in the spirit of "normal" science). See Ariew 2010.

[103] In a different context Robert Desgabets, in the second half of the seventeenth century, thinking about the various kinds of Cartesians, proposes what he calls the first supplement to Descartes' philosophy, in as much as he "tries in it to correct Descartes' thoughts when it seems to [him] that Descartes has left the right path leading to the truth"; he compares it with what he calls "the second supplement, the new application of Descartes' incontestable principles to phenomena he had not known, or to truths he had not spoken of," what Cartesians such as Cordemoy, Rohault, de la Forge, Clauberg, and others have done (Desgabets 1985, p. 156). The two kinds of Cartesians map very well into two kinds of normal scientists: the "second supplement" type looks like a Kuhnian normal scientist; the "first supplement" type is the non-Kuhnian normal scientist in the mode of du Chevreul, Bouju, Fromondus, *et al*.

some false theories about solar and lunar spots and comets. True, but it is not obvious that they should have done otherwise. The evidence for radical change was not clear without hindsight. As we have already pointed out, even Galileo maintained a roughly Aristotelian theory of comets as sublunary events. Moreover, Descartes, who did break from the traditional view of comets, placing them in the heavens and accepting their generation and corruption, also held a false view of them as very hard, fast moving, massive bodies.[104]

Taken in a piecemeal fashion, the Aristotelian system appears to have been rich enough to have been able to provide explanations for the various astronomical novelties: Aristotelian science in the seventeenth century was much like an organism, living and adapting. Descartes provided another complete system to compete with it;[105] soon Gassendi

[104] René Descartes, *Le Monde*, chap. 9, and *Principia Philosophia* III, art. 119–122.

[105] On the need to provide complete explanations and not to try to explain phenomena piecemeal—that is to say, concerning Descartes' criticism of Galileo's scientific methodology—see Ariew 1986. A side issue about the relations between Descartes and Galileo: It is clear that Descartes had significant philosophical differences with Galileo, both with respect to his method and its resultant theories. Descartes notoriously said of Galileo concerning the *Two New Sciences*:

> I find that he philosophizes much more ably than common people insofar as he avoids as much as possible the errors of the Schools, and tries to examine physical matters by means of mathematical reasons. In that I entirely agree with him, and hold that there is no other way to discover the truth. But it seems to me that he is greatly deficient in that he digresses continually and does not stop to explain fully a subject; this shows that he has not examined them in orderly fashion, and has sought for the reasons of some particular effects without having considered the first causes of nature, and thus, he has built without foundation. (AT II, 380)

Descartes is often taken to task for not showing sufficient deference or not appreciating Galileo's greatness. Such critiques usually miss the large element of contingency and possible misunderstanding in the relations between the two thinkers. Descartes had already said something similar with respect to the *Two Chief World Systems*:

> I find that he philosophizes well enough on motion, though there is very little he has to say about it that I find entirely true. As far as I could see, he goes wrong more often when following received opinion than when going beyond it, with the exception of his discussion of the ebb and flow of the tides, where I find his reasoning rather forced. (AT I, p. 304)

Descartes was in the position to make this assessment of Galileo's natural philosophy because, as he divulged in the same letter, "Beeckman came here on Saturday evening and lent me the book by Galileo. But he took it away with him to Dordrecht this morning; so I have only had it in my hands for thirty hours. I was able to leaf through the whole book" (ibid.). We assume that Descartes had access to Galileo's works and that he would know about as much concerning Galileo as we do. But Descartes' letters impart a different impression. Before his notorious pronouncements on Galileo's *Two*

and Hobbes would do the same and a battle for supremacy would be waged among the various creatures.

New Sciences, Descartes had refused to comment about the work simply because he had not read it: "Your last letter just contains observations on Galileo's book, to which I cannot reply, because I have not yet seen it; but as soon as it is available for sale, I will look at it, if only to be able to send you my copy with my annotations, if that would be worth doing, or at least to send you my observations" (AT II, 94). It took a few more months before Descartes was able to read the book (see AT II, 271 and 336). Later, responding to an accusation that he had borrowed some of Galileo's ideas, Descartes said: "concerning Galileo, let me say that I have never met him, and have had no communications with him, and consequently I could not have borrowed anything from him. Moreover, I see nothing in his books that gives me cause to be envious, and hardly anything I would wish to acknowledge as my own. The best part [of his work] is what he has to say on music" (AT II, 388–389). We can see yet another element of muddle and miscommunication in Descartes' statement that what is best about Galileo has to do with what he says about music. It looks as though Descartes confused Galileo with his father Vincenzo (1520–1591), a noted musical theorist. This would account for Descartes' puzzlement about Galileo's great longevity: "You write about Galileo as if he were still alive and I thought that he was long dead" (AT III, 74).

CHAPTER SEVEN

DESCARTES AND THE JESUITS OF LA FLÈCHE: THE EUCHARIST

In his *Brief Lives of Contemporaries*, John Aubrey reports that Hobbes

> was wont to say that had M[ieur] Des Cartes (for whom he had great respect) kept himselfe to geometrie, he had been the best geometer in the world; but he could not pardon him for his writing in defence of transubstantiation, which he knew was absolutely against his opinion (conscience) and donne meerly to putt a compliment [on] (flatter) the Jesuites.[1]

Thus, Aubrey maintains what became a popular interpretation of Descartes' views on the relationship between theology and philosophy and on Descartes' motives for entering into a theological discussion—specifically the one concerning the explanation of the sacrament of the Eucharist. One can find variations of this interpretation almost everywhere; it is frequent in pre-twentieth century commentaries and still very common in Anglo-American scholarship.

In its usual form it goes as follows: Descartes did not want to bother with transubstantiation, but, after Arnauld's objections, he could not avoid it; nineteenth-century commentator Francisque Bouillier, paraphrasing Descartes' late seventeenth-century biographer, Adrien Baillet, states: "no doubt [Descartes] would truly have wanted to avoid meddling into this topic of transubstantiation, but, after Arnauld's objection, he was no longer allowed to remain in silence."[2] Descartes is said to have been dragged into a debate in which he did not want to participate and in which perhaps he should not have participated. Baillet states: "It would

[1] Aubrey 1898, vol. 1, p. 367.

[2] Bouillier, 1868, vol. 1, p. 450. It seems to be his opinion, though he puts it forward as Baillet's; he quotes Baillet, who wrote: "Ce n'est pas que M. Descartes ne prit toutes les mesures possibles pour se dispenser de jamais remuer la matiere qui concerne la transsubstantiation au Sacrement de l'Eucharistie, parce qu'il la regardoit comme une question de pure Théologie, et comme un mystere que Dieu nous propose de croire sans nous obliger a l'examiner. Mais, depuis que M. Arnauld luy en fait l'objection, comme au nom des Théologiens Scholastiques, il ne luy fut plus libre de demeurer dans son silence," Baillet 1691, vol. II, p. 520.

have been desirable for Descartes to have recognized in good faith and steadfastly the moral impossibility in which all philosophers will always be, of demonstrating transubstantiation using the principles of physics, or that he would have had the strength to keep a perpetual silence on this point, not attempting to plumb the depths of so inexplicable a mystery."[3] In a recent article, Nicholas Jolley echoes: "instead of contenting himself with saying that the dogma [of transubstantiation] was a mystery that must simply be accepted on faith, Descartes attempted to explain it in terms of his own philosophy. Descartes' possibly misguided efforts were to be taken up by his overzealous disciples."[4]

As evidence for the general view, one may cite the alleged fact that Descartes issued different explanations of transubstantiation, suggesting that he was constructing his explanations as he went along; for instance, Richard Watson counts three separate theories of transubstantiation: the first in Descartes' *Reply* to Arnauld, the second, "which turns out to be an explanation of transubstantiation completely different from the one he gives to Arnauld," in his letters to Denis Mesland, and the third when, not remaining "long satisfied that [the second theory] alone is adequate," Descartes, in a later letter to Clerselier, "combines his first with his second theory."[5] Also adduced as evidence is the fact that churchmen who accepted Descartes' explanation got into trouble with Church authorities (as if they and Descartes were doing something wrong). Bouillier asserts: "A small time after this letter [on transubstantiation], Father Mesland was sent to the missions to tend to the savages, perhaps because of his overly ardent taste for the new philosophy . . . "[6] And Watson tells us more forcefully that "the exchange of letters [between Descartes and Mesland] began in 1644 and was terminated abruptly in 1646 when, as extreme discipline for his commerce with Descartes, Mesland was banished to Canada."[7] He even asks "Why was Mesland dealt with so severely?" and he answers "Undoubtedly it was for the same reasons that led Descartes

[3] Baillet 1691, vol. II, p. 521.

[4] Jolley, "The Reception of Descartes' Philosophy," in Cottingham 1992, pp. 393–438.

[5] Watson 1987, p. 161, and Watson, "Transubstantiation Among the Cartesians," in Lennon, Nicholas, and Davis 1982, pp. 135–136.

[6] Bouillier 1868, p. 451. A marginal note on the manuscript copy of the letter to Mesland makes the same point: "Ce Pere fut relegué en Canada, ou il est mort, à cause de la trop grande relation qu' il auoit avec Mr Des Cartes." See AT IV, 345.

[7] Watson 1987, p. 156 and Watson in Lennon, Nicholas, and Davis 1982, p. 129. Watson adds that Mesland "died on the Canadian mission in 1672 without, as far as is known, inquiring further into transubstantiation."

to drop his guard to make some tentative proposals about Cartesian theology himself. The issue of transubstantiation was crucial."[8]

Now, it is true that, during the second half of the seventeenth century, Descartes and the Cartesians were very heavily criticized by various scholastics, and especially by the Jesuits, for their explanations of the Eucharist. The issue seems to have been the focus of opposition to Cartesianism. It was alleged to be the cause of Descartes' works being placed on the *Index of Prohibited Books* in 1663; it was the issue to which a 1671 edict by the King of France referred; and it was specifically cited as grounds for the condemnation of Cartesianism by the University of Louvain in 1662. Among the disputed propositions at Louvain were those supporting the Cartesian rejection of substantial forms or real accidents.[9] The objection against these propositions was that, as a consequence, the accidents of bread and wine would not remain without subject in the Eucharist.[10] As early as 1665, one can find, as part of a general assessment of the doctrinal difficulties of Cartesianism by the Jesuits of the Collège de Clermont, that "the Cartesian hypothesis must be distasteful to … theology … because it seems to follow from the hypothesis that there can be no conversion of bread and wine in the Eucharist into the blood and body of Christ, nor can it be determined what is destroyed in that conversion, which favors heretics."[11] Moreover, in 1678 the Oratorians and the Jesuits decided to require their professors to teach *against Descartes* that "in each natural body there is a substantial form really distinct from matter," and "there are real and absolute accidents inherent in their subjects, which can supernaturally be without any subjects."[12] At the same time at the Collège d'Angers, the Oratorian Fathers Eugène Fromentier, Bernard l'Amy, and Cyprian de Villecroze were removed from their teaching positions for having taught "the opinion of the Cartesians who state that there are no species or real accidents in the Eucharist, which is contrary to the theology of the holy fathers and to the doctrine of the church … and which was censured by the Sorbonne in 1624 as bold, erroneous, and approaching heresy."[13] Subsequently, the Jesuits formally condemned the following propositions: "There are no substantial forms

[8] Watson 1987, p. 156 and Watson in Lennon, Nicholas, and Davis 1982, p. 129.
[9] *Principia* I, art. 51–51 and *Responsiones VI*, sec. 7.
[10] Ariew 1994, p. 3; trans. in ACS p. 255.
[11] As reported by Robert Boyle in a letter to Henry Oldenburg (Oldenburg 1966, vol. II, p. 35).
[12] See Ariew 1994, p. 4; trans. in ACS p. 257.
[13] Babin 1679, pp. 39, 44.

of bodies in matter," and "There are no absolute accidents."[14] Many school books contained discussions of the above doctrines, as this example from Jean-Baptiste de la Grange's 1682 textbook shows:

> the manner in which Descartes explains the Mystery of the Holy Eucharist is completely false, as we shall show in the present treatise on accidental forms … If it is true, for example, that there are no substantial forms, as Descartes assumes, one cannot say that man would be rectified by an inherent grace—which is however what is set forth by the Council of Trent against the heretics.[15]

With the publication, in 1680, by the Père de Valois, writing under the pseudonym Louis de la Ville, of *Sentimens de Monsieur Descartes touchant l'essence et les proprietez du corps opposez à la doctrine de l'Eglise, et conforme aux erreurs de Calvin sur le sujet de l'Eucharistie*, discussions about the Eucharist became even more frequent, but usually shifted from the Cartesians' denial of substantial forms and real accidents to the consequences of their principle that quantity or extension is corporeal subsistence.[16] The authorities at Louvain had previously found offensive the Cartesian principle that the extension of bodies constitutes their essential and natural attribute.[17] Oratorians and Jesuits were required to teach "that actual and external extension is not the essence of matter."[18] In 1691 the University of Paris condemned the proposition that "the matter of bodies is nothing other than their extension and one cannot be without the other."[19] The Jesuits formally echoed this sentiment with a prohibition of the proposition that "the essence of matter or of body consists in its actual and external extension."[20] Scholastic textbooks from the second half of the seventeenth century were filled with such discussions.[21]

It is also true that the Cartesians found Descartes' explanations in two of the Letters to Mesland so sensitive that they did not disseminate them widely. Clerselier did not publish these letters in his three-volume edition of Descartes' *Correspondance* (though he did circulate them in private).[22]

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[14] Ariew 1994, p. 6; trans. in ACS p. 260.
[15] De la Grange 1682, vol. I, p. 3; see also pp. 109–135.
[16] See chapter 9.
[17] Ariew 1994, p. 3; trans. in ACS p. 255.
[18] Ariew 1994, p. 4; trans. in ACS p. 256.
[19] Ariew 1994, p. 4; trans. in ACS p. 257.
[20] Ariew 1994, p. 6; trans. in ACS p. 259.
[21] For example, pp. 189–201 of Duhamel 1692. For more on this issue, see chapters 8 and 9.
[22] They were not actually published until the nineteenth century, first in Descartes 1811, and then, in a better edition, in Bouillier 1868, pp. 453–459. In 1660, the Benedic-

Moreover, Descartes himself recognized that he was dealing with delicate matters. When writing to Mesland, he expressed the fear that, since he was not a Theologian by profession, things he might write could be less well taken from him than from another. Thus, he wrote about the Eucharist to Mesland "under the condition that if you communicated it to others, it would be without attributing its authorship to me, and even that you would communicate it to no one, if you judged that it is not completely in conformity with what has been determined by the Church."[23] Similarly, when Arnauld later asked Descartes for further explanations, Descartes answered that he would fear an accusation of rashness if he dared to come to any specific conclusion on the question, and that he would prefer to communicate such conjectures by word of mouth, rather than in writing.[24] Such circumspection might have been needed; the sacrament of the Eucharist was a point of division between Catholics and Protestants at a time when religious wars had been waged throughout much of Europe.

But still, we should not read our history backwards. Descartes could not have known that he was bound to fail. So I propose to read the letters to Mesland in the context of Descartes' correspondence with the Jesuits in general and in the broader context of discussions of the Eucharist before the 1640s. Descartes would then be seen as making genuine attempts at enlisting the Jesuits into teaching his philosophy, attempts that follow the same practices as those of previous natural philosophers, attempts that will fail, of course, but that need not have failed. In this way, we can see that the common view of Descartes on the Eucharist is false on almost every count; in this way we can also reaffirm the interpretations of contemporary French commentators on Descartes and the Eucharist, from Henri Gouhier to Jean-Robert Armogathe.[25]

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tine Dom Antoine Vinot advised Clerselier not to correspond with the Jesuit Jean Berthet "Pour vous parler donc, Monsieur, avec toute la sincérité d'un véritable ami, de votre commerce avec le Père Bertet Jésuite, je crois que vous ne pouviez donner une atteinte plus mortelle à la Philosophie de Monsieur Descartes, ni à la réputation de sa personne, qu'en communiquant vos pensées et vos écrits sur la matière de l'Eucharistie à ces gens-là." Agostini 2009, vol. 2, p. 187. See also Nadler 1988, esp. p. 256.

[23] AT IV, 165. In the next letter, Descartes suggests "Vous ferez de ma lettre ce qu'il vous plaira, et pource qu'elle ne vaut pas la peine d'estre gardée, ie vous prie seulement de la rompre, sans prendre la peine de me la renvoyer," AT IV, 216.

[24] "conjecturas autem meas viva voce malim exponere, quam scriptis," AT V, 194.

[25] Gouhier 1972 and Armogathe 1977. Sortais 1929 and 1937 can be seen as an early proponent of approximately the same view.

Cartesianism was not alone in being censured for holding doctrines inconsistent with various Church dogmas. Ironically, most of the difficulties with Cartesianism in the seventeenth century were previously difficulties with Aristotelianism in the thirteenth century. Among the propositions condemned by the Bishop of Paris in 1277 were some that were seen as threatening to the Eucharist.[26] Moreover, in a notorious case in 1624, the Université de Paris and the Parlement prohibited the denial of substantial forms by some anti-Aristotelians on the grounds that holding an atomist philosophy would have been inconsistent with giving an intelligible explanation of transubstantiation.[27] The University prohibited several theses concerning matter and form, one in particular denying all substantial forms, except for rational soul, along with prime matter; its official condemnation is that "this proposition is overly bold, erroneous, and close to heresy."[28] There are many extant reports about the events of 1624, including some by Descartes' correspondents, Mersenne and Jean-Baptiste Morin. These reports have little favorable to say about the theses of the anti-Aristotelians. Mersenne defends Aristotle against them, and dismisses them as charlatans; all of the reports evince concerns about the compatibility of anti-Aristotelian philosophy and Catholic theology.[29]

Moreover, the anti-Aristotelians were not being singled out in this respect. It was a common tactic at the start of the seventeenth century to claim that a particular philosophical view was not able to accommodate the Eucharist. For instance, Scipion Dupleix argues in his *Physique* that Thomists are inconsistent with their explanation of the Eucharist if they deny that matter can be without form;[30] that is, he argues against Thomas Aquinas' doctrine of prime matter as pure potency by analogy to what is required in the sacrament of the Eucharist:

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[26] See propositions 196–199 (originally 138–140) in Mandonnet 1908, pp. 175–191.

[27] The anti-Aristotelians, Etienne de Clave, Jean Bitault, and Antoine Villon scheduled a disputation by posting a broadsheet containing fourteen anti-Aristotelian theses on the streets of Paris. The disputation did not take place. The President of the Parlement saw copies of the theses and prohibited the disputants from sustaining them on pain of death. The Parlement then sent the theses to the Sorbonne to be examined. A few days later the Sorbonne replied with a censure of some of the theses and, through an arrêt, the Parlement ordered de Clave, Bitaud, and Villon to leave Paris, never to teach again within their jurisdiction, on pain of corporal punishment. See Garber 1988, pp. 471–486 and 2002. See also Blair 1993.

[28] De Launoy 1656, pp. 310–321. This prohibition was renewed in 1671 and became the basis for condemnations of Cartesianism; see chapter 10.

[29] Mersenne 1625, pp. 100–101.

[30] Dupleix 1990, pp. 131–132.

> [Saint Thomas] truly agrees that God can make an accident subsist in nature outside its subject, in the same way that all genuine Christians believe that all the accidents of the bread are without the bread in the Holy Sacrament of the Eucharist, and the accidents of the wine are without the wine, even though it seems that there is a greater incompatibility in this than in having matter subsist without form, insofar as matter does not need any subject or support, being itself the subject and support of all other natural things, and accidents cannot naturally subsist without subjects.[31]

We can see the same line of argument in later textbooks. For example, René de Ceriziers argues, in *Le philosophe français*, that there can be no form without matter and no matter without form naturally, but he adds, "however, one must not deny that God can conserve matter without any form, since these are two beings that can be distinguished, that no more depend upon one another than accident on substance, the former being separated from the latter in the Eucharist."[32]

Such discussions were especially frequent in the commentaries on Aristotle's *Physics* concerning matter, form, place, time, and void. We have just seen the Eucharist invoked by Dupleix and de Ceriziers in their discussions of matter, and by various authorities in Paris in their censure of the rejection of substantial form. We can also see Dupleix arguing, in his discussion of place, that supernaturally two bodies can be in the same place, and that, given the sacrament of the Eucharist, one body can be in two places.[33] This is a common discussion in early seventeenth-century philosophy textbooks. Both of the questions—whether one body can occupy two places and whether two bodies can occupy one place—are answered affirmatively, given the Eucharist, by the Jesuits of the University of Coimbra and by Charles d'Abra de Raconis.[34] Another

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[31] Dupleix 1990, pp. 131–132.

[32] De Ceriziers 1643, chap. 3, pp. 51–52.

[33] "Pour le regard de l'autre question, à sçavoir-non si un corps peut estre en divers lieux en mesme temps, je croy que naturellement cela ne se peut faire non plus que plusieurs corps ne se peuvvent trouver en mesme temps en un mesme lieu: mais que par la toute-puissance de Dieu l'un se peut aussi bien que l'autre: je dy que Dieu peut tout les deux: et par ainsi (puis qu'il l'a voulu et l'a dit) que le corps de son fils est en tous les sacremens de la sainct sacrée Eucharistie, et en chaque petite piece d'iceux." De Ceriziers 1643, pp. 261–262.

[34] Conimbricences 1594, lib. 4, cap. 5, quaest 4, art. 2: "certum esse posse duo corpora virtute divina eodem loco simul existere," and quaest. 5; "Utrum idem corpus simul in duobus loci divina virtute esse queat," art. 1: "solutio quaestionis," esp. pp. 42, 44 (though their account is a strange hybrid of Thomism and Scotism); de Raconis 1651, Tertia pars, Physica, Tractatus secundus, de loco, ad quartum librum physicorum, quaest. 1: "An plura loca idem numero corpus capere possint, seu an idem numero corpus possit

textbook writer, Eustachius a Sancto Paulo, holds a similar doctrine. After maintaining that two bodies can be in one place by divine virtue, he argues that there is no incompatibility involved in one body existing in several places. The example he gives for the latter proposition is that in the Sacred Eucharist the body of Christ is really and personally in several places.[35] Eustachius also evokes the Eucharist in his chapter on matter and quantity: "just as one and the same piece of matter can undergo various forms in succession, so one and the same quantity may endure in all these forms—and sometimes indeed there are changes in the very nature of the matter, as happens in the most revered sacrament of the Eucharist."[36]

Another early textbook writer, Théophraste Bouju, in his *Corps de Philosophie*, argues for the possibility of void on the model of transubstantiation; he asserts the impossibility of internal place or space being void of all bodies, but he adds, "Except that God by his absolute power can give subsistence to quantity as he does, in the Holy Eucharist, to the species of bread and wine which remain after transubstantiation."[37] Even Gassendi, in 1624, accepting the seemingly innocuous doctrine that "the essence of quantity is nothing but its external extension,"[38] feels compelled to point out that his doctrine has negative consequences for the sacrament of the Eucharist and to take steps to reaffirm his orthodoxy:

> To continue, let us now turn our attention to the famous difficulty concerning the essence of quantity. Our philosophers explain it so well that nothing could be more obscure, though nothing would seem to be more obvious than quantity. However, I must confess that the mystery of the Eucharist, as our faith conceives it, may cause some difficulty in this matter.[39]

The inescapable conclusion is that, at least during the first half of the seventeenth century, it was the common practice of Catholic philosophers when they were theorizing about natural philosophy to discuss the com-

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esse in pluribus locis," quaest 2: "An duo vel plura corpora possint esse in eodem loco per penetratione," esp. pp. 207, 216.

[35] Eustachius a Sancto Paulo 1629, Physica, Pars I, tract. 3, disp. 2, quaest. 3: "An duo corpora in eodem loco, et idem corpus in duobus locis esse possit," p. 59.

[36] Eustachius 1629, Physica, Pars I, Tract. I, Disp. 2, quaest. 4: "Quaenam sint praecipuae proprietatis materiae," p. 16.

[37] Bouju, 1614, p. 469.

[38] Gassendi 1624, II, exer. 3, art. 10.

[39] Gassendi 1624, II, exer. 3, art. 10; also art. 11: "Species Eucharisticas non item fore Fides nos Orthodoxa docet."

patibility of their physical theories with such mysteries of the Catholic faith as the sacrament of the Eucharist. The question is what Descartes' correspondence might reveal about the extent of his awareness of these practices. An initial response might emphasize the fact that Descartes read the philosophy textbooks of at least two of the above scholastic authors—Eustachius a Sancto Paulo and Charles d' Abra de Raconis—in November 1640, just before his first pronouncements on the Eucharist in *Replies* IV to Arnauld, circa March 1641.[40] He surely knew some of the others as well: he was taught from the textbooks of the Conimbricences at La Flèche.[41] Thus, a more careful examination is called for.

Descartes, the Jesuits, and the Eucharist

Descartes' correspondence with the Jesuits can be considered as three separate series of letters, each spanning a couple of years. First are four letters to some Jesuits at La Flèche in 1637 and 1638—possibly Noël, Fournier, and Vatier—requesting comments about his newly published *Discourse on Method*.[42] Second is the series of letters written during 1640 to 1642, dealing with Descartes' "war with the Jesuits," that is, the Bourdin affair, and culminating with the *Letter to Dinet*, published with the second edition of the *Meditations*.[43] And third is the set of letters from 1644 to 1646, predominantly involving Mesland, but also including others such as Charlet, Noël, Grandamy, and the now friendly Bourdin.[44] For most of these letters, Clerselier does not provide the name of the correspondent or the date of the letter; he simply identifies them as "A un reuerend Pere Iesuite." Descartes himself generally treats the Jesuits as if they were a collective whole, that is, as if it did not really matter with whom he was corresponding; in the *Seventh Objections*, he refers to the Jesuits as "a society which is very famous for its learning and piety, and whose members are all in such close union with each other that it is rare that

[40] See *To Mersenne*, 11 November 1640, AT III, 232–234, for the references to Eustachius and Abra de Raconis, and *To Mersenne*, 4 March 1641, AT III 328 for the first mention of the replies to Arnauld.

[41] See AT III, 185; see also chapter 1.

[42] AT I, 382–384, 454–456, 456–458, 558–565.

[43] AT III, 97–100, 105–118, 168–174, 221–228, 269–277, 464–468, 575–577, 594–602, and VII, 563–603.

[44] III, 378–382, IV, 110–120, 121–123, 139–141, 142–143, 143–144, 156–158, 158–160, 160–161, 161–170, 172–179, 215–217, 344–348, 584–586, 587–588.

anything is done by one of them which is not approved by all,"[45] and he says to Huygens: "since I understand the communication and union that exists among those of that order, the testimony of one of them alone is enough to allow me to hope that I will have them all on my side."[46]

The first four letters of 1637–1638 are extremely interesting. Writing to one of his old teachers—something he has not done for at least twenty years—Descartes sends him the *Discourse on Method* as "a fruit that belongs to him, and whose first seeds were sown by him in his mind, as he owes to those of his Order the little knowledge he has of letters."[47] Descartes asks the Jesuits to examine the work. In the second and third letters, Descartes again asks for "censures" and asks the Jesuits to continue to teach him: "For there is no one, it seems to me, who has more interest in examining this book than the members of your Society … I do not know how they can henceforth continue to teach these subjects, as they do every year in most of your colleges, unless they disprove what I have written or unless they follow it."[48] It is in this context that Descartes communicates his awareness that the principal reason the Jesuits reject all kinds of novelties in philosophy is the fear that these might also cause some change in theology.[49] Some four years before the *Replies* to Arnauld, Descartes boldly asserts in the letter to his Jesuit correspondent that his naturalistic explanations are consistent with the mysteries of the Catholic faith, that is, that his physics is compatible with Catholic revealed theology—including the mystery of the Eucharist—*and that he will make this clear in the future*. Even more to the point, in the fourth letter, Descartes, buoyed up by the fact that his correspondent has given a favorable reception to his *Essays*, tells him that his opinions were not conceived lightly and that they are worth the bother of examining; he adds:

> I say to you also that I do not fear that anything against the faith would be found in [my physics and metaphysics]; for on the contrary, I dare boast that faith has never been so strongly supported by human reasons as it may

[45] AT VII, 452. See also the *Lettre au P. Dinet*, AT VII, 564.
[46] AT II, 50. See also Ariew 1995.
[47] AT I, 383. See chapter 1.
[48] AT I, 455.
[49] AT I, 455–456. Later, in the *Lettre au P. Dinet*, Descartes repeats this claim, "Atque omnino profiteor nihil ad religionem pertinere, quod non aeque ac etiam magis facile explicetur per mea principia, quam per ea quae vulgo recepta sunt" he then refers to his striking example of this at the end of *Responsiones IV*, and adds that he would be ready to do the same for any other topic, if needs be; AT VII, 581.

> be if one follows my principles; transubstantiation, in particular, which the Calvinists take as impossible to explain by ordinary philosophy, is very easily explained by mine.[50]

Descartes is not only implying, but declaring openly, that he has an explanation of the Eucharist based on his principles of natural philosophy. This should not really surprise us; for, as early as 25 November 1630, Descartes, writing to Mersenne about his physics, specifically about his theory of colors, states:

> I think I will send you this discourse on light as soon as it is done, and before sending you the rest of the *Dioptrics*; for, wanting to describe colors in it in my way, and consequently, being obliged to explain in it how the whiteness of the bread remains in the Holy Sacrament, I would feel more comfortable if it were examined by my friends before it is seen by the whole world.[51]

Thus, it is clear that Descartes understood very well the practices of contemporary Catholic philosophers when they were theorizing about natural philosophy; as early as 1630, deliberating about color, he understood that he would be required to discuss the compatibility of his theory and the mystery of the Eucharist. It is probable that Descartes had worked out his explanation of the Eucharist as early as 1630, and that in 1637–1638 he was sincere in his belief that his principles of physics were consistent with the mysteries of religion. His declaration in 1637 that he would make this clear on one or more occasions was unlikely to be an empty one. And, in 1638, he must have been ready to substantiate his boast that faith, particularly the mystery of transubstantiation, had never been so strongly supported by human reasons as it could be by his principles.

When Descartes first announced to Mersenne that he was sending him the *Replies* to Arnauld's objection concerning the Eucharist, he seemed very confident of his position; he declared to Mersenne:

> You will see that my philosophy agrees so much with what is determined by the Councils about the Holy Sacrament, that I maintain that it is impossible to give a satisfactory explanation of it by means of the traditional philosophy. Indeed I think that the latter would have been rejected as repugnant to faith had mine been known first … I am confident that I can show that there is no opinion in their philosophy that accords as well with faith as mine.[52]

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[50] AT I, 564.
[51] *To Mersenne*, 25 novembre 1630, AT I, 179.
[52] AT III, 349–350.

It is true that, in the first edition of the *Meditations* in 1641, Descartes refrained from publishing the last few paragraphs of his *Reply* to Arnauld; as he says, he censored himself at Mersenne's urging, so that he would not have any difficulty in getting the approbation of the Sorbonne.[53] He explains to Huygens, "Father Mersenne has pruned 2 or 3 pages from the end of my replies to the *Fourth Objections*, concerning the Eucharist, because he feared that the Doctors would be offended in that I proved there that their opinion concerning that point did not agree as well as mine with the Scriptures and the Councils."[54] In any case, Descartes quickly restored the pages in the second Amsterdam edition in 1642, when there was no longer any need for the approbation of those Doctors.[55]

Arnauld's objection is that transubstantiation requires that the accidents of the bread remain after the substance of the bread is taken away. According to Arnauld, this would not be possible in Cartesian philosophy, since for Descartes there are no real accidents, but only modes of substance which are unintelligible apart from the substance in which they inhere.[56] Descartes accepts this characterization of his position, in general, except that he denies ever having rejected real accidents and affirms that God can bring about things that we are incapable of understanding.[57] But he then goes on to sketch an account of how objects affect the senses by means of their surface or the surrounding air or other bodies, opposing the scholastic theory of the transmission of intentional species.[58] He hypothesizes that if the substance of the bread is changed into the substance of something else but still occupies the boundaries occupied by the previous substance, the new substance will affect our senses in the same way the old one did.[59] Descartes even quotes from the Council of Trent

[53] "J' approve fort que vous auez retranché ce que i' auois mis à la fin de ma Réponse à M. Arnauld, principalement si cela peut nous aider à obtenir une approbation," AT III, 416.

[54] AT III, 772.

[55] See AT III, 785, in which Descartes tells Huygens that the second edition of the *Meditationes* is "plus correcte que celle de Paris, et mesme un peu plus ample, principalement en la fin de ma response aux quatriesmes obiections, ou ie me suis emancipé d' escrire que l' opinion commune de nos Theologiens touchant l' Eucharistie n' est pas aussi orthodoxe que la mienne, ce que le pere Mercenne auvoit retranché pour ne pas deplaire à nos Docteurs." See also Armogathe 1994.

[56] AT VII, 217–218. See also Stephen Menn's article, "The Greatest Stumbling Block: Descartes' Denial of Real Qualities," in Ariew and Grene 1995.

[57] AT VII, 248–249.

[58] AT VII, 249–251.

[59] AT VII, 251.

and goes on to prefer his hypothesis to the teaching of the theologians (the section excised by Mersenne).[60]

Descartes' response is obviously limited to the problem at hand: to explain, without using real accidents, how the bread after transubstantiation might still look like bread to us. Even a superficial look at Thomas' *Summa Theologiae*, Part III, questions 73–78 (and 79–83), would indicate that there are many issues not discussed by Descartes and, in particular, that he has said nothing about the real presence of Christ in the consecrated bread. This is, in fact, what Descartes indicates to Mesland:

> As for the extension of Jesus Christ in that Sacrament, I gave no explanation of it, because I was not obliged to, and I keep far away, as far as possible, from questions of theology, especially as the Council of Trent has said that he is present, *ea existendi ratione quam verbis exprimere vix possumus* [in this manner of existing which we can barely express by means of words]. I quoted that phrase, toward the end of my Reply to the Fourth Objections, precisely to excuse myself from giving an explanation.[61]

He adds, however: "But I venture to say that if people were a little more used to my way of philosophizing, they could be shown a way of explaining this mystery which would stop the mouths of the enemies of our religion so that they could say nothing against it."[62]

Descartes provides his explanation in a subsequent letter. First he reaffirms and clarifies the hypothesis of the *Fourth Replies*,[63] then he sketches an account of individuation for bodies and the human body:

> The numerical identity of the surface does not depend on the identity of the bodies between which it exists, but only on the identity or similarity of the dimensions. Similarly we can say that the Loire is the same river as it was ten years ago, although it is no longer the same water, and perhaps there is no longer even a single part of the earth which then surrounded that water.[64]

In the case of a human body, it remains the same through changes of matter, on account of its union with a soul: "they are *eadem numero* [numerically the same], only because they are informed by the same soul."[65] Thus, humans naturally transubstantiate other matter by incorporating it and

[60] AT VII, 251–256.
[61] 2 May 1644, AT IV, 119–120. See also AT IV, 374–375.
[62] AT IV, 120.
[63] 9 February 1645, AT IV, 163–164.
[64] AT IV, 164–165.
[65] AT IV, 167.

making it part of their bodies, bodies that are informed by a soul.[66] In a similar fashion, Descartes accounts for the miracle of transubstantiation by having the soul of Christ supernaturally inform the matter of the host upon consecration.[67]

There is no doubt that both aspects of Descartes' explanations of the Eucharist are in conflict with Thomist explanations. However, what is not often noted is that seventeenth-century Catholic explanations of the Eucharist were as much in conflict with Thomist explanations as were Descartes'. As we have seen, the explanation of the Sacrament of the Eucharist not only refers to specific metaphysical and physical theories about substance, substantial forms, accidents or modes, to extension and quantity, but also to place and to the principle of individuation. In school texts during the seventeenth century, there were (at least) two major alterations to the metaphysics underlying transubstantiation. The first—which we have already noted—is that Schoolmen accepted (against Thomas) that two bodies could be in one place and one body could be in many places at the same time, thus changing the interpretation of how Christ could be in the sacrament. This issue was a point of contention between Thomists and Scotists in their discussions of the Eucharist, Thomas formally rejecting the notion that one body can be in two places[68] and Scotus officially insisting that two bodies can be in one place.[69] Ironically, Descartes ranks himself with Thomists on this issue. Though he does not state it explicitly, it is clear that his reasoning in *Principles* II, art. 22, on the impossibility of multiple worlds, requires the impossibility of two bodies being in one place at the same time.[70]

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[66] AT IV, 167–168.

[67] AT IV, 168–169. See also *To Mesland*, 1645 or 1646, AT IV, 345–348 and *To Clerselier*, 2 March 1646, AT IV, 371–373. Clearly, an explanation of how any object affects our senses is still an explanation in the realm of philosophy, for Descartes; so is an explanation of the principle of individuation for bodies (and "natural transubstantiation"). However, when Descartes explains transubstantiation as a supernatural phenomenon, he is entering into the realm of theology.

[68] Aquinas 1964–1976, Pars III, quaest. 75: "quia impossibile est quod unus motus ejusdem corporis localiter moti terminetur simul diversa loca"; see also Aquinas 1918–1930, IV, chap. 63. For Thomas denying that one body can be in two places, see Aquinas 1964–1976, Pars IIIa, quaest. 83 and 84, *Quodlibeta* I, art. 2, *Physica* IV, lect. 9 and *Metaphysica* III, lect. 7.

[69] Scotus 1639, *Quaestiones quodlibetales*, quaest. 10, art. 2.

[70] This was pointed out in the seventeenth century: "Ce que je trouve de plaisant, c'est que Descartes enseigne hardiment des conclusions très dangereuses, qu'il tire de deux principes qui ne sont point prouvez. Le premier principe qu'il suppose, est que

The second major alteration in seventeenth century scholasticism is that the principle of individuation changed from matter to form, thus modifying the grounds on which one says that Christ is in the sacrament.[71] For example, Scipion Dupleix's position is the Scotist opinion 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.[72]

And there are similar doctrines in the *Metaphysica* of Eustachius a Sancto Paulo and Abra de Raconis.[73] The Scotist position seems to be the majority position in the seventeenth century. It entails that form, not matter, is the principle of individuation. Thus Descartes' position in this second respect looks very much like the majority position.

In spite of the pronouncements of the Council of Trent (or perhaps because of them) there was a fair degree of latitude in the first half of the seventeenth century with respect to the metaphysical issues that provided the foundations for explanations of the Eucharist.[74] Obviously, there were

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par tout il y a de l'espace, il y a aussi de la matière … Le second principe qu'il doit supposer nécessairement, pour conclure que plusieurs mondes sont impossibles, et dont neantmoins il ne parle point; c'est que deux corps ne peuvent pas, absolument parlant, estre dans un mesme lieu, et que la matière ne peut pas estre dans une autre matière [. . .] De sorte qu'il faut remarquer que non seulement la conclusion de Descartes, que plusieurs mondes sont impossibles est fausse et dangereuse; mais aussi qu'elle est tirée d'un principe dangereux, qui est que deux corps ne sauraient estre, absolument parlant, dans le mesme espace," de la Grange 1682, pp. 7–9.

[71] See chapter 4.

[72] Dupleix 1992, p. 235.

[73] De Raconis 1651, quarta pars, Metaphysica, tract. 4, sec. 2, 4, brevis appendix, "De unitate singulari et numerica, seu principio individuationis," pp. 76–78; Eustachius a Sancto Paulo 1629, quarta pars, metaphysica, tractatus de proprietatibus entis, disp. 2, de simplicibus proprietatibus Entis, quaest. 4, "Quodnam sit principium unitatis numerica, seu individuationis," pp. 38–39. Another doctrine in the same general direction is that of Franco Burgersdijk in his 1657, I, chap. 12, "De Unitate Numerica et formali, deque principio individuationis," pp. 66–75. (Burgerdijk is obviously not a French Catholic philosopher, but he does represent a natural extension of the Scotist view, which almost merges with the Cartesian doctrine.) Burgersdijk rejects both Scotus' and Thomas' opinions (with Thomas' as the worse one). His own doctrine is that composite substances have both material and formal principles of individuation (pp. 71–72). With humans, the individuality lies in the rational soul, which is an immaterial form. And, of course, humans can also be differentiated by their accidents (pp. 74–75).

[74] See Lewis 1995.

clear indications that certain views were prohibited—consubstantiation, for example—but there did seem to be enough room for Descartes to be hopeful that his views would be accepted.[75]

Of course, all of this simply belies the common interpretation. The fact is that Descartes' account of transubstantiation was not done merely to flatter the Jesuits, as Hobbes believed; Descartes considered the relationship between his physics and Catholic theology years before he corresponded with the Jesuits. Nor did he want to avoid meddling in the topic, as Baillet and Bouillier stated. As Descartes himself tells us, it was the Calvinists who took transubstantiation to be impossible to explain by ordinary philosophy. Thus, Descartes could not have accepted Jolley's suggestion that he should have contented himself with saying that the dogma must simply be accepted on faith. Nor could he have accepted Baillet's similar pronouncement that philosophers will always find it impossible to demonstrate transubstantiation using the principles of physics. One needs to understand Hobbes' statements as more revealing of his Protestant views than of Descartes' genuine motives; similarly, Baillet's comment tells us more about Jansenist (and anti-Jesuit) politics at the end of the seventeenth-century than about Descartes.[76] Further, since Descartes probably worked out an account of transubstantiation based on his principles of physics well before his *Replies* to Arnauld, it seems doubtful that he would be making up theories as he went along. Thus Watson's interpretive theses are unlikely as well. Finally, it is improbable that Mesland was being disciplined by the Jesuits for his commerce with Descartes. We cannot be sure, of course, but we can surmise that being sent to the missions was not a punishment but a reward for a Jesuit in the seventeenth century. Camille de Rochemonteix states (though without giving any documentation) that Mesland had requested the assignment himself.[77] Moreover, the length of Mesland's stay in the New World (some 26–28 years, 22–24 years after Descartes' death) is evidence against the thought that Mesland was being punished—or if this was punishment, it was very severe punishment indeed![78] The only plausible account

[75] See Nadler 1988, on Arnauld's attempts to defend Descartes's philosophy (including the explanations of the Eucharist) against various attacks, in the latter half of the seventeenth century.

[76] See Gregor Sebba, "Adrien Baillet and the Genesis of His *Vie de M. Des-cartes*," in Lennon, Nicholas, and Davis 1982, pp. 9–59.

[77] De Rochemonteix 1899, vol. IV, p. 78.

[78] For details about Mesland's stay in the New World—in Martinique and Santa Fe (now Bogota) of Nouvelle-Grenade (now Columbia), not Canada—see AT IV, 669 and

for the whole affair is to think that Descartes was attempting to enlist the Jesuits as teachers of his philosophy and making a genuine attempt to establish his philosophy as a new Catholic philosophy to replace the Aristotelian—with all that this entails. Together with the *Principles of Philosophy*, Descartes' correspondence with Mesland constitutes a first step towards a Cartesian scholasticism.[79]

The (Non) Reception of Descartes' Views on Transubstantiation

As we have said, Descartes' views on transubstantiation were condemned during the second half of the seventeenth century. On the whole, elements of Cartesian philosophy were claimed to be incompatible with naturalistic explanations of the Eucharist. Descartes' views in the *Fourth set of Replies* were well known, although his views from the letters to Mesland were not. Descartes' literary executor Clerselier published Descartes' correspondence in three volumes from 1657 to 1667, but he did not include Descartes' letter to Mesland of February 9, 1645, concerning the Eucharist, in any of the volumes. Clerselier circulated the letter in private,[80] but did not publish it because he thought it too politically

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Armour 1988; both provide basic data to counter the standard misinformation about Mesland (especially that of the *Bibliothèque de la Compagnie de Jésus* which confuses Denis Mesland with Pierre Mesland, who also taught at La Flèche and who died before the exchange of letters with Descartes).

[79] In this respect, see, in particular, Descartes' letter "A un reverend Pere Iesuite" AT IV, 121–122, in which he repeats that at La Flèche, in his youth "i'ay receu les premieres semences de tout ce que i'ay iamais appris, dequoy i'ay toute l'obligation à vostre Companie," and talks about Mesland's paraphrase of the *Meditationes*, which will be "efficace pour authoriser mes Meditations." Cf. also the letter of 14 December 1646, AT IV, 584–586.

[80] One of Pascal's *pensées* shows this. In the fragment Pascal discusses transubstantiation and the criterion of identity that allows one to accept the real presence of Christ in the consecrated host. The *pensée* is clearly a criticism of the February 9, 1645 letter Descartes wrote to Mesland about the Eucharist:

> It is, in its idiom, wholly the body of Jesus Christ, but it cannot be said to be the whole body of Jesus Christ.
>
> —
>
> The union of two things without change does not enable us to say that one becomes the other.
>
> In this way the soul is united to the body, and the fire to the wood, without change. But change is needed to make the form of the one become the form of the other.
>
> Thus the union of the Word to mankind.
>
> —

sensitive. Clerselier had shown the Mesland letter to Robert Desgabets who defended Descartes' account in an anonymous pamphlet, *Considérations sur l'état present de la controverse touchant le Très Saint-Sacrement de l'autel*, published in 1671. The pamphlet was promptly condemned by the French royal confessor Jean Ferrier as "heretical and very pernicious"; even Arnauld criticized this pamphlet. Desgabets' Benedictine order was prompted by the controversy to prohibit him from speaking out publicly on theological matters.

But a solution to the problem of the real presence of Christ in the consecrated host, similar to that of Descartes and Desgabets, independently found another adherent. In 1668 a young Leibniz was in the service of Baron Johann Christian von Boineberg. One of his interests at the time was the reconciliation of the Catholic and Lutheran Churches in Germany. Leibniz, the Lutheran, wrote some conciliatory essays on various theological topics such as the Eucharist, for Boineberg, a convert to Catholicism. The mystery of the Eucharist was a complex matter. Leibniz indicated what he thought the Catholic Church required to be demonstrated, which he also thought might have been acceptable to Protestants as well.[81] "Bread and wine, losing their own substance, acquire the substance of Christ's body and become everywhere numerically identical with it, only their species or accidents remaining, the substance of Christ's body being present in all places where the species of consecrated bread and wine exist."[82] His resolution was to assert that bodies were not

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> Because my body without my soul would not constitute the body of a man, then my soul united to any matter whatsoever will constitute my body.
> This does not distinguish the necessary condition from the sufficient condition. The union is necessary, but not sufficient.
> The left arm is not the right.
> —
> Impenetrability is a property of matter.
> —
> *Numerical* (*de numero*) identity with respect to the same time requires the identity of matter.
> —
> Thus, if God united my soul to a body in China, the same body *numerically the same* (*idem numero*) would be in China.
> —
> The same river that runs there is *numerically the same* (*idem numero*) as the one running at the same time in China. (Pascal 2005, pp. 301–302)

[81] For a substantial portion of the history of this extremely complex subject, see Bakker 1999. See also Adam 2001, pp. 172–180.

[82] Leibniz 1923–, VI.1, p. 508; Leibniz 1976, p. 115, modified.

substances apart from a concurring mind because a substance is a being that subsist in itself, such a being "has a principle of action in itself," and "actions pertain to supposita—*actiones sunt suppositorum*." As Leibniz said, "substance is union with a mind." Thus, bodies that lack reason are substances through a union with universal mind, or God.[83] So transubstantiation occurred when the body's union with the concurring mind was changed. The bread and wine of the sacrament are transubstantiated when the mind of Christ takes them on and substitutes its special concourse for the general concourse of the universal or divine mind. Using such propositions, Leibniz then proved that those bodies would have numerically the same substantial form as Christ's body and that a body transubstantiated in this way would not be changed except in the substantial form of the concurring mind; it would therefore retain all its accidents or species. Since minds lack extension, are not in space, can act upon bodies in space, and can think many things at the same time, Christ's mind can be present everywhere in the species of consecrated bread and wine. Given that Christ's mind is his substance, Christ's substance can be present everywhere.[84]

Leibniz recognized that his proposal for the explanation of transubstantiation required a particular principle of individuation, namely, substantial form alone and not matter and form or accidents. He asserted in his 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 properly nature in the same philosopher. Hence Averroës, Angelus Mercenarius, and Jacob Zabarella also assert that substantial form is the principle of individuation."[85] In his 1663 Bachelor's thesis *Disputatio Metaphysica de Principio Individui* (*Metaphysical Disputation on the Principle of the Individual*), Mercenarius and Zabarella were cited as supporters of the Scotist view; they were now among those who agreed with Leibniz. In case the point was not fully understood, Leibniz also referred to "Those who locate the nature of subsistence in the union of matter and form, like Murcia,"[86] thereby distancing himself from that position. In Leibniz's 1663 thesis, Murcia was among those who agreed

[83] There is a further complication I will disregard, in that Leibniz states that "Idea est unio Dei cum creatura—The idea is the union of God with creature," Leibniz 1923–, VI.1, p. 509; Leibniz 1976, p. 116.

[84] Leibniz 1923–, VI.1, pp. 508–510. For more on Leibniz's 1668 essay on transubstantiation, see Mercer 2001 and Fouke 1992.

[85] Leibniz 1923–, VI.1, p. 510; Leibniz 1976, p. 117.

[86] Leibniz 1923–, VI.1, p. 510; Leibniz 1976, p. 117.

with Leibniz in holding the "whole entity" principle of individuation, which, for composite beings, is matter and substantial form.[87] Leibniz emphasized that he was using the terms substance, transubstantiation, accident, species, and identity in the same sense which the Council of Trent favored, that none of his conceptions were 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 Aristotlelian philosophers, for whom substantial form is the principle of individuation."[88]

The closeness of the views of Leibniz and Descartes on the Eucharist[89] might raise the question of the influence of Descartes on Leibniz in this respect. In 1668, when Leibniz wrote his essay on the Eucharist, he was still fairly young and had not yet traveled to Paris (that which he would do between 1672 and 1676); he would not have had the opportunity to read the Mesland letter, which waited the nineteenth century to be published. In any case, Leibniz himself reported in 1676, that he had not read Descartes directly before then, but relied on secondhand reports of his philosophy.[90] So while Leibniz's conclusion about transubstantiation and the principle of individuation for informed bodies agreed in large part with Descartes' similar views in the Letter to Mesland, Leibniz formed his 1668 Scotist views independently of Descartes. In fact, Leibniz's 1668 views were transitional between his previously self-identified "nominalist" or anti-Scotist views from 1663[91] and his more developed

[87] Leibniz's English translator and commentator, Leroy Loemker, realized this; in a footnote to the passage he wrote: "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" (Leibniz 1976, p. 120). Loemker was 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.

[88] Leibniz 1923–, VI.1, p. 510; Leibniz 1976, p. 117.

[89] Descartes and Leibniz both treat the soul as a substantial form and use it as the principle of individuation for informed matter, though, of course, Leibniz extends the principle to all things—including what Descartes would have considered inert matter—not just to human bodies.

[90] See the Letter to Foucher, Leibniz 1923–, II.1, pp. 386–392, trans in Leibniz 1989, pp. 1–5.

[91] In the *Metaphysical Disputation*, Leibniz, as expected, followed the path traced out by Jakob Thomasius, his professor at Leipzig. He set aside Thomas' solution as not furnishing a single principle of individuation for both material and immaterial substances and discussed four other possible solutions to the problem, rejecting three of them,

Scotist views from his mature period in 1686, in the *Discourse on Metaphysics*, for example. Leibniz ironically issued the latter views as criticisms of Descartes (and Spinoza) on individuation.

Leibniz's *Discourse on Metaphysics* contains a direct critique of several of Descartes' fundamental principles. Leibniz starts the *Discourse* with the basic tenet that "God is an absolutely perfect being," who "does everything in the most desirable way"; for Leibniz, this entails that God "acts in the most perfect manner, not only metaphysically, but also morally speaking."[92] Among the opponents of his view are "those who maintain that there are no rules of goodness and perfection in the nature of things or in the ideas God has of them and who say that the works of God are good solely for the formal reason that God has made them."[93] Though he does not name him, Leibniz is clearly thinking of Descartes, who issues such propositions in print as early as in 1641, in the *Sixth Replies*, section 8. Leibniz continues by labeling the consequences of these views he considers contrary to his as "extremely dangerous"; he states, "I confess that the contrary opinion seems to me extremely dangerous and very near to the opinion of the recent innovators who hold that the beauty of the universe and the goodness we attribute to the works of God are but the chimeras of those who conceive of God in terms of themselves." This time Leibniz is thinking of Spinoza, given that he is paraphrasing the Appendix to Part I of the *Ethics*; in the earlier draft of the *Discourse*, instead of the "recent innovators" he explicitly mentioned "Spinosists."[94] Although Spinoza's anti-anthropocentrism in the Appendix to Part I of the *Ethics* was in part directed against Descartes' conception of God, in this context, Leibniz regards Spinoza's view as an extension of Descartes' view or, as he says, something "very near" to it. Leibniz continues:

> I also find completely strange the expression of some other philosophers who say that the eternal truths of metaphysics and geometry and consequently also the rules of goodness, justice, and perfection are merely the effects of the will of God; instead, it seems to me, they are only the consequences of his understanding, which, assuredly, does not depend on his will, any more than does his essence.

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including the Scotist answer, *haecceity*, defending as best the "whole entity" principle of the nominalists, that is, matter and form. For more on Leibniz's 1663 principle of individuation, see Ariew 2009.

[92] *Discours de la metaphysique* (1686) § 1. Leibniz 1923–, VI.4b, p. 1531; Leibniz 1875–1890, IV, 427; Leibniz 1989, 35.

[93] *Discours de la metaphysique* § 2.

[94] *Discours de la metaphysique* § 2. Leibniz 1923–, VI.4b, p. 1532.

In the early draft, instead of "some other philosophers," he wrote "Monsieur Descartes."[95]

All of this was consistent with Leibniz's previous pronouncements, from circa 1678 on, about the conceptions of God held by Descartes and Spinoza. For example, in a 1679 letter, we find the same elements, the same rejection of a purposeless God who does not aim for the good, and the same association of such a God with both Descartes and Spinoza:

> Descartes' God, or perfect being, is not a God like the one we imagine or hope for, that is, a God just and wise, doing everything possible for the good of creatures. Rather, Descartes' God is something approaching the God of Spinoza, namely, the principle of things and a certain supreme power or primitive nature that puts everything into motion and does everything that can be done. Descartes' God has neither *will* nor *understanding*, since according to Descartes he does not have the *good* as object of the will, nor the *true* as object of the understanding.[96]

For Leibniz, the doctrine of the creation of the eternal truths puts Descartes on the wrong side of the Euthyphro-type equation. According to Leibniz, the eternal truths are true or good for Descartes because God creates them, not that God creates them because they are true or good. God does not understand them as true or good; he simply wills them and they are so because he wills them. Spinoza's God is trivially related to this because, of course, for Spinoza, "neither intellect nor will pertains to the nature of God."[97] Thus, Spinoza's God does not choose the good, since he does not choose.

Leibniz's response to Descartes and Spinoza in the *Discourse* is that God's activity in the creation results from his choice of a world perfect both metaphysically and morally. After rejecting the view that God could have done much better,[98] Leibniz states forthrightly that the rules of the perfection of divine conduct consist in the simplicity of his ways being in balance with the richness of their effects. According to Leibniz, "God has chosen the most perfect world, that is, the one which is at the same time the simplest in hypotheses and the richest in phenomena."[99]

There have been considerable discussions, not to say whole books, about Leibniz's criterion of perfection and what he claims to follow from it, namely the complete concept of individual substances. But what

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[95] *Discours de la metaphysique* § 2. Leibniz 1923–, VI.4b, 1533.
[96] Leibniz 1923–, II.1, p. 501; Leibniz 1989, p. 242.
[97] Ethics I, proposition 17.
[98] Attributed to Malebranche; see 1680, Pr. disc., sec. xiv.
[99] *Discours de la metaphysique* § 6.

has not been given sufficient attention is the notion of individuation Leibniz employs here. God chooses the perfect world, one made up of individuals with actions and passions, since actions and passions properly belong to individual substances—*actiones sunt suppositorum*, as Leibniz says. 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."[100] Among the "several paradoxes that follow," as Leibniz calls the propositions to which he is committed, is the claim that no two substances can resemble each other completely and differ only in number—*solo numero*. In an earlier draft Leibniz had added: "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."[101] Now, this is clearly a criticism of Spinoza's view of individuation and it is surely also aimed at Descartes. In his published works, Descartes holds that "all the variety in matter, or all the diversity of its forms, depends on motion."[102] And, however he meant it, Spinoza officially follows this view as well: "Bodies are distinguished from one another in respect of motion-and-rest, quickness and slowness, and not in respect of substance,"[103] repeating "Bodies are individual things which are distinguished from one another in respect of motion-and-rest."[104]

The *Discourse on Metaphysics* is a French-language treatise. In it Leibniz lapses into Latin at some crucial junctures, an indication of the obvious fact that the terms and phrases he is using have long histories within scholastic terminology, that he is more familiar with them as such. And indeed they also have long histories in Leibniz's own thinking from his earliest, pre-Cartesian and pre-Spinozist times. Even the mature Leibnizian doctrine that two substances cannot resemble each other completely and differ only in number had its roots in a Paris-period

[100] *Discours de la metaphysique* § 8.

[101] Leibniz 1923–, VI.4b, p. 1541.

[102] *Principles* II, art. 23. The title of the principle is "Omnem materiæ variationem, sive omnem ejus formarum diversitatem pendere a motu."

[103] Ethics II, Proposition 13, Lemma 1.

[104] Ethics II, Prop. 13, proof to Lemma 3. The secondary literature on these matters is extensive. For a discussion of bodies being individuated by their motion, see Garber 1992, pp. 175–181.

essay from April 1676 entitled *Meditatio de Principio Individui*. Leibniz asserted there: "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." 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 concludes 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."[105] The argument is repeated as late as 1685 in Leibniz's "Notes on Cordemoy's Treatise *On the Distinction between Body and Mind*."[106]

In the 1686 *Discourse on Metaphysics*, Leibniz's answer to Descartes and Spinoza requires him to adapt an older scholastic doctrine for his use, given that two substances cannot differ only in number; he 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*)[107] is true of all substances."[108] The mature Leibniz will be more dismissive about the scholastics and their views concerning individuation; putting a negative twist on the "paradox" that two things cannot be perfectly similar, 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*."[109] But this was not always Leibniz's opinion. For Leibniz, in the *Discourse on Metaphysics*, an individual is a *haecceity*, that is, a Scotist individuating form, or mind, which Leibniz likens to the half of Thomas' doctrine dealing with angels or separated intelligences. The Scotist solution on the principle of individuation that Descartes seemed to favor was also favored by Leibniz, though Leibniz developed it as a criticism of Descartes' views, because these were not generally known as Descartes' during the seventeenth century.

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[105] Leibniz 1923–, VI.3, p. 491. English trans. in Leibniz 1992, p. 51.
[106] Leibniz 1923- VI.4, 1799. See chapter 4.
[107] See Aquinas 1964–1976, I, q. 50, art. 4.
[108] *Discours de la metaphysique* § 9.
[109] Leibniz 1875–1890, VII, p. 395; Leibniz 1989, p. 334.

CHAPTER EIGHT

CONDEMNATIONS OF CARTESIANISM: THE EXTENSION AND UNITY OF THE UNIVERSE

Descartes made some converts to his new philosophy with the publication of the *Principles*, the systematic exposition of his thought, set out in scholastic style, but, on the whole, he did not succeed in getting the work adopted in the curriculum of the schools. Here and there, one can find Cartesian principles taught, as with the ill-fated Oratorians at Angers in the 1670s and Edmond Pourchot at Paris in the 1690s. One can also find Cartesian propositions included in some disputations, but the discussion is mostly negative. For most of the seventeenth century, the official response to Descartes' philosophy was unfavorable. At various times, Descartes waged fierce battles with his opponents. In the 1640s, he thought himself at war with the Jesuits.[1] And there were troubles and official condemnations by Protestants at Utrecht around 1642 and at Leyden in 1647.[2] The battles continued and intensified after Descartes' death in 1650. There were condemnations by Catholics at Louvain in 1662,[3] culminating with Descartes' works being put on the *Index of Prohibited Books* by the censors of Rome in 1663.[4] The fighting raged in the second half of the seventeenth century: the Jesuits held more anti-Cartesian disputations at Clermont College in 1665, some clearly intended to make Descartes look ridiculous.[5] It intensified with numerous attacks in print.[6] The Cartesians counter-attacked with satires[7] and learned essays.[8] The anti-Cartesians also responded with their own satires.[9] Ultimately, the

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[1] See chapter 1.

[2] Verbeck 1992.

[3] D' Argentré 1736, pt. II, pp. 303–304.

[4] Bouillier 1868, vol. I, pp. 446–447.

[5] Prou 1665.

[6] See Vincent 1677, de la Ville [Louis le Valois] 1680, de la Grange 1682, and Huet 1692.

[7] See the "arret burlesque," Boileau 1747, vol. 3, pp. 150–153; Murr 1992, pp. 231–240.

[8] [Antoine Arnauld?], *Plusieurs raisons pour empecher la censure ou la condemnation de la philosophie de Descartes* in Boileau 1747, vol. 3, pp. 117–141 (reprinted in Cousin 1866, vol. 3, pp. 303–317). See also Bayle 1684.

[9] Daniel, 1690; M.G. de L' A. [Pierre Daniel Huet] 1692; Daniel 1693.

dispute spilled into the official political arena, the domains of the King, of the Universities, and of the teaching orders: The King issued an edict in 1671;[10] the faculty of arts at Paris tried to condemn Cartesianism in 1671 and succeeded in 1691;[11] there were skirmishes at Angers and Caen during 1675–1678;[12] the Jesuits, in a Congress with the Oratorians, ultimately prohibited the teaching of Cartesianism in 1678,[13] and formally condemned it in 1706.[14]

The official condemnations of Cartesianism of the late seventeenth century were unusually frequent and ferocious. Only the condemnations of Aristotelianism in the thirteenth century seem to have been as frequent and as wide-sweeping; however, the reasons for the prohibitions of Cartesianism were even more diverse than those given against Peripatetic philosophy. Cartesianism was censured not only for doctrinal reasons, but also on pragmatic and pedagogical grounds. Reflecting the pedagogical judgment of the authorities of Utrecht, it was often asserted that being taught Cartesian philosophy would leave one unprepared for the higher faculties of theology, law, and medicine.[15] And the Jesuits, echoing Pierre Bourdin's preoccupation with hyperbolic doubt, usually gave pragmatic reasons for dispensing with Cartesianism. This view can be captured nicely by the following comment by René Rapin: "In truth, Descartes teaches one to doubt too much, and that is not a good model for minds who are naturally credulous; but, in the end, he is more original than the others."[16] A general assessment of the doctrinal difficulties of Cartesianism can be found in a summary of a disputation by the Jesuits of Clermont College during 1665:

> To say no more, the Cartesian hypothesis must be distasteful to mathematics, philosophy, and theology. To philosophy because it overthrows all its principles and ideas which commonsense has accepted for centuries;

[10] Bouillier 1868, vol. I, p. 469.

[11] D' Argentré 1736, pt. I, p. 149.

[12] For an account of the events at Angers, see Babin 1679.

[13] *Concordat entre les Jesuites et les Peres de l'Oratoire*, *Actes de la Sixiéme Assemblée, September 1678*, in Bayle 1684, pp. 11–12.

[14] Rochemonteix 1899, vol. IV, pp. 89–93. The full text of the documents in notes 10–14 is given in Ariew 1994, pp. 1–6; trans in ACS pp. 254–260.

[15] See Verbeek 1992 and Ariew 2002.

[16] Rapin 1725, p. 366. Doubt is often the target of criticism. See Babin 1679, p. 41: "Dire qu' il faut douter de toutes choses, c' est un principe qui tend à l' athéisme … ou du moins l' hérésie des manichéens"; cf. also the condemnations of 1691 and 1705, propositions 1–4 (Ariew 1994, p. 5; trans in ACS p. 258). For the textbook critiques, see Vincent 1677, pp. 3–12, and Duhamel 1692, pp. 1–8.

> to mathematics, because it is applied to the explanation of natural things, which are of another kind, not without great disturbance of order; to theology, because it seems to follow from the hypothesis that (i) too much is attributed to the fortuitous concourse of corpuscles, which favors the atheist; (ii) there is no necessity to allow a substantial form in man, which favors the impious and dissolute; (iii) there can be no conversion of bread and wine in the Eucharist into the blood and body of Christ, nor can it be determined what is destroyed in that conversion, which favors heretics.[17]

This summary is broken down into three main categories: the first, a complaint already issued at Utrecht, is the rejection of any novel philosophy. Descartes had previously attempted to defend himself against that charge by arguing (unsuccessfully, it seems) that his philosophy was not novel, but the oldest of all philosophies, since he only accepted principles that had been generally admitted by all philosophers.[18] The second refers to the scholastic doctrine of the classification of the sciences. The claim is that mathematics should be subalternated to physics and not vice-versa, as with Descartes. Finally, the third is itself divided into three parts, all concerning the relations between philosophy and theology. Cartesian philosophy is unfairly linked with atomism and the standard complaint against atomism is issued against it.[19] The disputants also object that, for

[17] A report of the disputation can be found in a letter from Oldenburg to Boyle of 4 July 1665, Oldenburg 1966, vol. II, pp. 430–435; the summary is on p. 435.

[18] AT VII, 580–581, 596. See Ariew 1994. The accusation, however, continued to be repeated; see for example, de la Grange 1682, I, pp. 1–2:

> Il n'est pas nécessaire d'entrer fort dans les détails des propositions qu'enseigne Descartes, pour connaître que c'est avec grande raison que sa Majesté, qui s'applique autant a maintenir la Paix dans l'Eglise, qu'a soutenir les intérêts de sa Couronne, a défendu depuis peu qu'on enseignât dans son Royaume les sentiments de cet auteur. Il suffit de scavoir que ses principes ruinent une bonne partie de la Théologie, en détruisant entièrement la Philosophie ordinaire, que les Théologiens Catholiques ont en quelque façon consacrée, par l'usage qu'ils en ont fait jusqu'à présent, tant pour expliquer plusieurs mystères de la foy, que pour répondre aux sophismes des hérétiques. Il ne faut qu'entendre Descartes expliquer les plus grands mystères de la Foy d'une manière toute nouvelle; et s'assurer que tous les Théologiens Catholiques se sont trompez jusqu'à présent, pour se persuader que si sa doctrine n'est pas erronée, du moins elle est dangereuse, et que les professeurs de philosophie ont tous les torts du monde de l'enseigner aux jeunes gens, a qui il est bon de ne point inspirer l'amour de la nouveauté, non plus que du mépris pour l'ancienne doctrine.

[19] The same accusation can be found in Goudin 1864 [1668], vol. 2, p. 16, art. 3: Des principes des choses suivant Leucippe, Democrite et Descartes, and art. 4: Exposé de la doctrine de Descartes sur les principes. 1. Opinion de Descartes sur les principes des choses 2. Les molecules de Descartes ne peuvent être les principes des choses.

Descartes, man's substantial form is not necessary, something Descartes himself complained about with respect to Regius' exposition of his philosophy.[20] At last, we come to the issue of the Eucharist, which seems to have been the focus of opposition to Cartesianism from at least 1671 on. It was the issue to which the King's edict referred; it was alleged to be the cause of Descartes' works being placed on the *Index*; and it was specifically cited as a ground for condemnation at Louvain, along with a few other intriguing difficulties.

The Condemnation of Cartesianism at Louvain

The 1662 condemnation at Louvain (which, according to Victor Cousin, was instigated by Jesuits) listed five difficulties with Cartesian doctrine, under the following topics: 1. Descartes' definition of substance; 2. His rejection of substantial forms or real accidents; 3. His doctrine that extension is the essential attribute of matter; 4. His espousal of the indefinite extension of the world; and 5. His rejection of the possibility of a plurality of worlds.[21] These five difficulties were heard again and again throughout the seventeenth century.

The definition of substance. The authorities at Louvain specifically referred to *Principles* I, art. 51: "By substance we can understand nothing other than a thing which exists in such a way as to depend on no other thing for its existence. And there is only one substance which can be understood to depend on no other thing whatsoever, namely God. In the case of all other substances, we perceive that they can exist only with the help of God's concurrence," and *Principles* I, art. 52: "But as for corporeal substance and mind (or created thinking substance), these can be understood to fall under this common concept: things that need only the concurrence of God in order to exist."[22] Their objection to these principles was that, as a consequence, except for rational soul, there would not be any substantial forms; indeed there would not be any substantial forms in animals and plants. The issue was picked up in the textbooks. One can find numerous discussions of the Cartesian definition

[20] *Letter to Regius*, mid-December 1641, AT, III, 460–462 and *Letter to Dinet*, AT, VII, 585–586.

[21] Ariew 1994, p. 3; trans. in ACS p. 254. In their 2003 article, Armogathe and Carraud show, as previously suspected, that the Louvain condemnations were the catalyst for having Descartes' works put on the *Index* in 1663.

[22] Descartes, AT, VIII, 24–25; CSM vol. I, p. 210.

of matter and body and repeated criticisms of the consequence that animals are machines lacking sensation and knowledge; these spanned such diverse thinkers as the Scotist Claudius Frassen and the Oratorian Jean-Baptiste de la Grange, among others.[23] Ultimately, the Jesuits condemned the proposition that "Animals are mere automata deprived of all knowledge and sensation."[24]

The rejection of substantial forms or real accidents. Here the reference was to *Replies Six*, sec. 7, where Descartes stated:

> It is completely contradictory that there should be real accidents, since whatever is real can exist separately from any other subject; yet anything that can exist separately in this way is a substance, not an accident. The claim that real accidents cannot be separated from their subjects 'naturally', but only by the power of God, is irrelevant. For to occur 'naturally' is nothing other than to occur through the ordinary power of God, which in no way differs from his extraordinary power—the effect on the real world is exactly the same. Hence if everything which can naturally exist without a subject is a substance, anything that can exist without a substance even through the power of God, however extraordinary, should also be termed a substance.[25]

The objection was that, as a consequence, the accidents of bread and wine would not remain without subject in the Eucharist. This was surely the most frequently repeated criticism of Cartesianism. As we have said, Oratorians and Jesuits required their professors to teach that "in each natural body there is a substantial form really distinct from matter," and "there are real and absolute accidents inherent in their subjects, which can supernaturally be without any subjects."[26] And at Angers, the Oratorians Fromentier, Lamy, and Villecroze were removed from their teaching positions for having taught the Cartesians doctrine that "there are no species or real accidents in the Eucharist."[27] The Jesuits condemned the propositions: "There are no substantial forms of bodies in matter," and "There are no absolute accidents."[28] Most textbooks contained

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[23] See, for example, Frassen 1686: Rejicitur sententia Cartesii de materiae et corporis definitione, p. 30; Negat Cartesius dari animam sensitivam atque cognoscitivam in brutis; et asserit esse meras machinas, quae ex sola organorum dispositione, et artificiosa partium structura instar horologii moventur, p. 646. Cf. also de la Grange 1682, I, p. 13: Les bestes n'on point de raisonnement.

[24] Ariew 1994, p. 6; trans. in ACS p. 259.

[25] AT, 434–435; CSM II, p. 293.

[26] Ariew 1994, p. 4; trans. in ACS pp. 256–257.

[27] Babin 1679, pp. 39, 44.

[28] Ariew 1994, p. 6; trans. in ACS p. 260.

discussions of the doctrine.[29] But the discussions about the Eucharist shifted from the Cartesians' denial of substantial forms and real accidents to the consequences of their principle that quantity or extension is corporeal subsistence—that is, to objection 3.

Extension as an essential attribute of matter. The authorities at Louvain found offensive the Cartesian principle that the extension of bodies constitutes its essential and natural attribute. As with the next two principles condemned, they did no more than refer to the Cartesian text. For this tenet, they cited *Principles* I, 53 and the *Meditations*,[30] though what they attributed to Descartes was not an exact quotation. Oratorians and Jesuits required one to teach "that actual and external extension is not the essence of matter";[31] in 1691 the University of Paris condemned the proposition that "The matter of bodies is nothing other than their extension and one cannot be without the other";[32] and the Jesuits echoed with a prohibition of "The essence of matter or of body consists in its actual and external extension."[33] The textbooks were filled with such arguments.[34]

The indefinite extension of the world. Louvain referred to *Principles* II, 21: "What is more, we recognize that this world, that is, the whole universe of corporeal substance, has no limits to its extension."[35] Similarly, the Oratorian Fathers of Angers are said to have wrongly taught that "the world is infinite in its extension, a principle which is no less dangerous than the first [concerning the Eucharist],"[36] and the Jesuits condemned the proposition that "In itself, the extension of the world is indefinite."[37] The issue was given full play in the textbook tradition.[38]

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[29] De la Grange 1682, vol. I, p. 3; see also pp. 109–135.

[30] Descartes, *Replies Six*, AT VII, 442 (CSM III, p. 298): "I did not attribute to gravity the extension which constitutes the nature of a body"; *Principles* I, 53 (AT VIII, 25; CSM I, p. 210): "each substance has one principal property which constitutes its nature and essence, and to which all its other properties are referred. Thus extension in length, breadth and depth constitutes the nature of corporeal substance."

[31] Ariew 1994, p. 4; trans. in ACS p. 256.

[32] Ariew 1994, p. 5; trans. in ACS p. 257.

[33] Ariew 1994, p. 6; trans. in ACS p. 259.

[34] For example, pp. 189–201 of Duhamel 1692. For more on this issue, see chapters 9 and 11. The classic discussion of this problem is Armogathe 1977.

[35] Descartes, AT VIII, 52; CSM I, 232.

[36] Babin 1679, p. 40; the sentence continues with: "il est vray que les Carthesiens ne veulent pas se servir de ce mot d'*infiny*, qui seroit trop odieux, mais seulement de celuy d'*indefiny* qui est la même chose, et qui n'ajoute qu'une seule syllabe à tout ce que nous disons de l'*infiny*."

[37] Ariew 1994, p. 6; trans. in ACS p. 259.

[38] De la Grange 1684, vol. I, c. 28 de la nature du lieu et du vide [393] que le monde est infini, qu'il n'y a point d'espaces vuide au de-la des cieux, et que plusieurs mondes

The plurality of worlds. The authorities at Louvain referred to *Principles* II, 22: "It can also easily be gathered from this that … if there were an infinite number of worlds, the matter of which they were composed would have to be identical; hence, there cannot in fact be a plurality of worlds, but only one."[39] Oratorians and Jesuits affirmed that one must teach "that there is no repugnance in God's creating several worlds at the same time,"[40] and the Jesuits condemned the proposition that: "There can be only one world."[41] Typically, the argument found in the textbooks was that Descartes was infringing on God's omnipotence:

> For who would believe that Descartes teaches only the truth and what is known clearly by natural light, when he tells us in Part II of his *Principles*, article 22, that several worlds are impossible? Can anything more novel and more shocking to reason be uttered? Ever since people have attempted to reason about God's works, possibly there has not been one who has dared to teach this doctrine, or even who has been of that opinion. In fact, there is nothing that seems more clear and natural to us than to assert that God, having produced this world, can still produce another.[42]

Void and Motion in the Void

A sixth, closely-related Cartesian principle, also connected with possible limitations of God's omnipotence, can be added to the list of frequently criticized sentences. The relevant Cartesian principles are *Principles* II, 16–18: "It is a contradiction to suppose that there is such a thing as a vacuum."[43] On this issue, the Oratorians and Jesuits affirmed "That the void is not impossible";[44] the Jesuits condemned the proposition that "The compenetration of bodies properly speaking and place void of all bodies imply a contradiction";[45] other scholastics discussed the issue amply.

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sont impossibles; Vincent 1677, an mundus sit indefinite extensus, p. 69; Duhamel 1705, vol. 5, Cartesio possibilis non est alter mundus, quia noster mundus est infinite, vel, ut loquitur, indefinite extensus, p. 16.

[39] Descartes, AT, VIII, 52; CSM I, p. 232.

[40] Ariew 1994, p. 4; trans. in ACS p. 257.

[41] Ariew 1994, p. 6; trans. in ACS p. 259.

[42] De la Grange 1684, vol. I, p. 6. See also Vincent 1677, p. 75, and Duhamel 1705, vol. 5, p. 16.

[43] Descartes, AT, VIII, 75–77; CSM I, pp. 229–231.

[44] Ariew 1994, p. 4; trans. in ACS p. 257.

[45] Ariew 1994, p. 6; trans. in ACS p. 259.

The problem arises because seventeenth-century scholastics deviated considerably from Aristotelian doctrine with respect to the void and motion in the void.[46] Aristotle denied the existence of the void. He argued that the void is impossible, if it is thought to be a place with nothing in it, that is, a location actually existing apart from any occupying body. Further, he concluded against the atomists that motion is impossible in the void, using an argument deriving from his principles of motion.[47] Most scholastics attempted to soften these arguments, not so as to accept the existence of the void, but to accept its possibility, that is, to argue that God could create a void. Although attacks on Aristotle's views about the void preceded the condemnations of various propositions in 1277, they gained theological inspiration from them.[48] By the seventeenth century, the standard scholastic position was that nature cannot abhor a vacuum because of its parts are connected and influence each other,[49] but that God's ability to produce a void—for example by annihilating the sphere of fire or air and not substituting another body for it—cannot be denied.[50] Assuming that God chose to create a void, would there be motion in that void? Scholatics argued that the reasons normally given for the denial of motion in the void would not hold then, because the situation would not be a natural one. Thus, they did not find it difficult to argue against Aristotle on these points. René de Cerizier's chapters on void, from his *Le philosophe français*, are typical of late scholastics discussions on void:

> Aristotle teaches, in the fourth book of his *Physics*, that motion in the void would be instantaneous because he assumes that the duration of that motion arises only from the resistance of the space. But who does not see that the motion arises also from the quality that produces it, from the succession of its parts, and the distance of its terms? … We are led to believe that the Philosopher denied motion in the void against the ancients only because they did not posit any other cause of its duration than the resistance of the medium. From this one could derive the absurdity that a feather would fall as fast in the void as the grindstone of a mill, if it is true that the weight of a body and the distance of its terms cannot be considered.[51]

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[46] See chapter 6.

[47] *Physics* 215b21–22.

[48] See Duhem 1985, chap. 9–10.

[49] For example, De Ceriziers 1643, vol. 2, pp. 94–95.

[50] De Ceriziers 1643, vol. 2, p. 96.

[51] De Ceriziers 1643, vol. 2, pp. 97–98. Compare with Léonard Marandé's remarkably similar discussion from *Abrégé curieux de toute la philosophie* (Marandé 1642, pp. 251–255):

The scholastic denial of the void is therefore less categorical than its Peripatetic counterpart.

Descartes actually hardened the position, looking more like Aristotle than the scholastics. He argued for the impossibility of empty space, both in and out of the world. Thinking of a vessel, its concave shape, and the extension that must be contained in this concavity, he asserted: "it would be as contradictory of us to conceive of a mountain without a valley, as to conceive of this concavity without the extension contained in it, or of this extension without an extended substance."[52] In fact, he argued that if God were to remove the body contained in that vessel and did not allow anything else to take its place, the sides of the vessel would thereby become contiguous. Scholastics such as Jean Duhamel took on Descartes' actual argument: "God can absolutely destroy the bodies presently between the heavens and earth, having produced them and conserving them freely . . . God could put a third body between them without displacing them . . . and, as a consequence, heaven and earth would not be touching truly and effectively."[53]

What is curious about all this is the feeling of déjà-vu for anyone with the slightest knowledge of the history of condemnations. Most of the difficulties with Cartesianism in the seventeenth century were previously difficulties with Aristotelianism in the thirteenth. Among the propositions condemned at the University of Paris in 1277 were some that were seen as threatening to the Eucharist; prohibited, for example,

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> Ceux qui sont persuadez que la succession necessaire pour mouvoir et porter un corps d' un lieu en un autre, procedoit de la seule resistance de l' air, qui comme une grande mer dans laquelle nous flottons ainsi que les poissons, ne permet pas qu' un corps solide dans un seul moment se puisse acheminer d' une extremité à une autre; ont estimé qu' il ne se pourrait faire de mouvement dans un espace vuide, supposé que la nature en cecy se voulut accorder avec notre hypothese et nous fournir de quoy en faire l' experience. Aristote mesme a esté de cette opinion.
>
> Mais parce que la succession requise pour le mouvement ne procede pas seulement de la resistance de l' air; mais aussi de la distance et de l' esloignement qui se trouve entre l' une et l' autre de ces extremitez supposées, de là vient que supposé le vuide dans la nature, rien ne pourroit empescher le mouvement d' un corps d' un lieu à un autre. (pp. 254–255)

[52] *Principles* II, art. 18.

[53] Duhamel 1692, chap. 4, si le vide des philosophes est impossible, p. 202, and 1705, vol. 3, p. 203, vacuum divinitus possibile est. Cf. also Frassen 1668, Cartesius contendit, non solum nullum vacuum existere; sec nec etiam divinitus esse possibile, p. 372; de la Grange 1684, chap. 30, si le vide est possible, pp. 410–417; and Vincent 1677, de vacuo philosophico, p. 63.

were: "to make an accident exist without a subject has the nature of an impossibility implying a contradiction," and "God cannot make an accident exist without subject or make more than one dimension exist simultaneously."[54] Also condemned in 1277 were numerous propositions thought to infringe upon God's absolute omnipotence, such as "The first cause cannot make more than one world," and "God could not move the heavens in a straight line, the reason being that he would leave a vacuum,"[55] the latter proposition being widely interpreted as a prohibition of the impossibility of void.

The Condemnation of 1277 in the Seventeenth Century

Perhaps Descartes and his contemporaries were unaware of the long history of these prohibitions. When we think of the condemnation of 1277, we bring to mind a set of 219 different censured propositions, ranging over a great many topics, attached to a preface. The preface denounces unnamed students who raise heretical issues to which they claim they are not to able to respond. The preface continues with an attack on the doctrine of double truths—"For they say that these things are true according to philosophy but not according to the Catholic faith, as if there were two contrary truths"—apparently aimed at unnamed "Averroists," meaning, in this context, some radical Aristotelians, presumably Siger de Brabant and Boethius of Dacia. The preface also specifically condemns the book *De Amore*, on courtly love, and books of geomancy and necromancy, fortune telling and sorcery. We may also bring to mind that the condemnation was issued shortly after the death of Thomas Aquinas and constituted an attempt by some conservative (Augustinian) theologians to stem the tide of what they considered to be overly naturalistic (Aristotelian) philosophical accounts, such as those of Aquinas, that they believed might have infringed too much on theological matters.

Indeed, such an account takes center stage in Stephen Gaukroger's *The Emergence of a Scientific Culture: Science and the Shaping of Modernity 1210–1685*. Gaukroger uses the condemnations of 1277 as an instrument that undercuts the Thomist solution of using metaphysics as the

[54] See propositions 196–199 (originally 138–140) in Mandonnet 1908, pp. 175–191.

[55] Propositions 27 (34) and 66 (49) respectively. Also proposition 190 (201): "That he who generates the world in its totality posits a vacuum, because place necessarily precedes that which is generated in it; and so before the generation of the world that would have been a place with nothing in it, which is a vacuum."

connection between revealed theology and natural philosophy; the failure of Thomism, he thinks, is the reason for the various later attempts to construct a new natural philosophy. As a result, 1277, considered as the principal condemnation of Thomist metaphysics and physics, gains importance for the seventeenth century. For this argument to succeed, Gaukroger needs to show the significance and effects of the condemnations of 1277 in the Western world lasting for almost five centuries—to establish that these condemnations are a concern during the sixteenth and seventeenth centuries.

In an interesting analysis of the situation just before 1277, Gaukroger points to a struggle between the philosophy and theology faculties of the University of Paris about what constitutes the highest good and about the status of the Christian virtues. As he indicates, this dispute spilled into the 1277 condemnation, which sided with the theology faculty, condemning various propositions, such as 40, "That there is no more excellent state than to study philosophy," 144, "That all the good that is possible to man consists in the intellectual virtues," and 154, "That the only wise men in the world are the philosophers." This struggle is palpable; Gaukroger could just as easily have cited other propositions to support this point, such as 145, "That there is no rationally disputable question that the philosopher ought not to dispute and determine .... It belongs to philosophy under one or another of its parts to consider all things," and 153, "That one does not know anything more by the fact that he knows theology."

The condemnation of 1277 is a very complex document. It is often not clear who is the target of the condemnation. Who, for example, in the thirteenth century, could have held propositions 176, "That happiness is had in this life and not in another," 180, "That one should not pray," 183, "That simple fornication ... is not a sin," or 172, "That the pleasure in the sexual act does not impede the act or the use of the intellect"? As James Weisheipl says,

> Normally such censured propositions were excerpted verbatim from written works, but it has been notoriously difficult, if not impossible, except in a few instances, to locate the sources of the 219 propositions of 1277 ... Perhaps some of the propositions were errors 'uttered' by arts masters in class, i.e., in *reportationes*, and not actually written by them in published works.[56]

[56] Weisheipl 1983, pp. 334–335.

In addition, it is not clear even exactly what is condemned or how one should parse any complex condemnation. For example, proposition 49 states: "That God could not move the heavens in a straight line, the reason being that he would then leave a vacuum." One might suppose that what is condemned is a particular argument based on a specific reason: since the proposition to be condemned has the form "not A because of not B," one might think that one could hold "not A, because of C"—that God could not move the heavens in a straight line because the heavens are not in any place and motion requires a place, or that God could not move the heavens in a straight line because it would not be in keeping with his wisdom; one might also think that one could hold "not A" by itself, or "not B." The evidence happens to indicate, however, that the condemnation was taken to apply to the proposition that God could not move the heavens in a straight line and also to the proposition that God could not cause a vacuum (both "not A" and "not B").[57]

Still, one thing is clear: Thomas Aquinas was not the target of the above, condemned propositions. He did not hold the doctrine of double truths. He did not think that man can attain the highest good by his natural powers or that the intellectual virtues are the highest virtues. For Thomas, imperfect happiness can be had in this life, but perfect happiness consists in the vision of the Divine Essence, and the revealed theological virtues are distinct from the intellectual and moral virtues.[58] Though a more complicated matter, Thomist theories of place and void were not prohibited by proposition 49.[59] Gaukroger points to thirteen (of up to twenty[60]) other propositions prohibited in 1277, sometimes

[57] As Weisheipl says, "One typical proposition condemned was the statement 'God cannot move the heavens in a straight line, for then there would be a vacuum' (prop. 49). The author of the condemnation maintained that God could do both, move the heavens in a straight line *and* create a vacuum!" (1983, p. 339).

[58] Aquinas 1964–1976, II.I, q. 3, art. 8; q. 5, art. 5; and q. 62, art. 1–3.

[59] As Edward Grant points out, Aquinas was sometimes seen as defending the possibility of motion in the void and sometimes seen as prohibiting it; on one occasion he is seen as doing both; see 1981, p. 278n4.

[60] Etienne Gilson aptly says, "The list of the Thomistic propositions involved in the condemnations is longer, or shorter according as it is compiled by a Franciscan or by a Dominican," 1955, p. 728. He proceeds to list 20 propositions by P. Mandonnet, O.P. As Gilson says, "The list could be made shorter, or longer, because these propositions cannot always be found literally in Thomas Aquinas, at least not without important qualifications, while others could just as well be added, with the same reservation," ibid. In the twentieth century, the condemnation of 1277 is known through its thematic reordering by Mandonnet in 1908, vol. II, pp. 175–181, based on the nineteenth century edition by Denifle and Chatelain in 1889–1897, vol. I, pp. 543–558.

associated with Thomas Aquinas, and dealing with "the individuation of the soul by the body, the theory of the relation between reason and the intellect, and the Aristotelian proof of the uniqueness of the universe," (p. 72).[61] These may very well have been intended to prohibit various Thomist doctrines, but, as Weisheipl says, "almost none of them are found verbatim in Thomas' works; certain ideas, however, can be found in his writings, though considerably qualified."[62]

Really, no proposition from 1277 needs to be considered definitively as applying to Thomas Aquinas' philosophy. In fact, within a few decades, the Church canonized Thomas Aquinas and any condemnation that might have been associated with him was repealed. As Weisheipl says:

> … forty-nine years after his death [1323], Thomas was declared a saint in the Holy Roman Church by Pope John XXII, a model to all not only in sanctity, but also in doctrine. It is clear that Pope John XXII wanted Thomas to be recognized not only for his sanctity and purity, but also for his wisdom, learning, and scholarship. As an anticlimactic measure, Etienne Bourret, bishop of Paris, revoked the sentence of excommunication and condemnation attached to the Parisian condemnation of 1277 from those propositions "insofar as they touch or seem to touch the doctrine of the aforesaid Blessed Thomas."[63]

The esteem in which Thomas Aquinas was held continued and even grew—if that can be imagined. As we have indicated, there was a renaissance in Thomist philosophy during the second half of the sixteenth century. Gaukroger is clearly aware of this revival of Thomism at the start of the early modern period; he asserts,

> It is easy to assume that these condemnations [of 1277] were largely forgotten in the wake of the de facto establishment of Thomism as the official philosophy of the Church in the fifteenth century, but the condemnations of Aristotle were mentioned in the widely read and repeatedly printed text of the Professor of Philosophy at Paris in the mid-seventeenth century, Jean de Launoy, *De varia Aristotelis in Academica Parisiensi Fortuna* (Paris, 1653).[64]

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[61] Gaukroger lists the thirteen as propositions 42–43, 50, 53–55, 110, 115–116, 46, 162–163, and 27, in Mandonnet's numbering. Gaukroger's number 46 is likely a typo for 146, so that the condemned propositions in their original ordering would be 96, 81, 77, 218, 219, 204, 191, 27, 97, 187, 173, 163, and 34. Weisheipl lists these, as well as 69, 124, and 129, for a total of sixteen condemned propositions (1983 pp. 336–337).

[62] Weisheipl 1983, p. 336.

[63] Weisheipl 1983, p. 349. The revocation was made public in 1325.

[64] Gaukroger, p. 72n90.

It is not clear why de Launoy's book would be relevant within a fifteenth (or sixteenth) century context, but the claim is worth investigating for the seventeenth century. The situation, I think, was very different than the one depicted by Gaukroger.

De Launoy, a well-known controversialist, censor, Sorbonne doctor of Philosophy and Theology, was among the *savants* who frequented the cell of Marin Mersenne (according to Mersenne's first biographer and fellow Minim, Hilarion de Coste).[65] My sense is that de Launoy's book project grew out of discussions within that milieu. There is an interesting passage in Mersenne's *La vérité des sciences*, chap. 9, where Mersenne's mouthpiece, The Christian Philosopher, argues in an Augustinian fashion that the truth of the sciences is something independent of humans: "Even if Euclid was the most evil man in the world, the whole would still be greater than its part and right angles would still be equal, for the truth of sciences is independent from our customs and our ways of living."[66] This independence entails that these truths proceed from God and that God revealed them to us through such agents as Aristotle and Euclid. God has wanted for us to learn philosophy through Aristotle's books and mathematics through the books of Euclid and others. One difficulty with his account that Mersenne considers is that he has heard that the Catholic Church once condemned some of the divinely inspired books of Aristotle:

> As for the books of Aristotle's *Metaphysics* that Rigord says have been condemned in Paris, we would have to see whether the council held in that city mentions the said books and if they were not by some other author. I have not read this account elsewhere than in Rigord's; that is why I have reference to its contents. Although, if it is true, I would be surprised that Saint Thomas did not recall it in his commentaries on the *Metaphysics*.[67]

Mersenne, one of the most broadly read and most widely connected persons in the seventeenth century, is clearly unsure whether the event occurred; it is the only such event he knows of. Still, he continues by constructing an argument to the effect that the Church can justly condemn Aristotle's works, Euclid's *Elements*, or even the Bible itself (in the vernacular), under appropriate circumstances. About the condemnation

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[65] Hilarion de Coste, *Vie et lettres inédites du Père Mersenne*, in de Larroque 1879–1897, p. 302. De Larroque's annotation refers to de Launoy as "L'hypercritique Jean de Launoy, l'historien du collège de Navarre, *le dénicheur de Saints*."

[66] Mersenne, in ACS p. 163.

[67] ACS p. 164.

of Aristotle of which he is unsure, Mersenne says: "the prelates and doctors could have prohibited the reading of these books for a time, having perceived that they were badly used and that this doctrine, which was not yet well understood, was being used to destroy the Catholic faith," (ibid.). For Mersenne, the Church can suppress any book it deems harmful to the preservation of the church or dangerous to piety:

> if some new heresy based on Euclid's *Elements* or Aristotle's *Physics* or *Logic* arose to fight the Catholic faith, and the supreme pontiff and other prelates judged that it would be appropriate to remove these books from the hands of Christians, for fear that they would be dissuaded from their faith by the subtleness of the heretics' sophisms and paralogisms, they could prohibit the reading of these books until they saw the danger passed and the poison of the heresy destroyed. [...] This should impose a perpetual silence on the heretics and libertines who attempt everyday to slander the prelates of the church and the general councils for their prohibition of the reading of censured books and of the Bible in the vernacular ... (ibid.)

The only condemnation of Aristotle of which Mersenne is aware is the one to which he refers as having been discussed by Rigord. Rigord happens to be the 13th century author of the life of Philippe-Auguste, *Gesta Philippi Augusti, Francorum Regis*; there is a single paragraph in the whole book that says that Aristotle's physics and metaphysics were condemned in 1209 (meaning 1210) because they can lead to heresies.[68]

De Launoy begins his book on Aristotle's fortune at the University of Paris with the same paragraph from Rigord. His chapter 2 concerns the Church Fathers—Christian Martyr, Clemens of Alexandria, Tertullian,

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[68] The paragraph is actually in the continuation of the *Gesta* by Guillaume le Breton, since Rigord died in 1207, though the history goes up through 1210; it was published in *Historiae Francorum ab Anno Christi DCCCC ad Ann. M.CC.LXXXV scriptores veteres XI* (Frankfurt, 1596). There was another edition of the *Gesta* in 1636 and a French translation with the continuation after 1207 by Guillaume le Breton in 1825. The one paragraph (in the continuation) that is interesting is from p. 246:

> At that time [1210] the works of Metaphysics said to be composed by Aristotle were being read in Paris. They had recently been brought from Constantinople and translated from the Greek into Latin. Since, not only did they give rise to the said heresy [of Almaric] through subtle maxims, but they could still engender new heresies, the books were ordered to be burned and the same council [of Paris] prohibited them, under pain of excommunication, from ever being transcribed, read, or defended, in any fashion whatsoever.

Almaric's male followers were rounded up and burned at the stake; since Almaric had died a few years earlier, his bones were disinterred, burned, and their ashes were thrown away.

Lactantius, etc.—and their previous difficulties with various philosophers; chapter 3 is about Saint Bernard, Peter Lombard, and Peter Abelard. Chapters 4–8 display a general awareness of some other interdictions against Aristotle's works: one in 1215 (chap. 4), another in 1241 (chap. 6), and a third in 1265 (chap. 8). After that, de Launoy refers to a condemnation of 1366 (chap. 9), and continues with a discussion of Ramus (chap. 13–14), ending with an extensive account of the 1624 condemnation of the anti-Aristotelians, de Claves, Bitaud, and Villon (chap. 15) plus a conclusion. There is no mention of the condemnation of 1277, which, I dare say, is completely unknown in the seventeenth century.[69]

Now, I do not wish to argue that the condemnation of 1277 had no effect on medieval science. The scholar most closely associated with a positive view of 1277 was Pierre Duhem; Duhem was very heavily criticized for asserting that the condemnations of 1277 were the "birth certificate of modern physics."[70] Regardless of these criticisms, when one reads post-1277 natural philosophers, like the fourteenth century John Buridan, one encounters numerous texts such as the one from his *Physics*, Book III, quaest. 7, about "whether local motion is a thing distinct from place and from that which is moved locally." Buridan's discussion leads him to consider whether God can move the entire world in a circle, if the world was continuous and lacking a place. Buridan answers in the affirmative: "I prove this through a certain condemned Parisian article that says that God cannot move the entire world at the same time with rectilinear motion. This is in error. And there is no reason why he should move it more with rectilinear motion than with circular motion." Similarly, you can find fifteenth century texts asserting:

> It is not contradictory that a world not be constituted from the totality of the matter of sensible things. In fact, it is stated in a Parisian article, that God cannot move the entire world at the same time with rectilinear motion is an error. It is therefore evident because of this that God can put the world in a place other than the one in which it is presently.[71]

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[69] Antoine Arnauld was also unaware of the condemnation of 1277 in the 1670s, as is shown in chapter 9. As far as I can tell, the first (only partial) text of 1277 was published in an essay by Jean Duhamel, *Quaedam recentiorum philosophorum ac praesertim Cartesii propositiones damnatae ac prohibitae* in his five volume textbook *Philosophia universalis, sive commentarius in universam Aristotelis philosophiam ad usum scholarum comparata* (Paris, 1705) and was available fully only in D'Argentré 1728, pp. 175–184.

[70] Duhem 1987, p. 4; see also the Preface, p. xxii, and Ariew and Barker 1992. For an excellent treatment of the criticism leveled at Duhem for this claim, see Murdoch, 2000, pp. 23–43, esp. pp. 30–36.

[71] John Hennon in Duhem 1985, p. 499.

It is stunning to see the condemnation of 1277 used in the fashion of a premise. But this does not license the inference that the condemnation itself is known; rather, it looks more like the kind of practice you see in commentaries, in which certain comments gain a life of their own. Someone refers to "the articles of Paris," and others use that reference, almost as an epithet. Nobody needs to associate the proposition with any specific theological debate, with a criticism of Thomas Aquinas, or anything else in particular. Certainly, scholars such as Mersenne were aware of condemnations against holding rigidly a denial of the void or affirming the uniqueness of the world, but they did not think of these as specifically connected to a prohibition against the works of Aristotle or of Aquinas.

The Extension and Plurality of Worlds

There was plenty of evidence, before the advent of Cartesianism, to understand that some of its assertions would be censored. One does not need to refer generally to the condemnation of 1277 to make such a point. The textbook tradition carried with it the record of many previous censures and those same propositions had their own history of condemnation in the seventeenth century itself. In 1624 the University of Paris and the Parlement prohibited the denial of substantial forms by some anti-Aristotelians on the grounds that holding an atomist philosophy would have been inconsistent with giving an intelligible explanation of transubstantiation.[72] The Cartesians and anti-Aristotelians were not singled out in this respect. It was a common tactic at the start of the seventeenth century to claim that a particular philosophical view was not able to accommodate the Eucharist. For example, Scipion Dupleix argued, in his 1603 *Physique*, that Thomists cannot explain the Eucharist if they deny that matter can be without form;[73] similarly, he argued that, supernaturally, two bodies can be in the same place, given the Eucharist.[74] Even the possibility of void was argued on the model of transubstantiation. Théophraste Bouju, in his 1614 *Corps de Philosophie*, argued for the *impossibility* of internal place or space to be void of all bodies: "Such a space being a quantity, it is impossible that it can be without body, as much as a quantity is

[72] For more on what is clearly an important event in the first half of the seventeenth century, See Garber 1988 and 2002.

[73] Dupleix 1990, pp. 131–132.

[74] Dupleix 1990, pp. 261–262.

an accident which requires a body in which to inhere, without which it cannot exist."[75] He also added, "Except that God by his absolute power can give subsistence to quantity as he does, in the Holy Eucharist, to the species of bread and wine which remain after transubstantiation."[76]

In 1624, Gassendi published his *Exercitationes Paradoxicae Adversus Aristoteleos*, book I. He had already written book II, about Aristotle's logic, and had sketched out books II to VII. Apparently, on Mersenne's advice, he forsook the whole project and did not even publish book II. There, Gassendi had accepted the seemingly innocuous doctrine that "the essence of quantity is nothing but its external extension."[77] As a result, he felt compelled to point out that his doctrine had negative consequences for the sacrament of the Eucharist and to take steps to reaffirm his orthodoxy:

> To continue, let us now turn our attention to the famous difficulty concerning the essence of quantity. Our philosophers explain it so well that nothing could be more obscure, though nothing would seem to be more obvious than quantity. However, I must confess that the mystery of the Eucharist, as our faith conceives it, may cause some difficulty in this matter.[78]

It seems clear that anyone with an understanding of seventeenth century philosophy and theology would have appreciated the conflicts between these two domains, as did Gassendi.

What I think might be useful is a bit of comparative history about condemned Cartesian propositions in relation to contemporary scholastic teaching about the same topics. I discuss the issue of Descartes' definition of substance (including extension as an essential attribute of matter) and his rejection of substantial forms or real accidents in relation to seventeenth century scholastic doctrines in chapters 4, 7 and 9. Here I wish to examine a more properly cosmological question, that is, whether the condemnation of *Principles* II, art. 21–22 would be warranted in the light of late scholastic doctrines about the extension and plurality of worlds.

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[75] Bouju 1614, vol. I, pp. 468–469, chap. XV: Comment le lieu environnant peut et ne peut estre vide, par la puissance absolue de Dieu.

[76] Bouju 1614, vol. I, pp. 468–469.

[77] Gassendi 1624, II, exer. 3, art. 10: Quantitatis essentiam esse extensionem externam. Let us recall that Mersenne also advised Descartes not to publish the end of Replies IV to Arnauld, dealing with the Eucharist; Descartes accepted his advice for the first edition (Paris, 1641), but published the full text a year later, in the second edition (Amsterdam, 1642).

[78] Gassendi 1624, II, exer. 3, art. 11: Species Eucharisticas non item fore Fides nos Orthodoxa docet.

The question of the infinity or finitude of the world depends on the resolution of the question of the possibility of infinity itself, a complex topic. Aristotle's doctrine on infinity[79] may be summarized as follows: there are two infinites to be considered, infinite by addition and infinite by division. But since, when we say that something is infinite, the "is" in that sentence means either what potentially is or what actually is, there are four possibilities to be considered, namely, potential infinite by division and addition, and actual infinite by division and addition. Aristotle denies actual infinities, thereby rejecting both the actual infinitely large and the actual infinitely small. His doctrine about potential infinity is more complex. He wishes to affirm the existence of the potentially infinite by division in magnitude and number, while denying the potentially infinite by addition in magnitude, except in the case where one is adding a part determined by a ratio, instead of keeping the parts equal. However, there is a problem with accepting the existence of the potentially infinite while denying the actually infinite. Generally for Aristotle, what is potential will be actual. This seems to license the inference from the existence of the potential infinite to the actual infinite. The phrase "potential existence" is thus ambiguous. Using Aristotle's example, when we speak of the potential existence of a statue, we mean that there will be an actual statue. It is not so with the infinite. There will not be an actual infinite. "The word 'is' has many senses, and we may say that the infinite 'is' in the sense in which we say 'it is day' or 'it is the games,' because one thing after another is always coming into existence."[80] There are then at least two senses of "potential" according to Aristotle. One sense, which the potential infinite shares with the Olympic games and things whose being is not like that of substance, consists in a process of coming to be and passing away, a process which is finite at every stage, but always different. The Olympic games are potential both in the sense that their being consists in a process, and in the sense that they *may* occur. It is only in the latter sense that when a state is potential, there will be an actual state. That is how Aristotle can affirm potential infinities such as the infinite in time, in the generations of man, in the division of magnitudes, and in numbers, while denying the actual infinite. But when Aristotle denies the potential infinite in magnitude by the addition of equal parts, he does so by asserting that "there is no infinite in the direction of increase. For

[79] Aristotle 1910–1962, *Physics* III, chap. 4–8.
[80] Aristotle 1910–1962, *Physics* III, chap. 6 (206a18–24).

the size which it can potentially be it can actually be. Hence, since no sensible magnitude is infinite, it is impossible to exceed every assigned magnitude; for if it were possible, there would be something bigger than the heavens."[81] Thus, Aristotle's physical world is finite and cannot grow, but in that world magnitude is continuous (or indefinitely divisible) and time and generation are unending (or extendible indefinitely).

The standard scholastic terminology for dealing with the problems of infinity was imported from logic. Logicians distinguished between categorematic terms and syncategorematic terms, or terms that have a signification by themselves, and terms that do not (cosignificative terms). Examples of the first kind are substantival names and verbs, and examples of the second kind are adjectives, adverbs, conjunctions, and prepositions.[82] The distinction is applied to infinity to yield both a categorematic and syncategorematic infinite: "The phrase 'infinitely many' is both syncategorematic and categorematic, for it can indicate an infinite plurality belonging to its substance either absolutely or in respect to its predicate."[83] One can then define the two kinds of infinite separately; syncategorematic infinite may be defined as "for any number or magnitude there is a greater" and categorematic infinite as "greater than any number or magnitude, no matter how great."[84] With the distinction one can solve logical puzzles, since it may be true that something is infinite, taken syncategorematically, and false that something is infinite, taken categorematically.[85] It also enables one to ask separately whether there are syncategorematic and/or categorematic infinites in nature, without worrying about potentialities. Naturally, various scholastics took differing views with respect to the existence of various infinites, and often disagreed with Aristotle's doctrines. It is not difficult to see why this should be so, given that portions of Aristotle's doctrine about infinity are clearly in conflict with the conception of an absolutely omnipotent God who is a creator. The standard doctrine (or correction of Aristotle) was the denial of

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[81] Aristotle 1910–1962, *Physics* III, chap. 7 (207b16–21).

[82] A list of the syncategorematic terms would normally include: every, whole, both, of every sort, no, nothing, neither, but, alone, only, is, not, necessarily, contingently, begins, ceases, if, unless, but that, and infinitely many.

[83] William of Sherwood 1968, p. 41.

[84] See, for example, Gregory of Rimini 1522, II, fol. 35, col. b. See also Duhem 1985, chap. 1–3.

[85] For example: "I would agree with this [syncategorematic] proposition: along all the parts, a spiral line is drawn; and I would not agree with this [categorematic] proposition: a spiral line is drawn along all the parts," Buridan 1509, fol. 59, col. c.

the categorematic infinite (in number and magnitude) and acceptance of the syncategorematic infinite (in number and magnitude); this would be equivalent to denying actual infinites but accepting all potential infinites. Of course, there were some thinkers, notably Gregory of Rimini and Albert of Saxony, who argued that God could create a categorematic infinite in nature.

The seventeenth century doctrines generally conflated syncategorematic infinite with potential infinite and categorematic infinite with actual infinite, but denied the inference from syncategorematic infinite to categorematic infinite.[86] There followed a denial of infinity in act. However, seventeenth century scholastics were also careful to state that others argued that God could create a categorematic infinite.[87] In his *Physics*,

[86] Goclenius 1613, for example, states, "Syncategorematice: Potentia, mentali abstractione, ut Zabarella loquitur. Ab infinito in potentia, ad infinitum actu nulla est consecutio. Categorematice: Actu. Haec immensitas non potest communicari ulli creaturae," p. 237.

[87] The condemnation of various propositions in 1277 influenced the discussions of the possibility of syncategorematic and categorematic infinites in nature. Among the condemned propositions was number 34.: "That the first cause cannot make more than one world." This proposition challenged directly the Aristotelian doctrines of the singularity of the universe and the impossibility of the potential infinitely large in magnitude. It also suggested that one should be careful when denying the actual infinitely large. Here is a typical Thomistic-leaning discussion:

> Il n' y a point d' estant reel qui ne soit finy ou infiny. L' infiny peut estre consideré en deux facons, simplement, et en quelque sorte. L' infiny simplement c' est ce qui n' est limité d' aucune borne ny d' aucun genre en toute latitude de l' estant, mais qui contient eminemment en soy tous les degrez de l' estant, et tous ceux qu' on peut donner de perfection sans dependre d' aucune autre chose que de soy mesme. Cette sorte d' infiny ne convient qu' a Dieu seul, lequel est infiny d' entité, d' essence, de perfection, et de duree: dont la raison est qu' il a l' estre de soy, et tout autre estant l' a de luy, comme nous le monterons en la Metaphysique particuliere: car tout ce qui a de l' estre d' un autre, est produit et determiné a quelque degré ou difference specifique: et partant le finy d' essence est limité d' estre et de perfection, c' est à dire determiné à quelque certain degre de perfection; soit que ce soit substance corporelle ou incorporelle, ou quelque accident.
>
> L' infiny en quelque sorte (s' il s' en trouvait en la nature) ce seroit une chose finie et determinee à un certain genre d' estant selon son essence; mais infinie en quantité d' estendue, ou discrette, ou de perfection, ou de duree: car un tel infiny ne se peut considerer qu' au respect de la quantité propre ou impropre: comme pour exemple, s' il se donnoit quelque chose quantitative continue qui ne fust point bornee en son estendue, elle seroit infinie selon l' essence et l' estre de quantité: c' est à dire en estendue; mais elle ne sera pas infinie simplement, car elle serait estant finy et limite au genre de quantité. Semblablement si elle estoit si blanche qu' elle n' eust aucun limite en sa blancheur, elle seroit intensivement selon sa propre esssense et perfection de blancheur: car cette blancheur seroit infinie, et toutesfois elle ne seroit pas infinie simplement: d' autantelle seroit limitee au genre de la qualité infinie

Toletus treats such topics as the categorematic infinite, division into proportional parts, and the question whether a body can be actually infinite,[88] but he affirms a generally conservative position. On the other hand, he does refer his readers to Albert of Saxony's more daring position: "Alber. Saxo. hoc lib. q. 9."[89] Roughly the same can be said about the Coimbrans[90] and Abra de Raconis, except that de Raconis gives specific citations to William of Ockham and Gregory of Rimini: "Prior est Ochami in 2. qu. 8 & quodlibeto 2. q. 5 Greg. Ariminensis in 1. dist. 43. q. 4 & aliorum per divinam potentiam infinitum actu categorematicum posse creari."[91] According to L.W.B. Brockliss, there was a schoolman—du Chevreul, Professor at Paris in the 1620s and 1630s—who taught that Aquinas was wrong to deny that God could create an infinite body.[92]

Eustachius a Sancto Paulo's doctrine seems to differ significantly from the standard view, so it is worth detailing. It looks as if Eustachius thinks of syncategorematic infinite as a species of infinite in act. In his

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> … Que s'il y avait un corps infiny selon toutes les dimensions, il seroit seul en l'univers, car il occuperoit tout le lieu; ce que nous scavons estre faux, y ayant plusieurs corps de diverse nature. Quant à la quantite discontinue il ne se trouve point d'infinie aussi. Car si elle estoit, ce seroit une certaine multitude nombrable ou innombrable …
>
> L'infiny en quelque sorte dont nous venons de parler, ne se trouve point non seulement en acte, mais aussi en puissance: car s'il se trouvoit en puissance passive il pourrait estre reduict en acte, attendu que la nature ne faict rien en vain: ou si c'estait en puissance objective ou active, c'est à dire en la puissance de l'agent, Dieu pour le moin le pourrait produire puis qu'il n'envelopperoit point de contradiction. Mais cela ne peut estre: car Dieu ne pouvant rien faire d'avantage que l'infiny, il ne pourrait rien faire apres qu'il l'auroit fait: et partant sa puissance seroit moindre qu'auparavant, voire nulle de tout, puisqu'il ne pourrait rien faire apres l'infiny: ce qui est tres absurd: attendu qu'elle ne se diminue, ny ne s'augmente, ny ne peut estre epuisee és choses qu'elle faict hors de soy. Davantage puisque la puissance de Dieu est infinie, comme nous le montrerons ailleurs, il ne la sauroit finit par quelqu'une de ses oeuvres. Et partant il n'en peut faire de si grande qu'il n'en puisse faire encores une plus grande, autrement la puissance de Dieu serait limitee par ce qui procederoit d'elle mesme. C'est pourquoi on dit que Dieu a l'infinite de puissance, mais non la puissance d'infinité, c'est à dire qu'encores que sa puissance soit infinie, qu'il ne scauroit faire aucune chose infinie: à scavoir distincte de son essence,
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> Bouju 1614, vol. I, pp. 275–278 (chap. LXXXVI: De l'estant finy et de l'infiny)

[88] Toletus 1589, III, quaest. v–vii, fol. 100, col. a to fol. 103, col. d.

[89] Toletus 1589, fol. 103, col. a.

[90] Conimbricenses 1592, *Physics* vol. I, col. 509–540, especially col. 524.

[91] Abra de Raconis 1651, pars III, p. 194. De Raconis is incorrect in attributing the categorical infinite in act to Ockham.

[92] Brockliss 1987, p. 338. (But see below for de Ceriziers' doctrine.)

Physics, tract. III, question 5, What and in what way is something infinite, Eustachius divides the infinite into infinite in actuality and potential infinite. He then divides the former into categorematic actual infinite and syncategorematic actual infinite, depending upon whether all the parts of a given infinite are actually separated or not. Infinites whose parts are not all in actuality are of three kinds: infinite in succession, addition, and subtraction.[93]

Eustachius does think that the continuum is divisible into infinite parts. But, in the final analysis, his doctrinal deviations from the standard view are more cosmetic than real. Eustachius argues that the continuum is not divisible by equal magnitudes; it is divisible by equal proportional parts (or by parts whose magnitudes diminish by halves). Thus it is infinitely divisible successively, and not simultaneously. The continuum is divisible to infinity not so that there can exist simultaneously actually separated infinite parts, but so that one can progress in the division:

> If you object that it follows that if one has to posit an actual infinity in nature, it would follow that either one can divide a continuum into infinite parts or those parts in the continuum would not be actually infinite, we reply, *infinity in act* can be conceived in two ways: one, properly speaking, in which all the parts are actually separated and distinct from one another, which is called categorematic infinite; the other in truth, improperly speaking, whose parts are not actually separated from one another, but are said to be communicating with one another, in which the smaller are contained in the larger, which is called syncategorematic infinite. Thus a continuum can be divided to infinity and it does not follow that we have to hold an actual infinity, properly speaking, but only an infinite in act in the second way, improperly speaking. From this it is to be understood that all parts of the continuum are actually in the continuum, not however actually infinite categorematically and properly, but syncategorematically and improperly.[94]

Eustachius is playing verbal games with "actual infinity" and "syncategorematic infinite." He does not really hold that syncategorematic infinites are, properly speaking, actual infinites. In fact, he reaffirms that "only the actual categorematic infinite is truly and properly infinite … Thus the actual syncategorematic infinite is not properly an infinite in act … it is to be called potential infinite."[95] And he rejoins the standard doctrine. He is even careful to look as if he is upholding God's absolute

[93] Eustachius 1629, Physics, tract. III, quaest. 5, Quid et quotuplex sit infinitum, p. 54.
[94] Eustachius 1629, Physics, tract. III, quaest. 4, An continuum sit divisible in infinitum, p. 53.
[95] Eustachius 1629, Physics, tract. III, quaest. 5, p. 54.

omnipotence when denying him the power to create a categorematic infinite: "There is no actual categorematic infinite, not because it is repugnant to God's power, but because nature cannot suffer it."[96]

The seventeenth century scholastic answers to the question of whether God can produce an infinite body ran the gamut from Scipion Dupleix's negative answer—there is no infinite body in nature and it is not repugnant to God's power not to be able to produce one[97]—to René de Cerizierss' positive answer: "Although we refuse Nature the power of producing the infinite, we should not refuse it to its Author. Can he not make everything he can in this moment, for example, can he not make all the men he can produce? If so, their multitude will either be finite or infinite. Let us say that it is finite; that would be to limit God's power. To grant that it is infinite is to agree with my opinion."[98] De Ceriziers proceeded to reject all arguments claiming that an actually infinite world would be impossible.[99]

Thus there were precedents for Descartes' doctrine of the indefinite extension of the universe. For Descartes, God is the only being in whose perfections one notices no limits,[100] and one can see that he is greater than the world,[101] so that the world cannot be called infinite.[102] But it conflicts with one's conception for the world to be finite or bounded.[103] Hence one calls it indefinite.[104] Descartes allegedly said to Franz Burman that the distinction between the infinite and the indefinite "is the author's [i.e. Descartes'] invention."[105] Moreover, defending himself against the claim that his hypothesis of an infinite would do harm to Christianity,[106] Descartes responded that "Cardinal Cusa and several other doctors have supposed the world to be infinite without ever being censured

[96] Eustachius 1629, Physics, tract. III, quaest. 7, An detur aut falsum dari possit infinitum, p. 56.

[97] Dupleix 1990, pp. 287–291. See also Goudin, 1864 [1668], vol. II, pp. 460–482 for the argument that God alone is infinite in act and that inifnity in act is impossible for any creature, magnitude, or multitude.

[98] De Ceriziers 1643, p. 116.

[99] De Ceriziers 1643, pp. 116–119.

[100] *Principles* I, art. 27.

[101] AT V, 345.

[102] AT V, 52.

[103] AT V, 345.

[104] AT V, 345; *Principles* II, art. 21; AT XI, 656. For the extension of matter called indefinite, see AT V, 274–275 and AT VII, 112–114. For more on Descartes and the infinite, see Ariew 1987$_a$.

[105] AT V, 167.

[106] AT V, 20–21.

by the Church," and that his own "opinion is not as difficult to accept as theirs."[107] Oddly enough, Nicholas of Cusa was the figure whose doctrine about the extension of the world was closest to Descartes'. In his *De docta ignorantia*, Cusa asserted that only the absolute maximum is infinite, for it alone is everything it can be. The universe does not include everything existing outside God, but it is not God; therefore it is not positively infinite. However, there is no term limiting the universe, so that we can call it infinite, if we take the word in a privative sense, signifying an absence of limit. More exactly, we might say that the universe is neither finite nor infinite.[108] For Cusa the universe is indeterminate in both sense of the word: it does not have a boundary (it is not terminated) and it lacks precision (it cannot be determined by us).[109] Hence, Cusa's doctrine is remarkably like Descartes'. Still, Descartes was right in thinking that his opinion should not have caused any difficulty for Christians.

However, although there are precedents for thinking the world infinite or indefinite in extent in scholastic philosophy, I have not been able to find a late scholastic philosopher who argued that there cannot be a plurality of worlds. The closest anyone comes to such an assertion is the argument that there would a unity to the world if there were only one; but even that argument is couched in a language that allows for the possibility of plural worlds: "Is it not likely that, being able to create an infinity of worlds, he produced only our own in order to mark the unity of the Creator in the unity of the work?"[110] Indeed, the most conservative thinkers take it for granted that God, who created this world, could create another.[111] Thus, Descartes is truly out on a limb by himself on this final issue.

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[107] AT V, 51.

[108] *De docta ignorantia*, II, chap. 1 in Cusa 1962 [1514], vol. I, fol. xiii.

[109] *De docta ignorantia*, II, chap. 1 in Cusa 1962 [1514], vol. I, fol. xiii verso. See also *Idiota de mente* chap. 2 and 3 in Cusa 1962 [1514], vol. I, fol. lxxxi verso to fol. lxxxiii verso.

[110] De Ceriziers 1643, p. 121.

[111] For example, Bouju does not treat the issue directly, but when discussing what there is above the first heaven, he claims, in good Aristotelian fashion, that there is nothing: no body can have its natural place beyond the first heaven; there are no surrounding places for a body to be contained there, and thus no void nor a real space. The only thing one can say, according to Bouju, is that there is an imaginary space above the first heaven "which is nothing else than its non-repugnance toward being the situation of a body, if God wanted to create one there." (1614, vol. I, p. 374). For the background to these issues, see Duhem 1985, chapters 11–13.

CHAPTER NINE

CARTESIANS, GASSENDISTS, AND CENSORSHIP

During the second half of the seventeenth century, Cartesians suffered a series of condemnations issuing from various authorities in France. The condemnations aimed at several fundamental propositions of corpuscularianism and the mechanical philosophy, such as the denial of substantial forms and real qualities. Also condemned was the Cartesian theory of matter and place, that is, the doctrine that extension is the principal attribute of matter, and some of its consequences, namely, the indefinite extension of the world and the rejection of the void.[1] These propositions were deemed incompatible with some of the mysteries of Catholicism and thus disruptive to the faith and to the public order. Moreover, it was well known—and commonly argued at the time—that Gassendism, the revival of Epicurean atomism, was for similar reasons equally incompatible with the same mysteries, as was the Gassendist doctrine of matter and space. But the Gassendists did not suffer the same fate as Cartesians; they were not condemned officially. But why were they not? From the point of view of the authorities, there should not be anything to choose between René Descartes and his followers and Pierre Gassendi and his followers. Nor if social causes are to be invoked to account for the asymmetry of condemnations, will they be found at the surface. After all, Descartes and Gassendi, two Frenchmen from the Provinces, traveled in the same circles—they were both friends and correspondents of Marin Mersenne—though Gassendi's circle also included the *libertins érudits*. Unlike Descartes, Gassendi actually published an anti-Aristotelian work as early as 1624. Moreover, although Gassendi was a priest and professor of philosophy at the Collège d'Aix, he was removed from his position when the Jesuits took over the college in 1623. Descartes, on the other hand, was taught by the Jesuits of La Flèche for more than eight years and, in spite of his seemingly harsh pronouncements about his education in the *Discourse on Method* and his war with the Jesuit Pierre Bourdin in the 1640s, he generally maintained good relations with them throughout

[1] See chapters 7 and 8.

his adult life.[2] Later in life, in 1645, Gassendi was nominated as Professor of Mathematics at the Collège Royal, but because of ill-health, he taught there only a year. One cannot underestimate Gassendi's fame at the time, but his royal connection would seem to have been counterbalanced by the handsome pension bestowed on Descartes by the King in 1646.

In the second half of the seventeenth century Descartes and Gassendi gained followers from all walks of life. Perhaps Descartes' followers were predominantly Jansenists and Oratorians and Gassendi's were Jesuits and others, but those facts themselves, if they are facts at all, would require much exposition and explanation: what was there about Descartes and Cartesianism that might have attracted Jansenists and Oratorians, but not Jesuits?[3] Similar questions may be asked about Gassendi and the Gassendists. Superficially, there would seem to be little to choose between the two challengers to the dominant Aristotelian intellectual tradition. So let us examine the two cases in greater detail.

Cartesians

With the Jesuits conspiring in the background, as was allegedly their fashion, the Catholic church in 1663 put Descartes' works on the *Index of Prohibited Books* with the notation, *donec corrigantur*—until corrected. Descartes had been dead for thirteen years. It was not likely that he would correct his works; so the prohibition was effective. Antoine Arnauld, complaining about the placing of Descartes' works on the *Index*, wrote: "it is true that the prohibition was only *donec corrigantur*. But that could not be done. Since there is no indication of what is to be corrected, it is the same thing as if the books were prohibited absolutely."[4] Thus, the prohibition was as effective as the Catholic Church could make it. However, the Church did not have any authority in the Protestant world;

[2] See chapters 1 and 7.

[3] It is easy to overstate the affinity between Port-Royal and Descartes. Steven Nadler reminds us that "the majority of those connected with Port-Royal professed an open hostility towards Cartesian philosophy. In fact, Arnauld appears to be one of the very few Port-Royalists of his generation to have had any sympathy towards this new philosophy," Nadler 1989, p. 18. One can also find Cartesian sympathizers among the Jesuits both during Descartes' life and after. Thus, pronouncements about Jansenist Cartesians must be handled carefully.

[4] Letter 830 to du Vaucel, Arnauld 1775, vol. 3, p. 398.

it did not even have authority in Catholic countries such as France, where censorship was the domain of temporal powers: the King and individual universities.[5] Moreover, Cartesianism seems to have made great inroads into French universities in the 1650s and 60s, spreading from private lectures and salons into university teaching and student writings, even though candidates for chairs in philosophy were required to deny the so-called new philosophy and to fight against Descartes.[6] The situation was about to change in the 1670's. In 1671, the Archbishop of Paris, François de Harlay, published the following verbal decree from the King:

> The King, having learned that certain opinions that the faculty of theology had once censored, and that the parlement had prohibited from teaching and from publishing, are now being disseminated, not only in the University, but also in the rest of this city and in certain parts of the kingdom, either by strangers, or by people internally, and wishing to prevent the course of this opinion that could bring some confusion in the explanation of our mysteries, pushed by his zeal and his ordinary piety, has commanded me to tell you of his intentions. The King exhorts you, sirs, to make it so that no other doctrine than the one brought forth by the rules and statutes of the University is taught in the Universities and put into theses, and leaves you to your prudent and wise conduct to take the necessary path for this.[7]

The reference to "certain opinions that the faculty of theology had once censored" was, interestingly enough, a reference to a condemnation of atomism in 1624, in which some in Descartes' circle, Mersenne and Jean-Baptiste Morin, for example, had played a role.[8] That condemnation was being used against Cartesianism almost five decades later. The "confusion in the explanation of the mysteries" was also a reference to the same episode. One of the reasons given for the condemnation was that holding an atomist philosophy would have been inconsistent with giving an intelligible explanation of transubstantiation.[9] It was clear that the scholastic

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[5] See McClaughlin 1979.

[6] Bouillier 1868, vol. I, p. 468.

[7] Bouillier 1868, vol. I, p. 469.

[8] Both Mersenne and Morin applauded the condemnation. For Mersenne's description of theses, see chapter 4. For an analysis of the event, see Garber 1988 and 2002.

[9] See Armogathe 1977. The loci for Descartes' view are the end of *Replies IV*, *Replies VI*, section 7, and the *Letters to Mesland* (AT IV, pp. 163–172 & 346–348). It was not out of the ordinary for the King to attempt to protect the mysteries of the faith. Neither were Cartesians and anti-Aristotelians singled out in this respect. See chapters 7 and 8.

metaphysics of matter and form was well suited to explain the mystery. While the religious and political authorities might have had many objections to Cartesianism (or to any atomist or corpuscularian philosophy) the King's edict had the effect of focusing the criticism on the Descartes' account of transubstantiation, something the Faculty of Theology of the University of Paris expressly censored, the Parlement prohibited, and the King cautioned about. In any case, the King's exhortation was a serious threat to Cartesianism in France; various Universities—Angers, Caen, Paris—followed with attempts to carry out the King's wishes.

We have a first-hand account of the subsequent events at Angers in a journal kept by François Babin, Doctor of the Faculty of Theology and financial officer of the University, someone horrified by the attitudes of the Cartesians.

> Young people are no longer taught anything other than to rid themselves of their childhood prejudices and to doubt all things—including whether they themselves exist in the world. They are taught that the soul is a substance whose essence is always to think something; that children think from the time they are in their mothers' bellies, and that when they grow up they have less need of teachers who would teach them what they have never known than of coaches who would have them recall in their minds the ancient ideas of all things, which were created with them. It is no longer fashionable to believe that fire is hot, that marble is hard, that animate bodies sense pain. These truths are too ancient for those who love novelty. Some of them assert that animals are only machines and puppets without motion, without life, and without sensation; that there are no substantial forms other than rational soul; and by completely contrary principles … others teach that the souls of animals are immortal, spiritual, and created directly by God, as are those of men.

It is clear that, for Babin, something had gone terribly wrong. He continued his observations, moving from pedagogical and epistemic to metaphysical and theological problems, and ultimately to political ones:

> The Cartesians assert that accidents are not really distinct from substance; that it would be well to guard oneself from attributing some knowledge or certainty to the testimony of our senses … They make the essence of all bodies consist in local extension, without worrying that Christ's body does not better accommodate their principles and our mysteries; they teach that something does not stop being true in philosophy even though faith and the Catholic religion teach us the contrary—as if the Christian and the philosopher could have been two distinct things. Their boldness is so criminal that it attacks God's power, enclosing him within the limits and the sphere of things he has made, as if creating from nothing would

> have exhausted his omnipotence. Their doctrine is yet more harmful to sovereigns and monarchs, and tends toward the reversal of the political and civil state.[10]

Babin seems to have been right. The Cartesians were so out of control that, far from heeding the edict of the King and of the Archbishop of Paris, they were making a mockery of it. Upon hearing the King's decree, Boileau, Racine, and others, had counterattacked with their own decree. If the King and his henchmen were going to condemn Cartesianism, the Cartesians were going to condemn them to their fate for having supported Aristotle.

The satire traveled even to Angers. Babin reproduced a version of it; his *Journal* entry was introduced with the following comment:

> We produce this piece here in order to show that the innovators use all their wit and industry in order to evade and translate into ridicule the powers that fight against them; and that they do not fail to use mockery, caricatures, or jokes, in order to validate their decried opinions, wishing by that means to dazzle the common minds by the effect of a false light and to persuade the rabble that reason, truth, knowledge, and good sense are theirs alone.[11]

The "arrêt burlesque," as it was known, with its mock legalese language, read as follows (after considerable preliminaries):

> The Court having respect to the aforementioned request, has kept and maintained, [and still] keeps and maintains the said Aristotle in the full and peaceful possession and enjoyment of the said schools, and orders that he will always be followed and taught by the regents, doctors, masters of arts and professors of the said University, without their being required to read him, or to know his language and opinions, and with respect to the principles of doctrine, returns them to their notebooks with the injunction to the heart to continue to be the principle of the nerves, and to all the professors of whatever quality, condition, and profession, to believe it to be so, notwithstanding all experiences to the contrary; similarly orders the digestive juices (*chyle*) to go straight to the liver, no longer passing through the aforementioned heart, and to the liver to receive it … It reestablishes the entities, identities, virtualities, haecceities, and similar Scotist formalities into good repute, … it banishes Reason to perpetuity from the schools of the aforementioned University, prohibits it from entering there, from troubling or bothering the aforementioned Aristotle.[12]

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[10] Babin 1679, p. 2.

[11] Babin 1679, p. 18.

[12] Bouillier 1868, vol. I, p. 471. Babin 1679, p. 18. Boileau 1747, vol. 3, pp. 150–153. Murr 1992, 241–240. The Cartesian also wrote satirical verses; here is a sample

As might have been expected, the authorities at Angers prevailed. They submitted some professors' writings to examination and found that the authors were teaching the prohibited propositions; moreover, they also found that the professors propounded theses to their students without these theses being submitted to examination by the Rector. Consequently, Fathers Fromentier and Villecroze of the Oratory, Professors of Philosophy at the College of Angers, were censured. Father Lamy and his successor, Vincent Pélaut, were ultimately prohibited from teaching and exiled from Angers.[13]

In Paris, the situation was different. Although the theology faculty formally condemned Cartesianism in 1671 and the faculty of medicine followed suit in 1673, the faculty of arts took no action. Perhaps the "arret burlesque" succeeded—at least Boileau thought so.[14] Perhaps also an anonymous treatise entitled "Several Reasons for Preventing the Censure or Condemnation of Descartes' Philosophy"[15] had an effect. The anonymous treatise was most probably written by Arnauld; Victor Cousin, who reprinted the treatise claimed to have found a manuscript of it dated 1679 and attributed to Arnauld.[16] Cousin also argued that the arguments and style of the treatise resembled greatly those of Arnauld. Although it was not reproduced in Arnauld's collected works, it can be found in an eighteenth century edition of the works of Boileau, right next to the "arrêt burlesque."[17]

In the treatise, Arnauld gave ten reasons against the condemnation of Cartesianism. He intimated that the attack on Descartes was a political ploy of the Jesuits and various enemies of the Jansenists attempting

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from a long poem entitled "Monsieur Descartes aux Universitez, Sur la defense de l'enseigner, qu'elles se sont procurées": "Tumultaire amas de quatre Facultez, / Bizarres Universitez, / Qui pour me chasser de la France, / Feittes la geurres à toute outrance, / Croyez-vous vos voeux exaucez / Parce que vous me bannissez, / De l'enceinte de vos Colleges / Comme un faiseur de Sacrileges? … / N'est-ce point, Recteurs bilieux, / Ce qui vous donnant dans les yeux / Vous à remplis de jalousie, / Contre nôtre Philosophie …" Babin 1679, pp. 15–17.

[13] Babin 1679, pp. 35–45. In fact, in 1678, the Oratorians and Jesuits got together at a general congress and agreed *not* to teach Descartes' new philosophy. For the text of the prohibition, see Ariew 1994, p. 4; trans. ACS pp. 256–257.

[14] See Boileau 1747, vol. 3, pp. 108.

[15] *Plusieurs raisons pour empêcher la censure ou la condemnation de la philosophie de Descartes*, Boileau 1747, vol. 3, pp. 117–141. Although anonymous, it was known to have been written by someone from Port-Royal.

[16] Cousin 1866, vol. 3, pp. 303–317.

[17] Boileau 1747, vol. 3, pp. 108–154.

to create troubles for the Jansenists.[18] But he said, even those without such political intentions can cause problems unwittingly, because it is impossible for an edict to change people's opinions and to cause those who do not accept a particular philosophy (such as Aristotle's) to embrace it. By necessity such an edict can only be general and thus cause endless disputes, since everyone can interpret it as they wish. In any case, people's minds are not so flexible that anyone can have the freedom of believing whatever they want. As the history of previous condemnations showed, you cannot succeed in requiring people to hold a particular philosophy. When this is tried, the authority of the church is compromised. Arnauld then listed various condemnations of philosophy, pointing to absurdities and contradictions in the prohibitions.

Arnauld based his account on de Launoy's *De varia Aristotelis fortuna*, published in 1653; it was a part of a growing interest, during the seventeenth and eighteenth centuries, in the history of condemnations, stretching from de Launoy's work, to a 1705 tract by Jean Duhamel, *Quaedam recentiorum philosophorum ac praesertim Cartesii propositiones damnatae ac prohibitae*, and culminating in the three massive volumes of Duplessis d' Argentré, *Collectio judiciorum de novis erroribus*, published in 1728–1736.

Arnauld's first group of condemnations detailed the thirteenth century battles between Aristotle and the church. Notwithstanding various church condemnations and prohibitions in 1209, 1215, and 1231, Albertus Magnus and Thomas Aquinas taught and commented upon Aristotle's books. Similarly, in 1264, Aristotle's books on metaphysics and physics were again prohibited by Apostolic authority. Yet two years later students were receiving degrees based on their readings of Aristotle's prohibited books. In contrast, the second group concerned the prohibitions of anti-Aristotelian writings by the church in the sixteenth and seventeenth centuries, from Ramus' criticisms of Aristotelian logic to de Claves, Villon, and Bitaud's anti-Aristotelian atomist opinions. Arnauld pointedly indicated that the 1624 anti-atomist edict, which forbade any teaching against the approved ancient authors, with capital punishment as penalty, did not

[18] From Arnauld's point of view, the equation Cartesian/Jansenist was unproblematic. The difficulties that Cartesians were having were political, according to Arnauld, the Jesuits acting against their enemies, the Jansenists. Arnauld also argued that since Descartes dedicated his metaphysics to the faculty of theology at Paris in 1641, the fact that the faculty had been silent about Descartes' work for thirty years indicated that the attempt at condemnation was a political act (Cousin 1866, p. 309).

prevent Gassendi from publishing the *Exercitationes paradoxicae adversus Aristoteleos*, in the very same year.[19] Finishing his history of condemnations, Arnauld referred to the medieval battles between realists and nominalists and to King Louis XI's decree against the nominalists, claiming that the edict cannot be read without being thought ridiculous and a testimony to the narrow-mindedness of the human mind.

Arnauld then launched into a discussion of the problem of the explanation of the Eucharist, beginning with the general point that a condemnation of a particular philosophy on the ground that it cannot explain the Eucharist would not be useful, but harmful, to religion. There would be no advantage to the church in having a popular philosophy, embraced by countless Catholics, declared as incompatible with the mystery of the Eucharist. (The act might even be used by Calvinists to infer that, like them, some Catholics did not believe in transubstantiation.) In addition, Aristotle himself was not without difficulty in this respect, according to Arnauld. Aristotle taught that a body cannot be in several places at once. Thus, even Aristotle needed to be reconciled with faith by means of a principle like "it is of the nature of the infinite not to be able to be understood by that which is finite,"[20] a principle which, Arnauld asserted, is needed to reconcile any philosophy with faith. Arnauld then recommended a demarcation between theology and philosophy in order to avoid purely philosophical questions in theology. He cited with approbation such Cardinals as Du Perron and Richelieu, who had avoided mixing philosophy with theology, and who had accepted the mysteries of the Catholic faith as matters of faith, not needing naturalistic explanation.

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[19] One should note that, as early as 1624, Gassendi had announced his intention of writing against Aristotle's doctrines of space and void: "Le Livre III est consacré à l'Exposition de la Physique. Ici l'on s'attaque au nombre des principes aristotéliciens, et l'on prouve entre autres choses que les Formes sont accidentelles … L'espace des anciens est rappelé d'exil, est substitué au Lieu aristotélique. Le Vide est introduit ou plûtot rétabli dans la Nature," Gassendi 1959, pp. 12–15. And Gassendi was almost immediately recognized as an opponent of Aristotle's, as can be seen by Frey 1628, chap. 3, In quo Petrus Gassendus innumera falsissima, et impia Aristotelem protulisse docens cribratur, pp. 37–41; chap. 12, Patricius, Gassendus et Campanella de infinito, de vacuo, de ideis, de lineis, de Galaxia contra Aristotelem sententientes, reiiciuntur. pp. 59–63; chap. 15, Patricius et Gassendus impiam omnem et falsam de Deo doctrinam Aristotelicam asserentes, cribrantur, pp. 67–73; and chap. 16, Ramus, Ludius, Patricius Gassendus reiiciuntur, asserentes nullum Peripateticorum usum Dialectices novisse, pp. 73–75.

[20] "Quand nous considérons, d'une part, la puissance infinie de Dieu, et de l'autre, la foiblesse de notre raison, le bon sens doit nous faire juger qu'il n'est pas étrange que Dieu puisse faire ce que notre raison ne savoit comprendre," Arnauld, in Cousin 1866, vol. 3, p. 311.

Arnauld then returned to the condemnation of 1624 against the atomists' rejection of substantial forms (except for rational soul). He referred to two good Catholics who had also rejected substantial forms in various published works: the Jesuit Fabri, in a work dedicated to the general of the Jesuits,[21] and the Minim Maignan, in a work approved by the Superiors of his order.[22]

As his final argument, Arnauld pleaded that there was nothing wrong with leaving things untouched, as they had been for many years, and that it was always good to maintain the peace and not to give those who wish to trouble the peace the opportunity to do so.

While Arnauld's treatise was a general counter-attack against those who wished to prohibit certain works, and as such was a complex document, full of nuances, still there are two items that particularly need to be emphasized. (1) Given the context of the second half of the seventeenth century, that is, given the works of Fabri and Maignan, which had already received church approbation, it would have been difficult to prohibit the new philosophy on the ground that it dispensed with substantial forms; a prohibition simply using the condemnation of atomism in 1624 would have been fairly weak. (2) Arnauld and other Cartesians had adopted the tactic of linking various philosophies together, arguing that, if one must be prohibited, all must be prohibited. In particular, the Cartesians argued that Gassendists were as guilty as, or even more guilty than, Cartesians with respect to some alleged heresies. We see this again in a letter written by Arnauld, in a passage concerning the prohibition of Descartes' works by the censors of Rome:

> I am not surprised by what I am told about Naples, that some young fools have become atheists and Epicureans through the reading of Gassendi's works. It is what one ought to expect, especially when one considers what he has written against Descartes' metaphysics, where he has used all his wit to attack everything powerful Descartes had found to prove the existence of God and the immortality of our souls. Isn't there something to admire in the great judgment of the inquisitors of Rome and the great service they render to the church by their prohibitions? They have allowed a freedom to these young people to read the author who destroys, as much as he can, the most solid proofs of the existence of God and the immortality of our souls (for there are no works of Gassendi on the *Index*), but they did not allow them to read the one who would have persuaded them of these truths, for fear that their minds would be set in the right direction; for the censors

[21] Fabri 1666.
[22] Maignan 1653.

> of Rome had care to place in their *Index*: *Renati Descartes Opera sequentia donec corrigantur. De Primà. philosophiâ in quâ Dei existentia, & anima humanae à corpore distinctio demonstratur*.[23]

Some years later, in 1691, the University of Paris finally took formal action and condemned eleven propositions of Descartes, including the propositions: "one must rid oneself of all kinds of prejudices and doubt everything before being certain of any knowledge," "one must doubt whether there is a God until one has a clear and distinct knowledge of it," and "we do not know whether God did not create us such that we are always deceived in the very things that appear the clearest."[24] Interestingly, the 1691 condemnation did not make any direct mention of the issue of the alleged incompatibility between Cartesianism and the mysteries of Catholicism. It did not prohibit the proposition at issue in the condemnation of 1624, the denial of substantial forms and real qualities. The closest the condemnation got to this subject was the obscure condemnation of the proposition: "as a philosopher, one must not develop fully the unfortunate consequences that an opinion might have for faith, even when the opinion appears incompatible with faith; notwithstanding this, one must stop at that opinion, if it is evident."[25] I should add that this did not prevent the scholastic textbook authors—Jean Duhamel, Claude Frassen, Antoine Goudin, Jean-Baptiste de la Grange, et al.—from criticizing Descartes' principles and his denial of substantial forms on theological grounds, both before and after 1691.[26]

In any case, the authorities struck at the Cartesian doctrine of matter and extension with a prohibition of the related doctrine that "The matter of bodies is nothing other than their extension, and one cannot be without the other." The denial of this proposition was also connected with

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[23] Arnauld, letter 830 to du Vaucel (1775, vol. 3, pp. 395–398).

[24] D' Argentré 1736, pt. I, p. 149.

[25] D' Argentré 1736, pt. I, p. 149. The authorities also condemned propositions whose avowal was not usually connected with Descartes. See Ariew 1994; trans. ACS p. 257. Of course, the condemnation of 1691 cannot be considered the necessary consequence of the events of 1671–1678; it itself needs to be contextualized. Here again the "arret burlesque" might come to the rescue: in a later edition of it, the line referring to the heroes of the "arret", "Cartistes et Gassendistes," was expanded to include "Pourchochistes et Malebranchistes." It does not take a lot of imagination to conclude that much of the condemnation of 1691 was directed against Edmond Pourchot, the first Professor of Philosophy at the University of Paris openly espousing Cartesian doctrines; Pourchot taught at the Collège Mazarin from 1690 to 1704. See Brockliss 1987.

[26] See for example, Duhamel 1705; Frassen 1686; Goudin 1868; de la Grange 1682; Vincent 1677.

the problem of the Eucharist and the interpretation of transubstantiation given at the Council of Trent. It had become the main issue for those who wished to claim that Cartesianism was incompatible with the Eucharist; indeed, it was the battle-ground chosen by the Père de Valois, a Jesuit of Caen, who wrote a treatise under the alias of Louis de la Ville, entitled *Sentimens de Monsieur Descartes touchant l'essence et les proprietez du corps opposez à la Doctrine de l'Eglise, et conforme aux erreurs de Calvin sur le sujet de l'Eucharistie*. As Pierre Bayle stated about de la Ville's treatise,

> It is clear that the Council of Trent has decided not only that the body of Christ is present everywhere there are consecrated hosts, but also that all the parts of his body are interpenetrated. It is clear, because of de la Ville's book, that this decision is absolutely incompatible with the doctrine positing that extension is the whole essence of matter.[27]

Gassendists

That was also the problem François Bernier, the most ardent defender of Gassendism in the seventeenth century, set out to resolve in his *Eclaircissement sur le livre de M. de la Ville*. Bernier needed to reply to de la Ville because his attacks were directed generally against the new philosophy and thus also against Gassendi.[28] As Bayle explained:

> Bernier, so well known because of his travels and the regard the celebrated Mr. Gassendi had for him, and because of the public testimony he gave of his veneration and gratitude for so great a Master, fearing the malign influences of the zeal of these people, had secretly published a small treatise (the third piece of this collection), copies of which he distributed in secret to his friends and even to some prelates.[29]

The content of the small treatise, however, was not as high-minded as one would have hoped for; according to Bayle,

> He lets them do whatever they want to the Cartesians and declares himself very vigorously against some Cartesian doctrines, in order to make his peace more easily; having as many reasons as the Cartesians to fear that he would be accused of heresy with respect to transubstantiation, he does what he can in order to have his innocence known.[30]

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[27] Bayle, "Avis au Lecteur," in Bayle 1684, fol. 7^{v}–8^{r} (s. n.).
[28] Bernier, *Eclaircissement sur le livre de M. de la Ville*, in Bayle 1684, pp. 45–91.
[29] Bayle, "Avis au Lecteur," in Bayle 1684, fol. 5^{v}.
[30] Bayle, "Avis au Lecteur," in Bayle 1684, fol. 5^{v}–6^{r} (s. n.).

Oddly, Bernier, at the same time, was publishing the second edition of the *Abrégé de la philosophie de Gassendi*.[31] and had just published a small work entitled *Doutes sur quelques-uns des principaux chapitres de son abrégé de la philosophie de Gassendi*,[32] most of which he also inserted as "Doutes sur quelques-uns des principaux chapitres de ce tome [i. e., vol. 2]," in his second edition of the *Abrégé* (II, pp. 379–480).[33] In these two places, Bernier seemed to abandon Gassendi's doctrine of an absolute space independent of things, in which all things are contained and succeed each other,[34] in order to identify space and body, as did Descartes.[35] The seeming inconsistency of someone criticizing the Gassendist theory of space and leaning toward the Cartesian doctrine of space while delivering Cartesianism to its scholastic and church opponents on the very same issue so disturbed Francisque Bouillier that he felt the need to chide Bernier some two centuries later; echoing Bayle's accusation, Bouillier wrote: "Bernier is wrong to seek to prove his innocence at the Cartesians' expense, even more so since he himself abandons Gassendi in order to get nearer to Descartes in one of the subjects most suspect for theologians, in the debate about the Eucharist."[36] But was Bernier really being inconsistent? Did he really abandon Gassendi in his *Doutes*? Did he actually compromise the Cartesians in his *Reply to de la Ville*? Instead of simply blaming Bernier for some real or imagined slight against Descartes, one can use this episode to explicate the patterns of debates, in the latter

[31] Bernier 1684.

[32] Bernier 1682.

[33] The main difference between the 1682 pamphlet and the "Doutes" in the second edition of the *Abrégé*, other than the inclusion of the relevant passages from Gassendi in the 1682 pamphlet, is that Bernier deletes a couple of his "Doubts" in the second edition; missing are two discussions of void: pp. 45–48, au lieu que nous devrions corriger nostre imagination, et concevoir que le vide n'estant rien, un corps dans le vide ne seroit en aucune chose, ou en aucun lieu; and pp. 144–154, si la raison qu'on apporte ordinairement pour prouver la necessité des petits vuides, est icy dans toute sa force. Both discussions are actually attempts to defend Gassendi rather than real doubts.

[34] For Gassendi's theory of space, referring to the doctrines of the *Animadversiones* and *Syntagma*, see Bloch 1971, chap. 6; see also Koyré, "Gassendi et la science de son temps," and Rochot, "La vraie philosophie de Gassendi," both in *Actes du Congrès du Tricentenaire de Pierre Gassendi* (1957), pp. 178–179 and 244–245. A recent text treating Gassendi's theory of space and Bernier's critique of it is Lennon 1993, chap. 2, sec. 7 and chap. 6, sec. 18.

[35] For Descartes' doctrine of extension and space, see *Principia Philosophiae* II, art. 10–15. See also Garber 1992, chap. 5.

[36] Bouillier 1858, vol. I, pp. 359–360.

half of the seventeenth century, among Cartesians, Gassendists, and Aristotelians for intellectual legitimacy in such social spheres as the Court, the Church, and the University.

Let us follow Bernier's own thoughts about this issue. According to him, the problem posed by de la Ville is as follows:

> What is at stake is whether one can maintain simply with Descartes *that the essence of matter consists in extension*, or as Gassendi says, *that considering things according to the ordinary laws of nature, the essence of matter seems to consist in solidity, or impenetrability, from which extension necessarily follows*. For it is claimed that if either one or the other of these opinions is true, it follows that extension, as essential to matter, can never be without matter, nor matter without extension; this is contrary to what is commonly taught in the schools, namely, that after transubstantiation, the extension of the bread subsists without bread and the body of Christ without its extension. The essence of matter therefore does not consist in extension, nor does it consist in solidity or impenetrability, but extension must be something accidental to matter, that is, some particular accident or some small entity that makes matter be extended, and that God by his infinite power can make subsist without matter. Here in a few words are the state of the question and the foundation of the objections of M. de la Ville and of several others who have preceded him.[37]

Bernier's resolution to de la Ville's problem began with what he calls assumptions. First, he noted that church councils did not say that the real extension of the bread remained after transubstantiation, only that the body of Christ was in its own, real extension. Second, it was not the intent of the church to legitimate a particular metaphysics, to determine that the species or accidents of the bread and wine were some small distinct entities, separable from matter, and not modes of matter or some other thing. Third, the Council of Trent, referring to what remains of the bread and wine after transubstantiation used the term *species*, not *accident*. The former signified appearances, as if the Council wanted it to be understood that, after transubstantiation, by a continuation of the miracle to which Catholics must submit, the species or appearances of the bread remain, even though there was no longer any bread, nor anything that could be in the bread; and that the species or appearances of the body of Christ were not in the sacrament, even though his body was truly and really there.

[37] Bernier, *Eclaircissement*, in Bayle 1684, pp. 45–46; repeated as Doute 15, Bernier 1684, II, pp. 479–480.

Given those assumptions, Bernier argued that one could respond to de la Ville by distinguishing two kinds of extension, one true and real, which is the body itself, and the other apparent, which is only the appearance of the body, or the appearance of the true and real extension. Thus, after transubstantiation, the apparent extension of the bread remained, even though the real and effective extension of the bread did not remain. And, of course, the real extension of Christ's body is in the sacrament, but his apparent extension is not. Bernier's account even used the image of the magician's trick, or of the apparition of a child in the hands of a priest officiating at mass, but with a difference: in the case of the Eucharist, although our senses are deceived, we ourselves are not deceived because we have been forewarned of the truth of the mystery.

Having sketched his resolution, Bernier then posed "a considerable difficulty," in order to turn the argument against de la Ville: "It is said that necessarily the body of Christ must be stripped of its extension and that all its parts interpenetrate each other, otherwise how can we eat it and transmit it at once into our stomach, as we do?"[38] His answer was that God, who can make a camel pass through the eye of a needle, can also make it that we eat Christ's flesh, actually extended, without its appearing extended to us; but it is incomparably more difficult to conceive that all the parts of a body, having no extension, interpenetrate each other, and the body remains a body:

> Do you not perceive a contradiction when you say or conceive that a mountain reduced to a point would still be a mountain? In truth, M. de la Ville, it seems to me that it is very dangerous to go so fast, and that, before determining absolutely that all the parts of Christ's body are stripped of all their extension and interpenetrate each other, one must think carefully.[39]

The crux of Bernier's response was, surprisingly, very similar to that of Arnauld: the Eucharist is a mystery; God's action is miraculous; and one can allow philosophers to philosophize in their own way, as long as they propose probable, non-dogmatic solutions within the sphere of the possible, limiting themselves to the natural—not supernatural—course of things:

> But without bothering with the replies of others, and without even insisting on the one I have proposed, it seems to me that de la Ville, without wounding his conscience, could always have allowed the Gassendists to

[38] Bernier, *Eclaircissement*, in Bayle 1684, p. 53.
[39] Bernier, *Eclaircissement*, in Bayle 1684, pp. 55–56.

> philosophize in their manner and to say, not dogmatically and decisively in the manner of Descartes, but *that considering things according to the ordinary laws of nature, the essence of matter seems to consist in solidity, or impenetrability, from which extension necessarily follows*; for this manner is completely modest; the Gassendists decide nothing positively and absolutely.[40]

Bernier's tactic was to sketch a probable resolution to the problem, limit the Gassendist's answer to the natural sphere, and then attack the dogmatists, that is, both de la Ville and Descartes.

In fact, in order to emphasize his point, the last ten pages of his *Eclaircissement* were an attack on Cartesian dogmatism: "do you wish to know what you could have objected to Descartes? I will touch upon it a little for you, in order to amuse the reader somewhat and to make him see the wrong you do to Gassendists by not distinguishing them further from the Cartesians."[41] There followed the criticism that Descartes' doctrine that the void implied a contradiction is too far-reaching, then some polemics against the bêtes-machines, the Cartesian proof for the existence of God, and occasional causes. But what should not be lost in the final volley of criticism is that Bernier's reply to de la Ville can also be used by the Cartesians. Bernier's solution is not doctrinal; it can countenance several theories of matter and space if they are advanced cautiously. In fact, paraphrasing Bernier, a Cartesian (though perhaps not Descartes himself) can also assert that "it seems to me that de la Ville, without wounding his conscience, could always have allowed the Cartesians to philosophize in their manner and to say, not dogmatically and decisively, but that considering things according to the ordinary laws of nature, the essence of matter seems to consist in extension." And, of course, for such a Cartesian, transubstantiation in the Eucharist would be an extraordinary event; after transubstantiation, the real extension of Christ's body would be in the sacrament, but the apparent extension of the bread would remain, even though the real and effective extension of the bread would not.

Thus, it would not be inconsistent for Bernier, given his *Eclaircissement*, subsequently to criticize the Gassendist doctrine and to lean toward the Cartesian doctrine of space and place in his *Doutes*. In fact, in keeping with his non-dogmatic attitude, it might even be appropriate for

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[40] Bernier, *Eclaircissement*, in Bayle 1684, pp. 75–76.
[41] Bernier, *Eclaircissement*, in Bayle 1684, p. 81.

him to do so. And, in his first doubt, he did reject the Gassendist doctrine of an incorporeal, penetrable, and immobile space, the reference for all motion, although, in opposition to Descartes, he defended the possibility of the void.[42] When reading Bernier's *Doutes*, one should keep in mind his own characterization of them in the preface to the 1682 treatise:

> These doubts are not about the foundation of this philosophy, for I do not believe that one can reasonably philosophize using a system other than that of atoms and the void; however, they are about some important matters, such as space, place, motion, time, eternity, and some others. Whether these doubts are well founded or not, you will judge. This small book will always serve you in two ways. The first is to let you see the poverty of all of our philosophies (I have been philosophizing for thirty years extremely persuaded of certain things, and yet here I begin to have doubts about them). The other, to give a rather general idea of Gassendi's philosophy, which, after all, seems to me the most reasonable, the simplest, the most sensible, and the easiest of all philosophies.[43]

These thoughts were echoed in his preface to the "Doutes" from the second edition of the *Abrégé*:

> I have been philosophizing for forty years extremely persuaded of certain things, and yet here I begin to have doubts about them … However, Madam, this must not shock us, and we must not imagine that all natural things are of that degree of obscurity; philosophy, mainly the philosophy of Gassendi, always has the advantage that it allows us to discover a great number of truths which without its assistance would remain hidden to us.[44]

In his *Doutes*, Bernier applied to himself the form of his own analysis with respect to the problem of the Eucharist from the *Eclaircissement*. He tried to act in the fashion of the magician who causes one to accept the appearance of criticism, while steadfastly maintaining the (Gassendist) substance underneath the appearances. Ultimately, Bernier's skirmishes with the Cartesians and the Aristotelians revealed the strategy of the

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[42] That is, Bernier defends the possibility of intra-mundane, small voids, not of an extra-mundane void. He devotes his first three Doubts to the issues of space, place, and void: 1. Si l'espace de la maniere que monsieur Gassendi l'explique est soutenable; 2. Si l'on peut dire que le lieu soit l'espace; 3. Si l'on peut dire que le lieu soit immobile. Bernier, "Doutes," in vol. II of Bernier 1684, pp. 382–405. As we have already indicated, Bernier's final doubt—15. Si l'opinion des ancients touchant l'essence de la matiere se peut accorder avec les mysteres de la religion—is a repeat of the problem of the Eucharist, from the *Eclaircissement*, with an added reference to chapter 4, on Qualities.

[43] Bernier 1682, preface.

[44] Bernier 1684, vol. II, pp. 379–381.

Gassendists for acceptance in the intellectual climate of the latter half of the seventeenth century; by emphasizing their probabilism, their non-dogmatism, they seem to have deflected the condemnations and criticism that the Cartesians received and that they also could have received as defenders of a new philosophy, indeed, a philosophy that emphasizes atoms and the void.[45]

Cartesio-Gassendists

So far we have been pretending as if it is always easy to tell Cartesians and Gassendists apart, and in the cases of Arnauld, the arch-Cartesian, and Bernier, the arch-Gassendist, that has been true. However, as expected, some thinkers in the seventeenth century blended the two together; there were even Cartesians who adopted elements of Gassendist epistemology. To display the former, I discuss briefly the writings of Walter Charleton, and as evidence for the latter, I display the empiricism of Cartesians such as the Oratorian Bernard Lamy (mentioned above) and the Lanterniste François Bayle.

Walter Charleton is best known for making Gassendi's atomism available in English. He was physician to the King and member of the Newcastle circle (whose most prominent member was Thomas Hobbes). One of Charleton's early works is a translation and augmentation of some Paracelsian treatises by Johannes Baptista van Helmont. In the first treatise, *Of the Magnetick Cure of Wounds*, Charleton proposed a naturalistic explanation of the cure of wounds by application of vitriol to the weapon having caused the wound, describing the phenomenon as a result of a "mumial atomes" flowing between the weapon and the wound. These invisible "effluviums" result from the "almost infinite" divisibility of atoms. Charleton did not develop a systematic metaphysics in the work, nor show a clear commitment to plenism or to indivisible atoms, but he did express a preference for treating van Helmont's "sympathies" in quasi-mechanistic terms. In another work, *The Darkness of Atheism dispelled by the Light of Nature*, Charleton paraphrased for himself Descartes' arguments for the existence of God from the *Meditations*. But his sympathies for the Cartesian project also extended to Descartes' mechanism.

[45] Of course, this is a single study, based on a few thinkers and a few texts. It depends upon the extent to which thinkers such as Arnauld and Bernier and their positions can be thought as typical.

Like Descartes, he dismissed real qualities and accidental forms: "*Light*, *Sounds*, *Odors*, *Sapors*, *Heat*, *Cold*, and other *tactile qualities*; these fall not under the comprehension of my thoughts."[46] He also accepted corporeal substance as simply "*Magnitude*, or *Quantity* extended into its three dimensions."[47] Charleton even highly praised Descartes' replies to the critics of the *Meditations*, claiming the master "by vast excesses, to overballance all the others, in points of comprehension, perspicuity, profundity, conviction."[48]

Charleton's metaphysical and physical work *Physiologia Epicuro-Gassendo-Charltoniana*, as the title claims, was an attempt to resurrect "a fabrick of science natural upon the hypothesis of atoms" as "founded by Epicurus, repaired by Petrus Gassendus and augmented by Walter Charleton." But, by his own admission, Charleton was not fully a Gassendist. In the first chapter of the work Charleton classified himself as one "electing" among a variety of opinions and not belonging to either the class of "assertors of philosophical liberty" or "renovators" of ancients, to which he claimed Descartes and Gassendi respectively belonged.[49] *Physiologia* was a translation of selected physical and metaphysical parts from Gassendi's late work, *Animadversiones in decimum librum Diogenis Laertii*, with additions from the then unpublished *Syntagma Philosophicum*. However, it also incorporated a healthy dose of Cartesian thought and of Charleton's own interpretations. For instance, Charleton mixed ancient testimonies for the natural existence of the void, or insensible void space between particles of matter, with a series of more modern chemical experiments such as salt "being in dissolution reduced into its most minute or Atomical Particles."[50] When Charleton addressed the praeternatural vacuum, or conglomerate void space, he discussed the Torricelli experiments in depth and included an explicit description of the experimental procedure. However, he admitted, the results pertaining to the existence of void are inconclusive:

> have many excellent Physicomathematical Discourses been written by Monsieur Petit, Dr. Paschal, Mersennus, Gassendus, Stephanus Natalis. Who, being all French, seemed unanimously to catch at the experiment, as

[46] Charleton 1652, p. 11.
[47] Charleton 1652, p. 11.
[48] Charleton 1652, Advertisement to the Reader, unpaginated.
[49] For more on Charleton as an eclectic, see Eric Lewis (2001), to whom I am indebted for my understanding of Charleton. See also Ariew and Lewis 2002.
[50] Charleton 1654, p. 31.

> a welcom opportunity to challenge all the Wits of Europe to an aemulous combat for the honour of perspicacity. Now albeit we are not yet fully convinced, that the chief Phaenomenon in this illustrious experiment doth clearly demonstrate the existence of a *Coacervate* Vacuity.[51]

Charleton proceeded to give ten reasons why air cannot be present in the tube. But, concerning the existence of a "most subtile and generally penatatrive substance," he claimed that "we do not find our selves any way obliged to admit, that the Desert Space in the Tube is repleted with [aether]" until its defenders have justified the "precarious assumption" that nature abhors a vacuum.[52] Charleton's rejection of the Torricelli experiments as crucial for either validating or falsifying the existence of absolute void gives evidence of his understanding of the metaphysical differences between Gassendi and Descartes. However, he smoothed some of these differences in Chapter I of Book II, "The Existence of Atoms, Evicted."

> Insomuch as nothing can be the Root or beginning of Material or Physical Extension, but, … *aliquid indissolubile*, something so minute and solid, that nothing can be conceived more exiguous and impatible in Nature (for, as the Radix of Mathematick, or Imaginary Continuity, is a *Point*: so must that of Physical or sensible Continuity be a *Body of the smallest Quantity*) such as are the ATOMS of *Democritus*, *Epicurus*, and other their Sectators; and the Insensible particles of *Cartesius*.[53]

Charleton concluded that the bodies shared by Gassendi and Descartes must be indivisible. He also gave a reference to Descartes' *Principles*, part IV, art. 201 to substantiate the existence of "exceeding minute" bodies as necessary for an explanation of nutrition.

Concerning place, Charleton followed Gassendi and rejected both Aristotle and Descartes, saying that they are "of the same common mistake" that dimension requires the coexistence of matter. He repeated Gassendi's thought experiment concerning the annihilation of all matter below the sub-lunary sphere, claiming that dimension would remain. Consequently, he distinguished between corporeal and incorporeal dimensions, "appropriating the *last* to Space." Charleton concluded that incorporeality alone is the formal reason for space and place is "properly and altogether *Incorporeal*."[54] This, he thought, makes consistent the

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[51] Charleton 1654, p. 35.
[52] Charleton 1654, p. 40.
[53] Charleton 1654, p. 85.
[54] Charleton 1654, p. 71.

claims that Angels can be conceived in place, have mobility, and can coexist with the corporeal dimensions of body. Charleton's eclecticism tempered his mechanistic tendencies. His assimilation of Cartesianism did not extend to explanations of all physical phenomena. For instance, he rejected Descartes' theory of vision in favor of one he attributed to Epicurus, but which sounded Aristotelian as well. Charleton's ability to switch explanatory frameworks and meld the doctrines of Gassendi and Descartes represents still another response to the challenges brought by the novel philosophies. We will see more such remixing of Descartes and Gassendi when Robert Boyle will declare the two thinkers as belonging to the same camp, as both being adherents of the mechanical philosophy.

One of the first Cartesians was Jacques Du Roure, who belonged to the group centering about Descartes' literary executor Claude Clerselier. Du Roure is the first to have published a complete textbook of Cartesian philosophy, *La Philosophie divisée en toutes ses parties* (1654), and subsequently *Abrégé de la vraye philosophie* (1665), before the more famous ones of Antoine Le Grand and Pierre-Sylvain Régis. In Du Roure's case, the parts of philosophy included natural theology and the usual elements of the curriculum: metaphysics, logic, ethics, and physics. Du Roure began his logic text with an examination of method, by which he meant primarily analysis and synthesis; he continued by discussing experience, including the following statements he takes to be true: "All our knowledge comes from experience [that is, the senses]. [. . .] And whoever makes use of reason more than experience or reflections on experiences often falls into error."[55] So with Du Roure we have somebody who falls clearly into the Cartesian camp, though he defends a view that might be thought at variance with orthodox Cartesianism, displaying an epistemology that looks more like Gassendist empiricism.

Du Roure was not alone in producing a more empirical Cartesianism. Each in their own way, the Oratorian Lamy and the Lanterniste Bayle seem also to fit the category. Lamy's Cartesian credentials are clear: as early as 1673, one can find the General of the order eliciting a promise from Lamy, who had just taught his first philosophy course at the College of Saumur, to stop teaching the opinions of Descartes;[56] and, as indicated above, Lamy and three other Oratorian professors of the College of

[55] Du Roure 1654, sec. 20.
[56] Girbal 1964, p. 29.

Angers (Fathers Fromentier, Villecrose, and Pélaut) were dismissed from their positions as professors at the College of Angers for teaching Cartesian doctrines.[57]

Now, it is clear that the Oratorian Fathers at Angers were condemned for many reasons, and that teaching Cartesian principles was only one of those reasons.[58] For example, there were thirteen propositions extracted by the censors from the teachings of Fromentier at the College of Angers during 1672 and 1673, only four of which were identified as Cartesian and criticized as such. In fact, one of the propositions, about the souls of animals, ran counter to Descartes' doctrine and was identified as non-Cartesian.[59] As for the objections identified as Cartesian, the censor objected to Fromentier's teaching that real accidents are not to be distinguished from substances, and to his explanation of the Eucharist without having recourse to real accidents.[60] He objected to the doctrine of the indefiniteness of the universe.[61] Similarly, he objected to Cartesian doubt,[62] against which he argued that: "To say that we must doubt

[57] Girbal 1964; Babin 1679, pp. 35–45.

[58] For Villecroze's theses, see Babin 1679, p. 38; the replies of the censor are on p. 45. Pélaut's theses with comments from the censor are on pp. 67–70.

[59] Fromentier: "Quid animae corporeae intra corpora? quid corporibus conferent si corporeae sunt? unde immaterialis at immortalis est anima illa qua belluae sentient," in Babin 1679, p. 36. Marginal note: "Ita nullus Philosophus Christianus." Reply from the censor: "Des Carthes a esté moins temeraire, et a eu plus d'estime de son ame que le P. Fromentier, puis qu'il fait entrer en communauté de la spiritualité et de l'immortalité de la sienne les ames des Bestes, mais aussi en élevant les ames des Chiens à la dignité de celles des Hommes, n'est ce pas ravaller les ames des Hommes à la condition mortelle de celles des autres Animaux? Et en assurant que les unes et les autres n'ont qu'une même origine, n'est-ce pas assez insinüer qu'elles sont toutes tirèes de la matiere?" p. 41.

[60] "1. Accidentia non distinguuntur realiter à substantiis, et illa sententia quae illa non distinguit à subjecto est propior fidei, quam quae distinguit. Accidentium distinctio plus nocet fidei realis praesentiae corporis Christi in Eucharistiâ, quam non distinctio, nam accidentia si adesse dixeris, videtur sequi quòd mutatio nulla facta sit," ibid., p. 35. These propositions are identified as Cartesian: "Ita Cartes. sub finem resp. ad 4as objectiones et in resp. ad 6as objnum. 7 ait. Omninò repugnat dari accidentia real. etc. alibi," 1679, p. 41.

[61] "4. Mundus est magnitudine indefinitus et omne spatium quod cogitatur extrà mundum non imaginarium est sed reale," ibid., p. 35. This thesis is also identified as Cartesian: "Ita Carthes. pri. phil. p. 2. n. 21 cognoscimus praterea hunc mundum nullos extensionis suae fines habere nam ultrà ipsos spatia indefinitè extensa, et realia percipimus," 1679, p. 41.

[62] "5. Veritatis sincero amatori unico momento in vitâ licet esse academicum, scepticum imo debet semel, citò, simul, omnia in dubium revocare, et quasi incerta essent quaerere. Tanta enim est vis veterum opinionum et diu defensae atque creditae falsitatis

all things is a principle that tends toward atheism and upsets the foundations of the highest of mysteries. [. . .] This principle manifestly entails atheism or at least the heresy of the Manicheans, who accepted a good and an evil principle for all creatures."[63] Finally, he criticized the atomism of Fromentier and Descartes,[64] even though both philosophers formally rejected atomism:

> The opinion of Epicurus and Democritus, that the world has been formed by the fortunate encounter of atoms and small bodies flying about from all parts, has been treated as extravagant and impious. One wants to believe that Descartes and his followers do not teach that the universe was made by chance and without God's providence, but, at bottom, what they say is not different than what Democritus and Epicurus advance, since Descartes only wants God to have created all matter, divided it into almost equal parts, agitated these parts in various directions, each to its own proper center, and several around a common center; after that, God can remain at rest [. . .] Is there something more odious in Epicurus' opinion not found in Descartes' hypothesis?[65]

In the case of Lamy, the censor objected to ten different propositions identified as Cartesian. Two of these objections concern problems already raised against Fromentier about the explanation of the Eucharist. However, in Lamy's case, instead of just protesting about real accidents, the censor objected to the definition of extension as the essence of body and to the rejection of substantial forms.[66] The censor also derided Lamy's acceptance of the *cogito*, his consequent definition of the soul as *cogitatio*, the assertion that children think in their mother's womb, and the proposition that sensations such as pain are experienced in the soul, not

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ut solâ omnium dubitatione expurgari possit animus, ac revera in sensibilibus, nec ego percepisse me dico quod vigilem," Babin 1679, p. 35. Marginal note: "Ita Carthes. prin. ph. 1. p. n. 1. De omnibus studeamus dubitare n. 2. illa etiam de quibus dubitabimus utile erit habere pro falsis. [n. 7.] Facile quidem supponimus nullum esse Deum, nullum coelum, etc." 1679, p. 35.

[63] Babin 1679 p. 36, pp. 40–41.

[64] "6. Prima principia nihil aliud possunt esse quam Democriti atomi, et minimae illae partes materiae, quibus constant; Democritum aliis omnibus praeferamus, forma ex multarum compositione atomorum exsurgit," ibid., p. 36. Marginal note: "Ita Carthesi. 4 p. princ. phi. num. 15 etc. 16 hinc sit ut hi globuli coelestes particulis tertii Elementi corpora omnia tertiae terrae regionis componentibus immisti varios in iis effectus producant," ibid.

[65] Babin 1679, p. 36. p. 41.

[66] See Lamy's propositions 4 and 8 in Babin 1679. p. 37 (also in Girbal 1964, pp. 156–157), with the censor's replies, propositions 1 and 5. Babin 1679, pp. 43–45; Girbal 1964, pp. 158–161.

in the body.[67] He also objected to Lamy's propositions that God is the principal cause of motion, that the quantity of motion is conserved, and that the only kind of movement is local motion.[68] In short, it is clear that a number of the doctrines taught by Lamy at the College of Angers during the years 1672 to 1675, which were objected to as Cartesian, were in fact Cartesian doctrines.

Less than a decade later, Lamy published his *Entretiens sur les sciences* ("permission et approbation" was granted in 1683). In the work, he still showed himself to be a Cartesian, but he limited his approbation of Descartes in the portion of the work called "Discours sur la philosophie." There Lamy talked about the air pump—of which Descartes was unaware—and the experimental knowledge his contemporaries derived from it, knowledge that went beyond what Descartes understood.[69] He claimed that Descartes gave incorrect explanations of meteorological phenomena because of his lack of experiments.[70] However, he credited Descartes with "having opened" the path of mechanism, namely, that "people no longer believe that something is known unless they can explain it mechanically." That is what he referred to as Descartes' "method" in the "Discours" and the focus of his approval:

> It is with his method that one should be associated; I say his method, because most of his explanations must be regarded as reasonable conjectures rather than as the truth. What he asserts is always clever and in keeping with the hypotheses he made up; but that is not to say that what he advances is true. [...] It is therefore, once again, the method of this philosopher that one should accept in physics, rather than his particular opinions. We will find many of his opinions to be false to the extent that we make more discoveries in physics.[71]

Moreover, Lamy praised Descartes for his account of mind and the union of mind and body: "He is the one who has spoken the best about the mind and who has distinguished its functions from those of the machine

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[67] See Lamy's propositions 6, 7, and 11 in Babin 1679, p. 37 (Girbal 1964, pp. 157–158), with the censor's replies, propositions 2, 3, 4, and 9, in Babin 1679, pp. 43–44 (Girbal 1964, pp. 160–162). The censor also tried to extend Lamy's rejection of qualities as distinct from substances to spiritual qualities; see the censor's proposition 10 (in Babin 1679, p. 44; Girbal 1964, p. 162), concerning Lamy's proposition 13 (Babin 1679, p. 37; Girbal 1954, p. 158).

[68] See Lamy's propositions 9 and 10 in Babin 1679, p. 37 (Girbal 1954, p. 157), with the censor's replies, propositions 6, 7, and 8 in Babin 1679, p. 44 (Girbal 1954, pp. 161–162).

[69] Bernard Lamy 1966, pp. 258–259.

[70] Lamy 1966, p. 259.

[71] Lamy 1966, pp. 261–262.

of the body with the greatest clarity [...] One can hardly add anything to what he teaches regarding the union of the soul and body."[72] Lamy used this praise as an introduction to Malebranche's account of sensation and morals; these, he asserted, were based on the existence of God being proved by all things and the dependence all creatures have on him.[73] According to Lamy, "These are all the principles of the new philosophy of Descartes, before whom nobody has shown so clearly the relation of man to God."[74]

But, in order to understand what Lamy found most appealing about Descartes, one has to look further into what he thought Descartes' "method" amounted to. Lamy talked of method in "Idée de la logique," another of the *Entretiens*, without mentioning Descartes at all—although the themes discussed by him were Cartesian (and Malebranchian) and clearly reminiscent of the *Meditations*. For example, one can find the Cartesian criterion of truth as God's guarantee that clear and distinct ideas are true:

> Humans are made so that, in the same way that they are attracted by the good, they are compelled by clear and distinct knowledge, which requires their consent. And hence they are not deceived, since nature, which is good, cannot require them to consent to what would be false. I understand by nature here the Author of all things, or the very things such as he has made them.[75]

One can also see various versions of the *cogito*: "When we are reflecting on [the fact that] we are thinking, we cannot doubt that we are existing."[76] And again: "But, after all that, when I consider that whether I am awake or asleep, whether or not I am being deceived, whether or not I have wings, *I am*. For if I am being deceived, I am therefore deceived; therefore *I am*. Thus, I must consent to [the fact] that I exist."[77] Furthermore, one can find the Cartesian distinction between the understanding and

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[72] Lamy 1966, p. 262. Lamy also praises Descartes's mathematics and optics in other parts of the *Entretiens*. See pp. 220–223, 232–236.

[73] Lamy 1966, p. 263.

[74] Lamy 1966, p. 263.

[75] Lamy 1966, pp. 79–80. Also: "La nature, comme nous l'avons dit, nous fait consentir à se que nous voïons clairement [...] L'on ne se trompe donc point dans ce que l'on aperçoit pourveu qu'on ne consente, ou qu'on ne croïe apercevoir que ce qu'on aperçoit effectivement," Lamy, p. 80. Obviously, clear and distinct perceptions make way for clear knowledge or clear perception, in Lamy's vocabulary.

[76] Lamy 1966, p. 79.

[77] Lamy 1966, p. 87.

the will: "There are, properly speaking, only two different operations of the mind. We perceive by means of the first; we consent by means of the second."[78]

However, Lamy's Cartesianism was framed in a context that Descartes would not have recognized. "Idée de la logique" begins with the statement that "We are the work of God; we therefore have no cause for believing that our nature is defective."[79] The principle could be given a Cartesian interpretation, but Lamy took it further than one might have expected. For Lamy, we can always determine the true simply by being attentive: "Attention constitutes the principal part of wisdom. [...] An attentive mind is capable of everything."[80] Another aspect of Lamy's optimism was that his notion of a clear idea encompassed much that Descartes would never have thought of as a clear and distinct idea. In fact, Lamy used an example of a tree in front of him as a model of a clear idea, *at the level of the cogito*:

> When something is proposed to us with complete clearness, it is not in our power to believe that it is not what it appears to us. [...] For example, when we reflect on [the fact that] we are thinking, we cannot doubt that we are existing. I see clearly this tree before me, I touch it, I cannot doubt that it is not there, because this idea of ourselves and of this tree that I touch contains within it the idea of an actual existence.[81]

True, Lamy did not go so far as to suggest that the senses give us *what* the tree is, just *that* it is. Nevertheless, Lamy went well beyond Descartes' conclusion in the Sixth Meditation, that the senses tell us that bodies exist, suggesting that the senses tell us that a particular body exists. Descartes would not have thought that the tree could be perceived clearly, nor that the tree would be known to exist with the same degree of certainty with which I know myself to exist. Lamy's Cartesianism seemed to have gone in the direction of empiricism. However, Lamy remained agnostic about the veracity of the senses: "I cannot examine here whether the senses are deceitful or not; lacking this examination, it suffices, in order not to be mistaken, to consent only to our having such and

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[78] Lamy 1966, p. 81.

[79] Lamy 1966, p. 79.

[80] Lamy 1966, p. 84. Lamy had so little doubt about the human capacity for knowledge that he even thought one accepted false religions (as Protestants did, according to him) simply because of lack of attention (Lamy 1966, p. 85). The only role that Lamy makes for doubt is that it puts us on our toes (Lamy 1966, p. 86).

[81] Lamy 1966, p. 79.

such ideas and such sensations on such and such occasions. And since this is the only clear thing, it is the only thing we must accept."[82] At the same time, Lamy was enough of an Augustinian that he wished to defend the proposition that there are spiritual ideas we find inside us taught to us by nature: "he who is always [seeking what is] outside of himself, who thinks only of things he finds in bodies, is not capable of [consciously] perceiving everything that nature requires him to receive as true."[83] This may resonate better with Cartesianism, but it looks more Augustinian than Cartesian. For example, Lamy talks about what nature teaches us, not what our nature teaches us and talks about it as "the seeds (*les semences*) all truths."[84] The overall impression Lamy gives is that he was an Augustinian who dabbled in Cartesianism. Since there was no Cartesian order and linkage of reasons in his philosophy,[85] he could pick and choose among Cartesian doctrines, modifying them to suit his Augustinianism. By putting Cartesian philosophy at the level of an empirical science, he could preserve his Augustinian theology as more basic; for him, in general, the Cartesianism was made to fit the Augustinianism.

An even more empirical form of Cartesianism can be found in the work of François Bayle. Bayle was a physician and, for most of his life, after 1666, a member of the Faculty of medicine at the University of Toulouse. He was associated with the Société des Lanternistes—an open forum in Toulouse for discussing ideas and reporting on new experiments. He was an active participant in the Society's meetings, teaching alongside Régis, Emmanuel Maignan, and others; such luminaries and Cartesians as Malebranche knew of him. His main philosophical work, *The General Systeme of the Cartesian Philosophy* (1670)—surviving only in English translation—was a synopsis of the Cartesian system, constructed out of Descartes' whole corpus. In it, Bayle went through the Cartesian system in an order somewhat reminiscent of the *Principles*: he detailed the *cogito*, the consequence that the soul knows itself better than it knows any other thing, both proofs for the existence of God, God's

[82] Lamy 1966, p. 88. Lamy also adds "C' est aussi aux Phisiciens d' examiner si toutes nos connoissances viennent des sens, ou s' il y en a quelqu' une qui n' en vient point," Lamy 1966, p. 88.

[83] Lamy 1966, p. 88.

[84] Lamy 1966, p. 88.

[85] It is Descartes who said: "those who do not take the time to grasp the order and linkage of my arguments (*rationum mearum seriem et nexum comprehendere non curantes*) [...] will derive little benefit from reading this work," AT VII, pp. 9–10.

guarantee that we cannot err in what we clearly and distinctly know, the certainty of the existence of bodies, the thesis that errors proceed from the ill-use of our freedom, etc. However, he concluded the first book, treating metaphysics, with the following remark: "when we say that the certainty of our Understanding is greater than that of our Senses, we mean nothing else, than that the judgments we form in a riper age, by reason of some new Observations we have made, are more certain than those, we have formed from infancy, without having reflected on them."[86] Bayle did make the final turn into empirical Cartesianism. For him the corrective for the prejudices of childhood was not reason, but experience. His empiricism became even more marked in his later works.

A Conclusion

The Gassendists escaped the condemnations received by the Cartesians. However, the various condemnations of Cartesianism did not prevent Cartesianism from being discussed and even taught. Cartesians could not always be distinguished from Gassendists. The temporal authorities attempted to issue new condemnations in 1704–1705 and the Jesuits formally condemned thirty Cartesian propositions in 1706, including some concerning the Eucharist and one against the law of inertia; among the prohibited propositions were: "there are no substantial forms of bodies in matter," "there are no absolute accidents," and "there is, in the world, a precise and limited quantity of motion, which has never been augmented nor diminished."[87] As Arnauld predicted, the latter condemnations also failed to succeed.

Either the authorities in France were not ruthless enough to have their will carried out or their will was not unified enough to give efficient orders. Of course, we all know that Bruno was burned at the stake in 1600, Campanella imprisoned and tortured from 1599 to 1626, and Galileo condemned in 1633 and put under house-arrest from then on, but those events occurred under the sphere of influence of Rome. In France, Vanini was hanged and burned at the stake in 1619. But the atomists Villon, de Claves and Bitaud were simply banished from Paris. De Claves continued to publish chemical works well after 1624. Again, given the division of

[86] Bayle 1670, pp. 76–77.

[87] "Prohibited propositions by Michel-Angelo Tamburini, General of the order in 1706," in Ariew 1994; trans. ACS pp. 258–260.

powers in France, formal condemnations were not very effective. Some of the more daring thinkers found protectors such as Cardinals Bérulle and Richelieu, whose political agendas did not coincide with those of Rome. Without more effective repression, Cartesianism could not be halted in France.

CHAPTER TEN

THE *COGITO* IN THE SEVENTEENTH CENTURY

Most of the enormous quantity of writings on Descartes' *cogito* is logico-linguitic in nature. My contribution to this mass of commentary takes the form of an investigation of its intellectual context and the criticisms it received by seventeenth-century philosophers. I do so in part for what these can tell us about the seventeenth-century philosophers and in part for what they can reveal about Descartes and the *cogito* itself.

The Cogito *in 1634–1635*

Numerous elements in Descartes' philosophy have been considered modern and distinguished from scholastic philosophy, including Descartes' use of radical skepticism and his appeal to the first-person perspective—that is, the *cogito*—as the first principle of knowledge.[1] These modern views are sometimes also contrasted with what is thought to be residual scholastic elements in Descartes' thought, such as his use of a causal principle to prove the existence of God.[2] But contrasts in this vein are likely projections from our present point of view. Many modern philosophers such as Leibniz and Spinoza were neither skeptical nor committed to the first-person perspective, and these elements were not unknown in medieval philosophy. Nicholas of Autrecourt, for one, took skepticism most seriously. Hobbes even chided Descartes for bringing up stale old skeptical arguments: "since it is commonly observed that there is a difficulty in distinguishing waking from dreams, I would have preferred the author, so very distinguished in the realm of new speculations, not to have published these old things."[3] Moreover, as is well known, the *cogito*

[1] Gueroult 1984–1985, vol. II, pp. 255–260.

[2] Gueroult 1984–1985, I, pp. 128–133.

[3] *Third Set of Objections and Replies*, AT VII, 171. Some people propose that a major shift occurred in skepticism itself, between ancient and modern skepticism, a thesis that was even held during the seventeenth century (see Pierre Bayle's *Dictionary* (1730), "Pyrrho," note B). But again, not all moderns took skepticism seriously. Even Cartesians in the seventeenth century rejected, reinterpreted, or severely limited Descartes' method of

can be found before Descartes, notably, in several of Augustine's works—as, for example in *The City of God*, *On Free Will*, and *On the Trinity*.[4] After he published *Discourse on Method* in 1637 displaying the *cogito*, a number of people informed Descartes of this fact, including his frequent correspondents, Mersenne, Arnauld, and Mesland;[5] Descartes responded to another of his correspondents, the Dutch protestant minister Andreas Colvius, as follows:

> You have obliged me by bringing to my notice the passage of St. Augustine that bears some relation to my "I think, therefore I am." Today I have been to read it at the library of this city, and I do indeed find that he makes use of it to prove the certainty of our being, and then to show that there is in us a kind of image of the Trinity, in that we exist, we know that we exist, and we love this being and the knowledge that is in us. On the other hand, I use it to make it known that this *I* who is thinking is an *immaterial substance*, and has nothing in it that is corporeal. These are two very different things. It is something so simple and natural in itself to infer that one exists from the fact that one is doubting, that it might have come from anybody's pen. But I am still glad to have come together with St. Augustine, if only to shut the mouths of the little minds who have tried to quibble with that principle.[6]

Descartes here sketches what he thinks is a significant contrast between his *cogito* and that of Augustine. According to Descartes, he, unlike Augustine, uses the *cogito* to make a case, in the end, that the self is an immaterial substance (thus he also lays the foundations to argue for its immortality).[7] Of course, one can dispute whether Descartes' claimed

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doubt; see Schmaltz 2002 or Ariew 2006a. In any case, when one sees a genuinely skeptical modern philosopher such as David Hume, his skepticism is "Ciceronian," or consequent, as he calls it, and practiced in opposition to Descartes' "antecedent" skepticism. See Hume's *Enquiry* (1993 [1777]), sec. 12, "Of the Academical or Sceptical Philosophy."

[4] *De Civitate Dei* XI, 26; *De Libero Arbitrio* II, 7; *De Trinitate* X, 16 and XV, 12.

[5] See *To Mersenne*, 25 May, 1637, AT I, 376; 15 November 1638, II, 435; and December 1640, III, 261. For Arnauld, see *Objections IV*, AT VII, 197–198, and 3 June 1648, AT V, 186. See also *To Mesland*, 2 May 1644, AT IV, 113.

[6] 14 November 1640, AT III, 247–248. Note that, although Colvius is reacting to the *cogito* of the *Discourse*, the letter is late enough that Descartes has already written the *Meditations*, which he is circulating: "The little I have written on metaphysics is already on its way to Paris, where I hope it will be printed. What I have here is a rough copy so full of crossings out that I could barely read it myself. That is why I cannot offer it to you. But as soon as it is printed, I shall take pains to send you one of the first copies, since it pleases you to do me the favor of wishing to read it, and I shall be very glad to learn your judgment of it." *Ibid*., AT III, 248.

[7] In the *Synopsis* to the *Meditations*, AT VII, 12–14, Descartes is clear that these moves are not an immediate result of the *cogito*, but require the whole sequence of reasons from Meditations II to VI. He makes the same point in reply to Hobbes, AT VII, 175. For a

contrast with Augustine is accurate, given that it is based on a single reading of a particular Augustinian text—and probably not all of it—and that there are numerous other Augustinian texts he could have consulted, in which a *cogito* is utilized.

Still, we should point out that Pascal, usually a reliable seventeenth-century reader of both Descartes and Augustine,[8] thought the differences between Augustine's *cogito* and that of Descartes so significant that Descartes could be claimed its "true author," even if he had learned it by reading Augustine. As Pascal says:

> For I know what difference there is between writing a word by chance, without making a longer and more extended reflection on it, and perceiving in this word an admirable series of consequences that prove the distinction between material and spiritual natures, and making of it a firm principle, supporting an entire physics, as Descartes claimed to do.[9]

Pascal agrees with Descartes that, unlike Augustine, he uses the *cogito* to prove the immateriality of the soul—or at least the distinction between material and spiritual natures—and adds the thought that the *cogito*'s central place in the Cartesian enterprise must be considered a key difference from the peripheral place it occupies in Augustine's philosophy.[10]

There are, however, other precedents for Descartes' *cogito* in the seventeenth century that at first glance seem to use the argument in the same way Descartes claims he does, and these may, by contrast, even shed further light on Descartes' intentions. One can, for instance, find something akin to the Cartesian line of reasoning in the treatise by Jean de Silhon entitled *L'immortalité de l'âme*. Silhon, a religious apologist, was a friend and correspondent of Descartes. *L'immortalité de l'âme* was published in 1634, before the *Meditations* and *Discourse on Method*. In it, the existence

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particularly interesting analysis of the relations between Augustine and Descartes, see Marion 2008, esp. chap. 2.

[8] Though Vincent Carraud argues convincingly that Pascal's knowledge of Augustine's philosophy is not as deep as one might have thought; see Carraud 2007.

[9] "… car je sais combien il y a de différence entre écrire un mot à l'aventure sans y faire une réflexion plus longue et plus étendue et apercevoir dans ce mot une suite admirable de conséquences, qui prouve la distinction des natures matérielle et spirituelle, et en faire un principe ferme et soutenu d'une physique entière, comme Descartes a prétendu faire." Pascal, *De l'esprit géométrique*, in Pascal 1963, p. 358 col. a.

[10] We should also recall Pascal's historiographical point from the *Penseés* (Pascal 2005): "Let no one say I have said nothing new: the arrangement of the material is new. When we play handball, we both play with the same ball, but one of us places it better." S575/L696.

of God, supreme cause of our being, is unfolded from the *cogito*, knowledge of self, which is taken to trump the possibility that the senses are deceiving us or that we are dreaming. According to Silhon:

> Every man who has the use of judgment and reason can know *that he is*, that is, that he has being. This knowledge is so infallible that, even though all the operations of the external senses might in themselves be deceptive, or even though we cannot distinguish between them and those of an impaired imagination, nor wholly assure ourselves whether we are awake or asleep, or whether what we are seeing is the truth or illusion and pretense, it is impossible that a man who has the power, as some have, to enter into himself, and to make the judgment *that he is*, should be deceived in this judgment, and *should not be*.

We have a clear exposition of Silhon's version of the *cogito*. Silhon follows it up with an interlude about some eternal truths and then rejoins his line of reasoning by concluding:

> Now this judgment that a man makes, *that he is*, is not a frivolous piece of knowledge, or an impertinent reflection. He can rise from there to the first and original source of his being, and to the knowledge of God himself. He can draw from it the demonstration of the existence of a divinity. … He can draw from it the first movements toward religion and the seed of this virtue that inclines us to submit ourselves to God, as to the first cause, and to the supreme principle of our being.[11]

These passages of Silhon occur in his Second Discourse, entitled: "That It Is Necessary to Show God Exists before Proving the Immortality of the Soul. Refutation of Pyrrhonism and of the Arguments That Montaigne Brings Forth to Establish It. Various Kinds of Demonstrations."[12] Thus

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[11] "Tout homme disje, qui a l'usage du jugement et de la raison, peut connaitre *qu'il est*, c'est à dire qu'il a un estre, et cette connoissance est si infaillible, que soit ou que toutes les operations des sens externes soient en elles mesmes trompeuses, ou qu'on ne puisse pas distinguer entre elles, et celles de l'imagination alterée, ny s'assurer entierement si l'on veuille ou si l'on songe, et si ce qu'on voit est verité ou illusion et feinte; il est impossible qu'un homme qui a la force, comme plusieurs l'ont, de rentrer en lui mesme, et de faire ce jugement, *qu'il est* qu'il se trompe en ce jugement, et *qu'il ne soit pas*. …

Or ce jugement que l'homme fait *qu'il est*, n'est pas une connoissance frivole, ny une reflexion impertinente. Il peut de la monter par discours jusqu'à la premiere et originelle source de son estre, et à la connoissance de Dieu mesme. Il peut en tirer la demonstration de l'existence d'une Divinité. … Il peut en tirer les premiers mouvements de la Religion, et le germe de cette vertu qui nous incline à nous soumettre à Dieu, comme à la premiere cause, et au souverain principe de nostre estre." Silhon 1634, pp. 178–180; trans. in ACS pp. 199–200.

[12] "Qu'il est necessaire de monstrer qu'il y a un Dieu pour prouver l'Immortalité de l'Ame. Refutation du Pirrhonisme et des raisons que Montaigne apporte pour l'establir. Divers genres de démonstrations."

Silhon makes use of a *cogito* to refute the skepticism of Montaigne, as a first step in an argument for the existence of God and the immortality of our souls. He issues a Counter-Reformation response to the Catholic brand of skepticism to which Montaigne and his close follower Charron were appealing, itself a Renaissance inspired move of the Catholic Counter-Reformation. The virtue of skepticism, as Charron said, was that "an academic or a Pyrrhonist will never be a heretic: the two things are opposites."[13] Montaigne and Charron proposed Pyrrhonian skepticism as an antidote to the religious wars, but apologists such as Silhon thought this remedy worse than the cure, and offered the *cogito* as an antidote to their skepticism.

Modern commentators have not been kind to Silhon. Faced with a *cogito* published just prior to Descartes', a number of them accuse Silhon of plagiarism. Silhon, they declare without any evidence, must have learned the *cogito* from Descartes in the years before he left for the Netherlands, circa 1626–1628.[14] Even when they do not accuse him of borrowing from Descartes, they consider that his version of the *cogito* is defective and that Descartes himself argues against it. At stake in these commentaries is Silhon's middle passage on the eternal truths; as we have said, Silhon argues that "it is impossible that a man who has the power, as some have, to enter into himself, and to make the judgment *that he is*, should be deceived in this judgment, and *should not be*." But he continues:

[13] "… jamais Academicien ou Phyrrhonien ne sera heretique, se sont choses opposites." *De la sagesse* (in Charron 1635), Livre second, vol. I, p. 22. Trans. in ACS p. 62. For background on the use of skepticism by Montaigne and Charron as a response to the intellectual crisis of the Reformation, see Popkin 2003.

[14] See Strowski 1907, pp. 283–284, Adam 1910, p. 464n, or Blanchet 1920, p. 137. See also Popkin, who is a bit more qualified than the others: "So in his [Silhon's] second book of 1634, *De l'immortalité de l'Ame*, a much more searching and interesting argument is offered, reflecting perhaps his acquaintance with the young Descartes," 2003, pp. 136–137. The question arises: what evidence is there of a Cartesian *cogito* before 1637? There is a shadow of a *cogito* in Rule 8: "If a man proposes to himself the problem of examining all the truths for the knowledge of which human reason suffices—a task which should be undertaken at least once in his life, it seems to me, by anyone who is in all seriousness eager to attain excellence of mind—he will certainly discover by the rules given above that nothing can be known before the intellect, since the knowledge of all other things depends on this, and not the reverse" AT X, 395—written sometime between 1618 and 1628. Some people have speculated that the short treatise in metaphysics that Descartes was writing in 1629 might have been an early version of *Discourse*, Part V, containing a *cogito*. But it remained unfinished and it has been lost. The only thing we know about the treatise is that it concerned the existence of God and immortality of the soul. (See *To Mersenne*, 25 November 1630, AT I, 182.)

> This truth is as perceptible to reason as that of the Sun is to healthy eyes—that action presupposes being, that it is necessary that a cause exists in order for it to act, and that it is impossible that nothing should make something. God himself can elicit being from nothing and existence from what is not; he needs neither subject nor matter in order to act, and all created things have issued immediately from his power. But to bring it about that what is not should act before it is: this is what entails contradiction—it is what the nature of things cannot suffer—it is what is entirely impossible.[15]

Léon Blanchet, discussing this paragraph, claims that Descartes clearly perceived and denounced the

> insufficiency and sophistical character of the proof presented in the manner of Silhon. For Descartes, the *cogito* proceeds from thought and thought alone, and that is why it achieves only the being supposed by thought. Once methodological doubt is complete, it bears on the reality of all operations other than thought.[16]

Blanchet then sets off on an analysis of the February–March 1638 exchange between what was then an unknown correspondent, S.P., and Descartes, about whether the *cogito* is any more certain than "I breathe, therefore I am" or "Every action presupposes existence."[17] He properly explains that one cannot "choose one of these operations as the argument's point of departure by substituting the act of breathing, for example, or walking, for thought."[18] Blanchet's conclusion from this is that Descartes' unknown correspondent had therefore as badly understood Descartes' thought as had Silhon.

Now, it simply is not at all clear that Silhon is making any of these mistakes (or that he had misunderstood Descartes, since that requires him to have been aware of his *cogito* in the first place). The then unknown correspondent, Alphonse Pollot,[19] challenged Descartes about the certainty

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[15] "C' est une vérité aussi sensible à la raison, que celle du Soleil l' est aux yeux sains, que l' operation suppose l' estre, qu' il est necessaire qu' une cause soit affin qu' elle agisse, et qu' il est impossible que ce qui n' est pas face quelque chose. Dieu mesme peut tirer du neant à l' estre et à l' existence ce qui n' est pas: il n' a pas besoin pour agir de sujet ny de matiere, et toutes choses creées sont sorties immediatement de sa puissance. Mais de faire que ce qui n' est pas agisse auparavant qu' il soit; C' est ce qui emporte la contradiction: c' est ce que la nature des choses ne souffre pas: c' est ce qui est du tout impossible." Silhon 1634, p. 179. Trans. in ACS p. 199.

[16] Blanchet 1920, p. 35.

[17] Blanchet 1920, p. 36. See AT I, 513.

[18] Blanchet 1920, pp. 35–36.

[19] S.P. is now known to have been the Sieur Pollot—see the notes at AT I, 670 and II, 728.

of the *cogito*: "The first principle of [Descartes'] philosophy is 'I think therefore I am.' It is no more certain than many others, such as this one: 'I breathe, therefore I am'; or this other: 'every action supposes existence.' "[20] Descartes replied as expected:

> When one says "I breathe, therefore I am," if one wishes to conclude one's existence from the fact that breathing cannot be without existence, one concludes nothing, because we needed to have been proven previously that it is true that one breathes, and this is impossible, if we had not also proven that one exists.[21]

Descartes added that one can conclude instead "I think that I breathe, therefore I am," in the same way that he will respond to Gassendi a few years later that "I walk therefore I am" cannot be known with as great a certainty as "I think, therefore I am," or even "I think that I walk, therefore I am."[22] We should note that Descartes' argument is dependent on the fact that we do not know whether we are breathing with the same kind of certainty as we know that we are thinking and that Descartes says nothing in response here about the certainty of "every action supposes existence."

It is ambiguous whether Silhon's argument concludes "I exist" from "every action supposes existence" and "I am acting."[23] But Silhon issued a second version of his argument in 1662 (presumably written around 1645), which looks a bit different than the first; Silhon states:

> No person with any spark of common sense, and with the slightest capability for reflection, is incapable of making this judgment about himself: *I exist, I am actually and really, and it is not true that I do not exist*. Therefore, this judgment one makes of the Existence of one's Being is so true that it is impossible he does not exist, in the same way that it is not possible even for God's omnipotence that a thing which does not exist operates and acts before it is and it exists.

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[20] AT I, 513.

[21] AT II, 37.

[22] AT VII, 352. Following Hobbes' criticism of the *res cogitans* as "I walk, therefore I am a walk," in the *Third set of Objections and Replies* (AT VII, 172), Gassendi uses "I walk, therefore I am" as an example of being able to infer one's existence by means of any of one's actions, "it being manifest by the natural light that everything that acts is or exists," *Fifth Set of Objections* (AT VII, 259–260) and *Disquisitio Metaphysica* (Meditationem II, Dubitatio I, art. 5; Gassendi 1962, p. 82).

[23] Silhon introduces his argument with: "voicy une connoissance certaine, en quelque sens qu'on la tourne, et de quelque jour qu'on la regarde, et dont il est impossible qu'un homme qui est capable de reflexion et de discours puisse douter et ne s'assurer pas." Silhon 1634, p. 178.

> In this way, in whatever state a man finds himself in, and whatever kind of action occupies him—whether he affirms something, whether he denies it or doubts of it, whether he is awake or dreaming—whether he is mistaken or not mistaken in what he is doing, he cannot affirm, deny, or doubt, be awake or dreaming, be mistaken or not mistaken, without actually being and existing, following this Principle known naturally and received in all the world, that operation supposes Being, or else that one must exist actually when one operates.[24]

The structure of this argument is clearer, especially in its second paragraph. The affirmer or doubter derives his or her existence from his or her affirmation or doubt together with the principle that "operation supposes Being."

Let us assume that Silhon's later version of the argument was what he intended in the earlier version. Still, in neither version is Silhon making the kind of claim Pollot would be making, of arguing along the lines of "I breathe, therefore I am." In both of Silhon's arguments, we are dealing with reflection, with affirmation, denial, doubting, etc.; in both, and most clearly in the first version of the argument, we are in a situation in which we could be dreaming and the external senses might, in themselves, be deceptive. One cannot interpret Silhon as thinking that what is at stake is the certainty of breathing or walking, especially when he prefaces his argument as something being performed by someone who has the power to enter into himself and to make a judgment. True, the argument requires the certainty of "operation supposes Being," but that principle is more certain than "I am breathing," or "I am walking," and, perhaps, on par with "in order to think we must exist." If Silhon is making a mistake, it is not the one Descartes rebuked in his letter of March 1638.

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[24] "II n'y a personne si elle a une estincelle de sens commun, et si elle est capable de quelque legere reflexion, qui ne puisse faire ce jugement de soy-mesme: *j'existe, je suis actuellement et réellement, et il n'est pas vray que je ne sois point*. Ce jugement donc que l'on fait de l'Existence de son Estre, est tellement vray qu'il est impossible qu'il ne le soit pas: Comme il n'est pas possible non pas mesme à la toute-puissance de Dieu, qu'une chose qui n'est point, opère et agisse avant qu'elle soit et qu'elle existe.

De sorte qu'en quelque estât que se trouve l'homme, et quelque genre d'action qui l'occupe: qu'il affirme quelque chose, qu'il la nie ou qu'il en doute, qu'il veille ou qu'il songe: qu'il se trompe ou ne se trompe pas en ce qu'il fait; il ne peut affirmer nier ny douter, veiller ny songer, se tromper ou ne se tromper pas, fans qu'il soit actuellement et qu'il Existe; suivant ce Principe naturellement connu et receu de tout le monde, que l'operation suppose l'Estre, ou bien qu'il faut estre actuellement quand on opère. Or nous monstrerons en un autre endroit que la connoissance que l'homme prend de l'existence de son Estre, n'est pas une connoissance frivole, ny une connoissance stérile: qu'elle est la racine et le germe des plus importante Connoissances qui le doivent esclairer, et des plus nécessaires vertus qui doivent orner sa vie." Silhon 1662, pp. 40–41.

Richard Popkin, who agrees with Blanchet,[25] launches yet another attack:

> Having presented what appears to be either an anticipation of, or a borrowing from, Descartes' refutation of skepticism, Silhon then explained why a man cannot deny his own existence. The explanation indicates that he had missed the crucial nature of the *cogito* almost entirely. … Thus, according to Silhon, the undeniability of our own existence is not due to the truth of the *cogito*, which is indubitable. Its undeniability depends on its derivation from a metaphysical claim that whatever acts exists. … By deriving the cogito from a metaphysical maxim that he had never shown must be true, he had allowed the skeptic the same rejoinder he could raise against all of Silhon's types of refutations of skepticism, namely, how do we know that the premises being employed are true, how do we know that the rules of logic measure truth and falsity, … that whatever acts exists?[26]

Popkin clearly thinks that these moves of Silhon are defective against the skeptic and thinks, in addition, that Descartes objected to his argument directly in March or April 1648, in a letter to an unknown correspondent, believed to be either the Marquis of Newcastle or Silhon himself. In that letter, Descartes thanks his correspondent—a friend of his—for his help in the attempt to procure him a pension while he was in Paris. It is now generally agreed that the letter was indeed to Silhon, because it is thought that the Marquis of Newcastle, being a foreigner, would not have been in the position to help Descartes in this way, while Silhon at the time was secretary to Cardinal Mazarin and the major distributors of pensions in France.[27] And in the letter, Descartes does assert that the *cogito* "is not a work of your reasoning nor an instruction that your teachers have given you; your mind sees it, feels it, and handles it."[28] This is the specific statement that Popkin thinks was intended as a criticism of Silhon's *cogito* by Descartes.

Popkin begins his account by asserting: "Even in presenting his important new answer to skepticism, the *cogito*, Silhon had failed to realize either the force of what he was opposing or the crucial character of the undeniable truth he had discovered. Descartes, in two letters that

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[25] Popkin 2003, p. 142, repeats Blanchet's argument that the criticism from the 1638 letter applies to Silhon.

[26] Popkin 2003, p. 139.

[27] Adam 1910, p. 463n. and AT V, 66on. The tone of the letter is also friendlier than that of the letters to the Marquis, Descartes addressing him as "Vostre Excellence" and "Monseigneur," whereas he addresses his 1648 correspondent as "Monsieur."

[28] AT V, 138.

may be about Silhon's *cogito*, indicated what was lacking here."[29] He then quotes from the two letters, the 1638 letter about "I breathe, therefore I am" and the 1648 letter about the *cogito* not being a work of one's reasoning, but something seen, felt, and handled. His analysis is that for Descartes,

> one does not arrive at the *cogito* on the basis of other propositions, which are less certain and open to doubt, but one encounters the truth and force of the *cogito* in itself alone. Silhon, at best, had seen that the skeptic could not deny the *cogito* and hence he could not deny that something was true. But he did not see what it was that was true, or what this might show.[30]

Now, it is *prima facie* unlikely that Descartes would be launching into what he considered a criticism of Silhon's *cogito* in a letter to Silhon thanking him for his help in the attempt to procure a pension. It also seems unlikely that Silhon would understand Descartes' statement as a criticism and then later would repeat his argument (and phrase it in such a way that it would be even more vulnerable to such a criticism). The question is whether Descartes' assertions in the 1648 letter need to be regarded as a criticism of Silhon's *cogito*, even when interpreted as that the affirmer or doubter recognizes his existence because of his affirmation or doubt, together with a principle like "whatever acts exists."

By 1648, Descartes had already answered numerous objections to the *cogito* in print; these were available for anyone's perusal. In fact, given that Descartes called the *cogito* the first principle of knowledge, a cottage industry grew up to show that the *cogito* could not be a first principle, that other principles are needed to be known beforehand. For example, the authors of the *Sixth Set of Objections* tried such a line of attack, though they embedded their criticism in an obscure argument within a series of peculiar ones:

> from the fact that we are thinking it does not seem entirely certain that we exist. For in order for you to be certain that you think you ought to know what it is to think, or what thought is, or again what your existence is. And since you do not yet know what these things are, how can you know that you think or that you exist? Therefore when you say "I think" and when you add "therefore I am" do you really know what you are saying.[31]

The objectors go on to assert that knowing that one is saying or thinking anything requires one to know that one knows what one is saying, which

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[29] Popkin 2003, p. 142.
[30] Ibid.
[31] AT VII, 413.

requires one to be aware of knowing that one knows what one is saying, and so forth. Descartes does not find it at all difficult to deny that the *cogito* requires reflective knowledge, demonstrative knowledge, or knowledge of reflective knowledge. He does acknowledge that "it is true that no one can be certain that he is thinking or that he exists unless he knows what thought is and what existence is."[32] Still, these kinds of objections continued. Gassendi provides a new formulation in his *Disquisitio Metaphysica*: The *cogito* is an enthymeme that requires the major premise "he who thinks exists," and thus the *cogito* cannot be the first truth discovered.[33]

In the *Seventh Objections*, Bourdin tries to expand the list of what one needs to know in order to conclude that one exists. Not only do we need to know what thought is, but also that dreaming entails thinking and not vice versa, since dreaming is not identical to thinking:

> I am dreaming that I am thinking. So I am not thinking.
>
> "No," you reply, "if someone is dreaming, then he is thinking."
>
> I see a ray of light. Dreaming is thinking, and thinking is dreaming.
>
> "Certainly not," you say. "Thinking extends more widely than dreaming. He who is dreaming is thinking; but he who is thinking is not dreaming all the time, but may be thinking while awake."
>
> But is this right? Are you dreaming it, or are you really thinking it? If you are dreaming that thinking extends more widely, does it follow that it really does so? … how do you know that thinking extends more widely than dreaming?[34]

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[32] AT VII, 422.

[33] Gassendi 1962, p. 84, in Meditationem II, Dubitatio I, art. 6, p. 84.

[34] AT VII, 494; CSM II, 334. Bourdin understands that Descartes claims not to need syllogisms; he says:

> Your method denigrates the traditional forms of argument, and instead grows pale with a new terror … If you propose any syllogism, it will be scared of the major premise, whatever it may be. 'The evil demon may be deceiving us,' it says. What about the minor premise? It will tremble and call the minor premise doubtful … Finally, what about the conclusion? It will run away from all conclusions as if they were traps and snares. (AT VII, 528)

So Bourdin's objection is actually that without syllogism, without the ability to go from truth to truth, and without a first truth, Descartes can never break out of what seems to him to be so into what really is so: "'I am thinking,' you say. / I deny it; you are dreaming that you are thinking … / 'I exist, as long as I am thinking,' you say … 'This is certain and evident,' you continue. / No; you merely dream that it is certain and evident" AT VII, 498.

Descartes foresaw objections of these kinds and attempted to defend himself against them in his replies to *Objections II*. The Second Objectors assert that, according to Descartes' own words, the *cogito* requires knowledge of the existence of God, something he has not achieved by *Meditation* II.[35] Descartes, defending himself, replies that "the knowledge (*notitia*) of first principles is not customarily called scientific knowledge (*scientia*) by dialecticians" and that "when we are cognizant of the fact we are thinking things, this is a first notion which is concluded to from no syllogism." He adds,

> when someone says "I think, therefore I am, or I exist," he does not deduce his existence from thought by means of a syllogism, but rather he recognizes it as something self-evident by a simple intuition of the mind. This is evident from the fact that, were he to deduce it by means of a syllogism, he would have to have known beforehand the major premise "whatever thinks is or exists."[36]

According to Descartes, then, the *cogito* is therefore not knowledge, properly speaking, but a simple intuition; it is not a syllogism.

But still, does it depend upon knowing what thought is, what existence is, etc., that which Descartes says in *Replies VI*, or is it independent of such knowledge, including the major premise "everything which thinks is, or exists," as he seems to say in *Replies II*? Descartes reaffirms the former when he claims in *Principles* I, art. 10:

> When I stated that this proposition *I think, therefore I am* is the first and most certain that presents itself to those who philosophize in an orderly fashion, I did not for all that deny that one must first know *what thought*, *existence and certainty are*, and that *in order to think we must exist*, and such like; but because these are such simple notions that of themselves give us no knowledge of anything that exists, I did not think them worthy of being enumerated.[37]

In fact, one of the questions addressed to Descartes by Burman was whether his assertion in *Replies II* is contradictory with what he affirms in *Principles* I, art. 10. Descartes' reported answer is interesting: He allegedly distinguished between what he is expressly and explicitly aware of before the *cogito* and what is implicitly presupposed by it. He is said to have claimed, using the language of syllogism, that "before this conclusion, 'I

[35] AT VII, 124–125.
[36] AT VII, 140.
[37] AT VIIIA.

think therefore I am,' the major 'whatever thinks is' can be known; for it is in reality prior to my conclusion and my conclusion depends on it."[38] Descartes' answer to Burman was not known during the seventeenth century. Still, there are sufficient texts published before 1650 in which Descartes admits that the *cogito*, while not a syllogism, requires in some way simple notions such as "it is impossible that that which thinks should not exist"; this would not be so very different than requiring the principle "acting supposes being."[39]

Neither Blanchet's nor Popkin's criticisms of Silhon as plagiarist or as having entirely missed the crucial nature of the *cogito* seem valid. As yet unanswered is the relation between Silhon's and Descartes' arguments. Are they sufficiently different, as Augustine and Descartes' arguments were said to be, such that one can still call Descartes "the true author" of the *cogito*? Well, it does not look like Silhon makes his *cogito* "a firm principle, supporting an entire physics" or that he uses it to show "that the self is an immaterial substance" that is, "to prove the distinction between material and spiritual natures." While Silhon thinks he needs the cogito to answer skepticism, his argument is not used materially to prove the existence of God and the immortality of the soul. Thus Silhon would have failed Pascal's two-fold criterion.

But Silhon was not the only thinker within Descartes' circle who made use of a *cogito* to prove the immortality of the soul. Mersenne, in a letter written in 1635 to the Leyden Protestant professor of theology André

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[38] AT V, 147.

[39] Can Descartes hold that the *cogito* is only a simple intuition—not a syllogism—and still require that we must first know what thought is, what existence is, and that it is impossible that that which thinks should not exist? I think the answer, though necessarily speculative, is yes. Descartes rejects formal logic for what one could call a material logic (see Ariew 2006b). So, let us consider as a paradigm of a Cartesian logical inference a (Sellarsian) material inference, something like: "Today is Tuesday. Therefore, tomorrow is Wednesday." The material inference would be valid because of the meaning of the terms, not because of the form of the inference. We would have to know what Tuesday and Wednesday are, together with the sequence of the days of the week, etc. Of course, we could always treat the material inference formally, as an enthymeme, and provide the missing premises about Tuesday, Wednesday, tomorrow, etc. In the same way, if we are dealing with an immediate (material) intuition—" 'I am, I exist,' is true every time I utter it or conceive it in my mind," let us say—perhaps that intuition is valid because of the interplay between the meaning of the terms and the context of the utterance. One would then be able to say that the intuition is not a syllogism or inference (it is not a product of one's reasoning and it is not an enthymeme)—it does not depend on the major premise "Everything that thinks exists"—but that it would still require for us know what thought and existence are, etc.

Rivet, referred to two such works; Mersenne said: "we have recently published two books on the immortality of the soul, one a large quarto in French, the other an elegant octavo in Latin."[40] The two books published on the immortality of the soul in 1634–1635 were the French quarto by Silhon and a Latin octavo by the Jesuit Antoine Sirmond, entitled: *On the Immortality of the Soul, Physical and Aristotelian Demonstration:* Against Pomponazzi and his Followers. In another letter to Rivet in 1638, Mersenne objected to his correspondent's position by claiming that "there is a difficulty with thinking that the soul or human understanding has some operation which is independent of the senses, if one holds Aristotle's axiom *nothing is in the intellect without being prior in sense*." To emphasize the difficulty Mersenne added that several of his people—that is, French thinkers from his circle—"have recently written a small number of books to prove the immortality of the soul on the grounds that it has operations that do not at all depend on the senses."[41] Clearly, in 1638, Mersenne was thinking of Silhon and Sirmond, and perhaps even of the Descartes of the *Discourse*. And, indeed, Sirmond's line of reasoning broadly resembles not just Silhon's, but also Descartes'. His intent (as he claims in his subtitle) was to demonstrate the immortality of the soul against the interpretations of Aristotle by Pomponazzi and his followers, using arguments based on Aristotelian principles.

We should recall that Descartes initially gave the *Meditations* the subtitle "in which the existence of God and immortality of the soul are demonstrated" and referred, in his letter of dedication to the Sacred Faculty of Theology of Paris, to the

> Lateran Council held under Leo X, in Session 8, which condemned such people [who say that human reasoning convinces them that the soul dies with the body, while it is by faith alone that they hold the contrary position] and expressly enjoined Christian philosophers to refute their arguments and to use all their powers to demonstrate the truth.[42]

The Fifth Lateran Council did indeed declare that there were three most pernicious errors corrupting the minds of the faithful, namely, that the rational soul is mortal, that there is one rational soul for all humans, and that these claims can be shown true according to philosophy.[43] The

[40] Mersenne 1933–1988, vol. V, p. 80.
[41] Mersenne 1933–1988, vol. VII, p. 24.
[42] AT VII, 3.
[43] For the Thomistic background on this debate and its Suárezian discussion, see Leijenhorst, forthcoming, and James B. South, forthcoming.

condemnation was directed against Pietro Pomponazzi who had asserted that conditions needed to be met in order to show that the soul is immortal: at the very least, the soul must be free from the mediating role of bodily powers, that is, the soul's operations cannot require the body as an object; the body cannot be a necessary condition for all operations of the intellect. Pomponazzi also argued that these conditions could not be defended philosophically. He proffered these arguments in his lectures,[44] as early as 1500, and published them in his principal work, *On the Immortality of the Soul*, in 1519, just after the Lateran Council's decree.

Returning to Sirmond: he granted that if our soul had an operation proper to itself, independent of the body, it would be able to survive the body; now, the action of the understanding would be the soul's operation, which it could do without the body, as long as it did not require phantasms to do so. If, as Pomponazzi thought, phantasms were necessary for the soul to think, then the soul would have no operation of its own independent of the body. So the issue revolved around whether impressed species were necessary for the perception of external objects. Sirmond argued that the soul could use intentional species, lacking anything better, but he also argued that there is no need for an intermediary such as an intelligible object in the case of the soul's knowledge of itself, in which intellect and intelligible object are conjoined.[45] Thus, he judged that "our soul can know itself without the impression of any species."[46] And, of course, Sirmond also judged that "the mind that can operate without body can also subsist by itself. The human mind can accomplish the former. Therefore, it can accomplish the latter." Sirmond used this argument to support the middle proposition in this other syllogism: "The mind that can exist without body is immortal. The human mind can do

[44] See Pomponazzi 1970, pp. 1–25.

[45] Sirmond 1635. Sirmond published the work in French in 1637 as *Démonstration de l'Immortalité de l'ame. Tirée des Principes de la Nature. Fortifiée de ceux d'Aristote. Où plusieurs beaux secrets de la philosophie sont mis en leur jour*. I cite the latter work: Sirmond 1637, p. 193.

[46] "Notre ame peut se cognoistre elle-mesme sans l'impression d'aucune espece." Sirmond 1637, p. 169. Sirmond extends this ability of the soul to know itself without intermediary to the separated soul and to angels: "the separated soul … knows itself without any means other than itself. And it is not difficult to believe that angels who have a more penetrating eye, similarly see in their own nature, without any other aid or impression of species, not only themselves, but many other things …" p. 193. For more on Sirmond, see also Blanchet 1920, pp. 126–138.

so. Therefore it is immortal."[47] Unlike Descartes and Silhon, Sirmond did not use his *cogito* to answer any skeptical challenge; like them, and especially like Descartes, he used it to prove the immortality of the soul; but unlike them, he did so within a self-consciously Aristotelian framework. It does look like this *cogito* can pass at least one of Pascal's criteria for being its "true author."

Moreover, there is no question about the provenance of Sirmond's *cogito*. He was pleased to be able to cite Augustine, whom he knew held the same argument:

> even in this life our soul understands and knows itself. … This is the opinion of St. Augustine in chap. 10 of Book 10 *On the Trinity*, that our souls, in the interim, make use of the power they have to know their own substance without any veil or curtain [intervening]. He derives this, which is a good coincidence for me, by means of the same proof I have used, and concludes that souls know themselves in the body without species preceding their knowledge.[48]

Sirmond then quotes from Augustine's well-known passage that Arnauld will discuss with Descartes in relation to his proof of the distinction between soul and body:[49] the mind knows itself, when it knows itself it knows its substance, and when it is certain of itself it is certain of its substance. For Augustine the mind is not certain whether it is air or fire or any kind of body or anything appertaining to body; therefore it is not any of these things. His argument continues with the specific passage that Sirmond cites:

> But if the mind were of the nature of fire or air, or of something similar, it would think of these things differently from the others—that is, not with a phantasm of the imagination in the manner we think of absent things that have struck our senses, whether as a species or as an individual—but with some inner, true presence that has nothing feigned; for nothing after all is more present to the mind than itself.[50]

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[47] "L'esprit qui peut opérer sans corps, peut aussi subsister de mesme. Celuy de l'homme peut le premier. Il peut donc aussi the second. … L'esprit qui peut estre sans corps, est immortel. Celui de l'homme le peut. Il est donc immortel." Sirmond 1637, p. 60.

[48] "Dés cette vie nostre ame s'entend et se cognoit elle-mesme. … C'est donc le sentiment de S. Augustin, au Cap. 10 du liv. 10 de la Trinité; que nos ames se serves dés astheure du pouvoir qu'elles ont de coignoitre leur propre substance sans voile, et sans Rideau. Ce qu'il tire par bon rencontre pour moi, de la mesme preuve dont je me suis servi, et conclud qu'elles se cognoissent dans le corps sans espèce qui prévienne leur cognoissance." Sirmond 1637, p. 222.

[49] See *From Arnaud*, 3 June 1648, AT V, 186.

[50] "Si l'ame estoit de la nature du feu ou de l'air, ou quelque chose semblable, elle deburoit penser à ces choses d'une autre façon qu'à tout le reste, sçavoir est, non pas au

Finally, Sirmond also asserts that Mirandulanus, that is, Pico della Mirandola, in his *Apology*, used the same passage by Augustine to assert that our soul has no actual and distinct knowledge other than itself; the soul has a secret, direct and permanent knowledge, independent of the senses.[51]

These arguments take on greater significance when one considers that Augustine's *cogito* lived in the seventeenth century independently of Descartes, that it was known by at least four correspondents who indicated to Descartes that his *cogito* reminded them of Augustine's.[52]

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moyen d'un phantosme fourny par l'imagination à la maniere, que nous pensons aux objets qui sont absents, et qui neantmoins ont autrefois frappé nos sens, soit en espèce, soit en individu; mais bien à la faveur d'une certaine présence plus intime et si véritable, qu'elle n'a rien de feint. Car que pourroit-on luy souhaitter de plus uny et plus présent qu'elle mesme." Sirmond 1637, pp. 222–223 (representing Augustine, *De Trinitate*, X, 16).

[51] There has been little written about Sirmond. Most of the commentary has treated his later treatise on *La defense de la vertu* (1641), which was criticized severely by many, and in particular both Arnauld and Pascal (the latter in *Provincial Letters*, X in Pascal 1963). Needless to say, Sirmond has not been treated very well in the secondary literature. Bremond 1932 begins as follows: "Il y a deux Sirmond: Jacques (1559–1631) et Antoine (1592–1643); l'oncle et le neveu; le géant et le nain," p. 7. There are some more even-handed treatments of Sirmond in relation to Pascal in Jovy 1932; the latter also has an interesting study of the relation between Silhon and Pascal (Jovy 1927). We can point out that Sirmond entered the Jesuit Order at Rouen in 1608 and subsequently taught humanities, rhetoric, then, philosophy, for five years, at the Jesuit College of La Flèche (roughly when Descartes was a student there). There has been no suggestion that the eighteen-year old Descartes taught the *cogito* to Sirmond circa 1614.

[52] So, the question arises, how to make sense of what Descartes says to Colvius: "You have obliged me by bringing to my notice the passage of St. Augustine that bears some relation to my 'I think, therefore I am.' Today I have been to read it at the library of this city, and I do indeed find that he makes use of it"? Is Descartes really to be understood as not knowing that Augustine made use of a *cogito* until Colvius pointed it out to him? The exchanges between Mersenne and Descartes about the *cogito* can provide some clues. As usual, we do not have Mersenne's side of the letters, but must reconstruct what he said through Descartes' replies. On 25 May 1637, Descartes said to Mersenne "I haven't sent you anything about … the passage from Saint Augustine, because it does not seem to me that he makes the same use of it that I do" (AT I, 376). Mersenne must have referred to a work of Augustine containing the *cogito* and Descartes, having general knowledge about it gives the gist of what will be his answer to Colvius, but puts off formally responding to Mersenne. On 15 November 1638, Descartes wrote to Mersenne: "I have searched for the letter in which you cited the passage of Saint Augustine, but I have not yet found it. I also have not yet been able to get the Works of this Saint, to see, in them, what you are asking about—for which I thank you" (AT II, 435). This is a continuation of the thread from the previous letter; Descartes does not deny knowing something about Augustine's views, but acknowledges that he still hasn't read over his works and checked the views expressed there against his own. It also seems that Mersenne is asking for the reference

They take on further significance when one realizes that Augustine's *cogito* was utilized for different purposes by various thinkers, not the least of which were Jean de Silhon and Antoine Sirmond.[53]

We seem to have similar views that can be described in dissimilar ways. Descartes' attempt to answer the skeptic by establishing that he exists as a thinking thing is often considered emblematic of modern philosophy, even though the line of argument continues in an effort to prove the existence of God and immortality of the soul from these foundations. Silhon's similar endeavor to answer the skeptic by proving one's own existence, continuing with the existence of God and immortality of the soul, cannot be thought as a very progressive move, being clearly rooted within a Renaissance perspective, in the debates between Reformation and Counter-Reformation positions. This *cogito* is the seventeenth-century version of the Augustinian *cogito*; at the very least, it shows that one can hold a *cogito* not for modern reasons, but for reasons rooted in issues germane to seventeenth-century thought and attempting to defend the status quo. Finally, Sirmond's attempt to show that the soul knows itself without the intermediary of the senses, and thus is immortal, is issued in an Aristotelian context, in continuity with scholastic philosophy. It is also the heir of Augustine's philosophy.

The Cogito *after 1640*

For twentieth-century philosophers, Descartes is the person who redirected philosophy inward with the *cogito*. He is the "father of modern philosophy," a thinker whose primary motivations were epistemological, in opposition to the metaphysico-theological concerns of the

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to Augustine from Descartes; this makes it even clearer that Augustine's works were not so readily accessible. Finally, in December 1640, just a month after his letter to Colvius, Descartes writes to Mersenne: "You had previously alerted me about a passage from Saint Augustine concerning my 'I think therefore I am,' about which you had, it seems to me, asked me again once more; it is in the 11th book of *On the City of God*, chap. 26" (AT III, 261). We can conclude from these three fragments to Mersenne that Descartes, in the letter to Colvius, would not be denying that he is aware of Augustine's *cogito*, but simply that he does not have the texts before him to check carefully so that he can speak about the matter with authority. Once he does, his prior judgment (in his first letter to Mersenne) is confirmed.

[53] Augustine's cogito was discussed and even criticized by various Jesuit theologians before Descartes. See Schmutz, June 2009 and 2007.

Scholastics; he is said to have been obsessed by the establishment of secure foundations for knowledge or the search for a new method for the acquisition of knowledge. Following Descartes, with the *cogito* as the turning point, moderns no longer needed to ask scholastic questions about being, but progressed instead to reflective questions about the self (bringing themselves a step closer to the linguistic turn).[54] However, that image of Descartes does not mesh very well with some of what Descartes says about the *cogito* or with the reality of the reception of his philosophy in the seventeenth century. Rarely was Descartes the epistemologist discussed then; instead, and not unexpectedly I suppose, seventeenth-century critiques were predominantly directed against Descartes' various metaphysical theses. The history of condemnations of Cartesianism in the seventeenth century provides a vast amount of evidence for this different image of Descartes. Seventeenth-century civic, religious, and scholastic authorities were most often extremely unhappy with Descartes the revisionist metaphysician, with such doctrines as the denial of substantial forms, the principle that extension is the essential attribute of matter, and the claim that the universe is singular and indefinite.[55] In fact, the controversy over these metaphysical doctrines and their consequences almost eclipsed all other potential discussions of Cartesianism.

One can read whole books critical of Descartes' philosophy, written in the seventeenth century, without running into any discussion of the *cogito* or any other aspect of Descartes' epistemology.[56] Witness, for example, Jean-Baptiste de la Grange's two-volume work, *Les principes de la philosophie contre les nouveaux philosophes, Descartes, Rohault, Régius, Gassendi, le p. Maignan, etc.*[57] De la Grange, a French Oratorian, believed

[54] In an interesting discussion, "a small but eminent group of Descartes scholars" were asked to address briefly the questions: "Why should we teach Descartes to philosophy students? Are there any aspects of his philosophy which are still living?" Four out of five (Chappell, Gaukroger, Schmaltz, and Wagner) responded by making reference to Descartes and epistemology: "his foundationalist program in epistemology"; "the royal road to problems of epistemology"; the emphasis on "Descartes the pure epistemologist"; and the *Meditations* offering "a distinctive form of epistemic review." The fifth (Watson) talked about mind-body dualism. See *British Society for the History of Philosophy Newsletter* 1996, pp. 29–33.

[55] These principles were condemned at Louvain. See chapters 8 and 9.

[56] The same can be said about works generally sympathetic to Descartes' philosophy—le Bossu 1674, for example.

[57] De la Grange 1682.

Descartes to be a dangerous person, a thinker whose philosophy had rightly been condemned by the King, since it was based on principles that were inconsistent with Christian theology; he also thought that Descartes' philosophy was ruining Christian theology by undermining the scholastic philosophy upon which it had been based:

> Although one might have an inclination for Descartes' philosophy because it appears new and much easier than that of the Peripatetics, nevertheless, were one to know its principles just a little, one would easily see that this doctrine contains something bad, such that it would be surprising that so many intellectuals profess the doctrine. For it is not necessary to enter deeply into the details of the propositions taught by Descartes to know that it is for good reason that his majesty … has not long ago prohibited the opinions of that author from being taught in his kingdom. It suffices to know that these principles ruin a large part of theology by completely destroying ordinary philosophy. … One need only hear Descartes explain the mysteries of the faith in a completely new way, and claim that all Catholic theologians up to now were mistaken, to be persuaded that whether his doctrine is erroneous or not, at least it is dangerous, and that the professors of philosophy are wholly wrong in teaching it to young people, in whom it is not good to inspire the love of novelty nor the hatred for the ancient doctrine.[58]

In consequence, he discussed Descartes' principles most critically, beginning with the rejection of the plurality of worlds,[59] a thesis that (according to him) was based on the definition of matter as extension, the indefinite extension of the world, and the assumed erroneous principle that two bodies cannot occupy the same place.[60] He continued, in succession, with

[58] De la Grange 1682, pp. 1–3.

[59] "Car qui croiroit que Descartes n'enseigne que la vérité, et ce qui est connu clairement par la lumière naturelle, lors qu'il nous dit dans l'article 22. de la seconde partie de ses Principes, que plusieurs mondes sont impossibles. Peut-on dire quelque chose de plus nouveau, et qui choque davantage la raison? Depuis que les hommes se mêlent de raisonner sur les ouvrages de Dieu, il n'y en a possible pas eu un, qui ait ose enseigner cette doctrine, ou mesme qui ait este de ce sentiment. En effet, il n'y a rien qui nous paraisse plus clair et plus naturel, que de dire que Dieu ayant produit ce monde, peut bien encore en produire un autre, de mesme qu'un sculpteur qui a fait une très-belle statue, peut bien en faire encore une semblable. Comment est-ce que Descartes a pu avancer cette erreur?" de la Grange 1682, pp. 6–7.

[60] "Ce que je trouve de plaisant, c'est que Descartes enseigne hardiment des conclusions très dangereuses, qu'il tire de deux principes qui ne sont point prouvez. Le premier principe qu'il suppose, est que par tout il y a de l'espace, il y a aussi de la matière; parce que qui dit espace dit étendue, laquelle n'est point différente de la matière. On peut voir dans l'articles 16 et 19 de la seconde partie des Principes, s'il apporte une seule

such topics as whether animals can reason, the accidents of the Eucharist, the nature of place and void, the infinity of the world, and the possibility of void; in his second volume, he broached the topic of the immobility of the earth and other similar subjects. His primary motivation was the re-establishment of the scholastics' substantial forms; he did not seem at all interested in skepticism, hyperbolic doubt, the *cogito*, ideas, or the analysis of sense perception.

A visit to Descartes' world, guided by the Jesuit Gabriel Daniel, imparts the same image.[61] Daniel satirized the Cartesian doctrines he found most offensive, namely, the union of soul and body (Descartes separating and reuniting them when he pleased); the account of motion and the conservation of quantity of motion; the explanation of the Eucharist; the denial of void; the acceptance of vortices and the motion of the earth; and the irrationality of animals—that is, Descartes' *bêtes-machines*. Again, the topics discussed in his extremely popular work[62] related to metaphysics, theology, physics or cosmology, but not to epistemology.

This is not to say, however, that all seventeenth century critiques were exclusively about metaphysical issues. Now and then one can find bits and pieces of the topics that might speak to more modern concerns. Fairly typical is the 1665 rejection of Cartesianism by the Jesuits of Clermont College, whose criticism is mostly aimed at the usual metaphysico-theological suspects; one can glimpse a criticism—under the rubric of "what is distasteful to mathematics"—directed against what scholastics called the classification or subalternation of the sciences, that is, the set of doctrines discussed in conjunction with Aristotle's *Posterior*

raison pour établir ce principe. Neantmoins il en conclue hardiment, que la matière, ou le monde n'a point de bornes ny de limites: parce que, comme on peut voir dans l'article 21. on s'imagine toujours au delà des limites que l'on donnerait à la matière, des espaces immenses et infinis, lesquels sont en effet tels que qu'on se les représente, et sont la matière mesme; puisque l'idée que nous avons de leur étendue, n'est point différente de l'idée de la substance corporelle. Le second principe qu'il doit supposer nécessairement, pour conclure que plusieurs mondes sont impossibles, et dont neantmoins il ne parle point; c'est que deux corps ne peuvent pas, absolument parlant, estre dans un mesme lieu, et que la matière ne peut pas estre dans une autre matière [...] De sorte qu'il faut remarquer que non seulement la conclusion de Descartes, que plusieurs mondes sont impossibles est fausse et dangereuse; mais aussi qu'elle est tirée d'un principe dangereux, qui est que deux corps ne sauraient estre, absolument parlant, dans le mesme espace," De la Grange 1682, pp. 7–9.

[61] Daniel 1690 and 1693.

[62] The work was even translated into Latin and English, the latter as Daniel 1692.

Analytics.[63] The basic issue is whether mathematics should be subalternated to physics, as most scholastics would have thought, or whether that order needs to be overturned, as seems to be Descartes' doctrine; in other words, whether or not mathematics, as an abstraction from natural things—that is, from the objects of physics—can be used in the explanation of natural things. In addition, the first criticism, under the rubric of "what is distasteful to philosophy," can be interpreted as a vague pragmatic critique of Cartesian doubt.[64]

Other condemnations of Cartesianism listed propositions that cannot be best described as evincing metaphysico-theological concerns. Statements condemning Cartesian doubt, for example, are among the

[63] Reported by Oldenburg in a letter to Boyle in Oldenburg 1966, vol. II, p. 35: "The Cartesian hypothesis must be distasteful to mathematics … because it is applied to the explanation of natural things, which are of another kind, not without great disturbance of order." See chapter 8 for the full text. The general issue is based on the principle that, among other requirements, genuine scientific knowledge needs to be knowledge of the reasoned fact (or the reason why), not of the mere fact (Aristotle, *Posterior Analytics* I, chap. 13); thus demonstration is a syllogism that proves the cause—i.e., the reasoned fact, not the fact (Aristotle, *Posterior Analytics* I, chap. 24). But reasoned fact and fact differ both when they are investigated by a single science and by different sciences. Aristotle can give examples of geometers knowing the reason why, when natural philosophers know only the fact; this situation occurs when fact and the reasoned fact are investigated by different sciences, that is, when problems are related to one another as subordinate and superior, as in the case of the mathematical sciences (such as optics or astronomy) and mathematics. The question, then, involves the ultimate classification of the sciences, whether mathematics is subordinate to natural philosophy or vice versa. Aristotle's doctrine is complex and open to interpretation on such topics, but Thomistic interpretations of Aristotle—what the Jesuits were committed to—are more rigid about such matters. Thomas holds that mathematicians abstract from sensible matter and motion (*Commentary on the Metaphysics* V, lect. 16, n. 989, and elsewhere) and that the mathematical sciences prove the same conclusions as the naturalists by formally different principles of demonstration (*Summa Theologiae* IIa.IIae, q. 1, art. 1). This is consistent with Thomas' discussion of the subalternate sciences: in the mathematical sciences, the geometer explains the reason why according to the formal cause, but the quantitative form is a remote cause as far as the natural phenomenon is concerned (*Commentary on the Posterior Analytics* I, chap. 13). For Thomas, mathematics and the mathematical sciences are subalternated to natural philosophy. Mathematics looks to natural philosophy for its justification.

Even the great Jesuit mathematician, Christopher Clavius, accepts these doctrines, though he tries to mitigate the implicit criticism in them. He limits himself to prudential considerations when discussing the subalternation of the sciences. For more on this issue, see Ariew 1992.

[64] "The Cartesian hypothesis must be distasteful to philosophy … because it overthrows all its principles and ideas which commonsense has accepted for centuries," Oldenburg 1966, vol. II, p. 35.

propositions censured by the University of Paris in 1691 and those condemned by General of the Jesuits in 1706.[65] Moreover, when the Oratorian professors at Angers were expelled from their positions in the 1670s for teaching Cartesian philosophy, among the reasons given for the expulsions was that they did not reject Descartes' skeptical method. As usual, they were condemned for having denied real accidents and the finiteness of the world; but they were also reproached for having forgotten that "To say that one must doubt all things is a principle that tends toward atheism … or at least toward the heresy of the Manicheans."[66] And they were censured for having accepted Descartes' *cogito* as a principle of knowledge. One can read, as one of the mistakes by an Oratorian professor, that

> he does not perceive that it is impossible for the reasoning to be the first principle of reasoning and knowledge, otherwise a thing would be a principle of itself. Now, *cogito ergo sum* is an argument, but a truly defective one, since the consequence of this enthymeme is the same thing as the antecedent. For *cogito* means in philosophical terms *Ego sum cogitans* … The first principle of the sciences must be universal and necessary, because science is of *universalibus et necessariis*; and this principle *cogito* is something singular and extremely uncertain, since it is … (as the philosophers say) *de individuo et in materia contingente. Ego sum: est propositio singularissima, et, cogito est quid incertissimum*; and is there a student who does not know that the first principle is the foundation of the truth of demonstrations and was never an *a posteriori* demonstration by effects. Now, *cogito ergo sum* proves *a posteriori* the existence of man by means of his own operation.[67]

The authors of the document reject the *cogito* as a principle of knowledge, or as science, properly speaking, because such a principle, according to the *Posterior Analytics*, must be a "commensurate universal," a proposition whose predicate belongs essentially to every instance of its subject (73b26–30). The *cogito*, thus, does not fit the scholastic model for pure scientific knowledge at all. It is neither universal nor necessary, but singular and contingent. Moreover, it is an argument, even a defective one; either it is dependent upon an unspecified major premise or it begs the question. And if it is an argument, it cannot be a principle of knowledge: an argument cannot itself be a principle. This compact passage relates

[65] d' Argentré 1736, pt. I, p. 149; Rochemonteix 1899, vol. IV, pp. pp. 89n–90n.
[66] Babin 1679, p. 41.
[67] Babin 1679, p. 42.

very briefly many of the reasons why seventeenth-century philosophers rejected the *cogito*; indeed, it is a paradigm of their criticisms of it and it reflects the previously published critiques of Descartes' *cogito*, those of the *Sixth Objectors*, Gassendi, Bourdin, *et al*. Here, as well, is the similar assesment by the Dominican Antoine Goudin who affirms in his *Metaphysics* that the *cogito* supposes the first principle that it is impossible that the same thing be and not be at the same time:

> But Descartes is unacceptable when he asks us to set aside all principles for a while, because they are doubtful, and to begin the knowledge of things by this principle: *I think*, in order to infer from it: *therefore, I am*. For, among other things, if the soul sets aside our principle as doubtful, with all the others, it would also have to doubt *that which thinks is or is not*. It would become possible to think and not to exist, if it is possible that *the same thing is and is not*. This principle, or rather this enthymeme, of Descartes, therefore requires our principle.[68]

There is a convergence to these critiques: one can object to the *cogito* that it is some kind of argument (if not a syllogism) which depends upon principles that are not proven or subject to doubt; one can also attempt to undermine the claim that it is a simple intuition. Both of these strategies are used in the most extended critique of the *cogito* by Pierre-Daniel Huet, then Bishop of Avranche, an important figure in late seventeenth-century French intellectual circles.[69] Huet repeats the objection that the *cogito* is an enthymeme missing its major premise or that it begs the question. He asserts that Descartes has abandoned his promise to take everything as doubtful when he accepts as certain something which is doubtful and should be held to be false.[70] He adds to the list of what needs

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[68] "At non ferendus hic Cartesius, cum jubet omni alio tantispet seposito principio, ut dubio, Mentem ab eo rerum cognitionem auspicari: *Ego cogito*, ex quo statim inferat: *Ergo ego sum*. Nam, ut caetera non urgeam, si cum aliis omnibus nostrum etiam principium Mens ut dubium seponat, dubium quoque erit, an, quod cogitat, sit vel non sit. Posset enim cogitare, et tamen non esse, si possible foret, *Idem esse et non esse*. Iraque vel illud ipsium Cartesii Principium, seu potius Enthymema nostro nititur principio." Goudin 1727 [1668], vol. 4, quest. 1, art. 1, pp. 187–188. While Goudin is a Dominican (and Thomist), interestingly enough, the same argument can be found in the works of the Franciscan (and Scotist) Claude Frassen; see Schmutz 2008, pp. 421–422.

[69] The critique is contained in chap. 1, art. 5–13, pp. 21–38, of Huet 1689 (corrected and augmented edition, Paris, 1694). It is interesting to note that the subtitle of the work is: *Servant d'éclaircissement à toutes les parties de la philosophie, sur tout a la métaphysique*. On the importance of Huet to French society, see Lux 1989. See also Malbreil 1991.

[70] Huet 1689, chap. I, art. 5; see also art. 7.

to be known in order for "I exist" to follow from "I think." He reminds his readers that there are many propositions that precede the *cogito*, such as "everything that thinks exists" and even "everything that acts exists." He then argues that

> we cannot know that that which acts exists unless we know what it is to act and what it is to exist. And to know what it is to act, we must know what is the agent, what is its cause, how it acts, and why it acts. Moreover, to know what it is to exist, we must know what the thing is that exists, what the cause is for it to exist, how it exists, and why it exists.[71]

He further argues that Descartes cannot defend himself by means of the rules of logic, since he has resolved to hold all things as false and cannot have any faith in them. He adds a new element to these kinds of objections, based, no doubt on the publication of Descartes' correspondence: since, according to Descartes, God can make two contradictory propositions be true at the same time, God can make it be that he who thinks exists and does not exist at the same time, or that he who thinks does not exist. The *cogito* cannot be an absolute certainty.[72]

In his lengthiest objection, he examines the temporal nature of the *cogito*. He argues, in a number of different ways, that the *cogito* occurs in time, that it requires the faculty of memory, and that it fails on account of it. Basically, the argument is that the *cogito* cannot be expressed as "I think, therefore I am." "I think" and "I am" can never occur at the same moment, so that the *cogito* can only be "I think, therefore I was," "I think, therefore I will be," "I thought, therefore I am," "I thought, therefore I will be," or "I thought, therefore I was." And, of course, none of these are satisfactory. The simplest argument is that the *cogito* requires that everything that thinks exists during the time it thinks. "But my thought has stopped existing when I say 'therefore I exist' and the time in which I say 'I think' is different than the time in which I say, 'therefore I exist,' which is why the argument signifies 'I think, therefore I will be,' or 'I thought, therefore I am.'"[73] Huet also argues that when Descartes says "I

[71] "Nec id quidem scire possumus, quin prius noverimus quid sit agere, quid esse. Ut noscamus autem quid sit agere, noscendum est, quid sit agens, quae caussa, qui modus, qui finis agendi. Rursum ut noscamus quid sit esse, noscendum est quid sit id quod est, quae caussa cur sit, quomodo sit, quo fine sit." Huet 1689, chap. I, art. 7.

[72] Huet 1689, chap. I, art. 6; see also art. 13. Presumably, this element appears principally because of the publication of Descartes' correspondence in 1657–1667.

[73] "Atqui jam desiit cogitatio illa, cum dico, Ergo sum: et aliud est tempus enuntiati

think," the object of his thought is his thought itself. But since a thought cannot both be an act and the end toward which the act is referred, Descartes' thought as object is not the thought by which his mind thinks: the thought by which Descartes thinks is different than the one about which Descartes thinks. "I think" is then "I think that I think," which actually signifies "I think that I thought." And, of course, Cartesians cannot conclude "therefore I exist" from that.[74]

Huet also denies that the *cogito* can be a simple intuition. According to him, "If 'I think therefore I exist' were a simple action of the mind, it would not be true that 'I think' would be better known than 'I exist."[75] As evidence for the claim that "I think" is better known than "I exist," Huet affirms that you can deduce "I exist" from "I think," but you cannot deduce "I think" from "I exist." Thus, "I think" must be known prior to "I exist" and "I think, therefore I exist" cannot be a simple intuition or action of the mind, but a progression of knowledge, the acquisition of something unknown from something known—in other words, an argument.

Pierre-Sylvain Régis,[76] acting as Descartes' stand-in, has no difficulty in replying to Huet's critique. He denies that the *cogito* is an enthymeme or that it begs the question. He asserts that Descartes has not abandoned his promise to doubt everything when he accepts something as true after having examined it.[77] He claims that Descartes never accepted the general rule to hold everything as false, but merely resolved to consider as false whatever appears doubtful. He distinguishes between real doubt, arising from the nature of things, and a feigned, methodological doubt—what Descartes called hypothetical, hyperbolic and metaphysical doubt—arising from his resolution to doubt.[78] In keeping with this interpretation of Descartes, he asserts that Descartes only held the rules of logic as false "hypothetically" in order to examine them. He asks rhetorically: "who can prevent Descartes from holding them as true, if they have

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antecedentis, Ego cogito, et aliud enuntiati consequentis, Ergo sum. Vel igitur id sibi vult ista argumentatis, Ego cogito, ergo ero; vel istud, Ego cogitari, ergo sum." Huet 1689, chap. I, art. 9.

[74] Huet 1689, chap. I, art. 9.

[75] Huet 1689, chap. I, art. 11.

[76] Author of the textbook exposition of Cartesian philosophy, Régis 1690, among other works.

[77] Régis 1691, I, art. 5.

[78] Régis 1691 I, art. 1.

appeared to him as such, after he has examined them?"[79] On the question of whether God can make something exist and not exist or something think and not exist, Régis allows that Descartes said something of the kind, but claims that Descartes said it with respect to God's extraordinary power, not with respect to things considered according to the ordinary course of nature, which is what is at stake in the *cogito*. Régis also denies that "I think, therefore I exist" requires the major premise "Everything that thinks exists." We know singular propositions before general ones, that which Descartes maintains in *Replies II*: "For such is the nature of our mind that it forms general propositions out of the knowledge of particular ones."[80] According to Régis, "Everything that thinks exists" does not precede "I think, therefore I exist" for someone who seeks to discover his/her existence by analysis; it only precedes the latter in the minds of those who wish to prove their existence to others by synthesis.[81] As for the argument that we cannot know we exist unless we know what it is to act and to exist and what is the agent, its cause, how it acts, why it acts, etc., he agrees that that would be required for *adequate* knowledge, but that what is at stake in the *cogito* is the *simple* knowledge of one's own existence.[82]

On the lengthy question about the temporality of the *cogito*, Régis claims that memory might be defective at times, for example, when we are dealing with distant memories (which is not the case here). However, it can be trusted at other times, when we are attending carefully to the matter at hand, as with the *cogito*. Regardless of that problem, he claims that "I think" and "therefore I exist" are both in the mind at the same time: one of them is in the understanding and the other in the will:

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[79] Régis 1691, I, art. 6.

[80] AT VII, 140–141. We should add that it is also Descartes' reported view in the *Conversation with Burman*; see AT V, 146–147; CSM III, 332–333.

[81] Régis 1691, I, art. 7. It is interesting to note that Leibniz shares this view (taking analysis and synthesis to correspond to order of knowledge and order of nature, respectively). Leibniz, of course, is almost never interested in the *cogito*. In the early "Letter to Foucher [1676]," however, he asserts: "But even though the existence of necessities is the first of all truths in and of itself and in the order of nature, I agree that it is not first in the order of our knowledge. For you see, in order to prove their existence I took it for granted that we think and that we have sensations. Thus there are two absolute general truths, that is, two absolute general truths which speak of the actual existence of things: the first, that we think, and the second, that there is a great variety in our thoughts. From the former it follows that we exist …" (Leibniz 1989, p. 2).

[82] Régis 1691, I, art. 7.

"For one has to note that Descartes teaches expressly that thoughts are passions that belong to the understanding and that affirmations and negations are actions that belong to the will."[83] Régis easily disposes of the other objections that make the *cogito* temporal. He denies that "I think" is equivalent to "I think that I think" and, thus, he does not consider whether "I think that I think" actually signifies "I think that I thought." According to him, the *cogito* is also not temporal because there is only one thought in it. While the meditator thinks, he/she perceives he/she thinks by a single and simple thought, which is known by itself; otherwise there would be an infinite progression of thoughts.[84] Finally, he reaffirms that the *cogito* is a simple intuition and he rejects the relevance of the argument that one can derive "therefore I exist" from "I think" but not vice versa: "Since being is something more general than thought, … one can truly conclude that something exists from the fact that it thinks, but one cannot infer in the same way that something thinks from the fact that it is. This is sufficient to destroy the reasoning of the author of the *Censura*."[85]

The matter did not end there. Huet published a corrected and expanded edition of his *Censura* in 1694 and several others published their own replies.[86] One of the more interesting of the latter kind was the one written by Jean Duhamel, Professor Emeritus at the University of Paris,[87] who published *Reflexions critiques sur le système cartésien de la philosophie de mr. Régis*. Duhamel devotes two of his chapters to the *cogito*. After considering Huet's and Régis' arguments, Duhamel comes down squarely on Huet's side. The *cogito* begs the question. Moreover, it is a defective argument. Duhamel argues that one cannot separate knowledge of one's existence from other knowledge:

> The analysis of our author … assumes that I can separate knowledge of the heavens, of the earth, or of the sea, from its proper object; now, it is false that I can separate this knowledge from its object, any more than from its

[83] Régis 1691, I, art. 9.
[84] Régis 1691, I, art. 9.
[85] Régis 1691, I, art. 11.
[86] Even Leibniz wanted to take part in the event—on Huet's side; see his letter to Huet of 1692 (Leibniz 1875–1890, vol. III, pp. 19–20) in which he proposes to have Huet publish his *Critical Remarks on Descartes' Principles* in the second edition of the *Censura*. Leibniz is still considering some such project five years later (to Nicaise, Leibniz 1875–1890, vol. II, p. 582).
[87] Author of the highly regarded (posthumously published) textbook, Duhamel 1705.

> subject, for knowledge is not less relative essentially to its object than to its subject, a difference being no less essential than a genus.[88]

He also argues that, since, according to the Cartesians, God can make it be that I think and not exist, "I exist" does not follow necessarily from "I think."[89]

But Duhamel's principal interest is in denying that the proposition "I think, therefore I am" is the first of all propositions known. He rejects Régis' claim that singular propositions are known before general ones and asserts that there are several general propositions that may be known before "I think therefore I exist," namely, "everything that exists exists necessarily while it exists," "Everything that acts exists," and "Everything that thinks exists."[90] He has a number of reasons for this. Direct propositions are known before reflexive propositions, because the object precedes the knowledge or idea of which it is the object.[91] The general propositions he listed are direct since they refer to an external object and the

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[88] "L'analyse … suppose faux; car elle suppose, que je peut séparer les conoissances du ciel, de la terre, de la mer, de leurs propres objets: or il est faux que je puisse séparer ces conoissances de leurs objets, non plus que de leurs sujets; car ces conoissances ne sont pas moins relatives essentiellement à leurs objets, qu'a leurs sujets, la différence n'étant pas moins essentielle, que le genre." Duhamel 1692, chap. 13.

[89] "De plus, on soutient que, de ce que je pense, il ne s'ensuit pas nécessairement que j'existe dans le principe des Cartésiens; car si Dieu peut faire que je pense et que je n'existe pas; de ce que je pense, il ne s'ensuit pas nécessairement, que j'existe: or Dieu peut faire que je pense et que je n'existe pas dans le principe des Cartésiens, et sur-tout de notre Auteur, qui dit expressément: *il reste donc qu'il n'y ait point d'impossibilité avant le décret de Dieu, en telle sorte que quand je dis, qu'il est impossible qu'une chose soit et ne soit pas, cela ne signifie autre chose, si ce n'est que Dieu a voulu qu'une chose fust tandis qu'elle seroit* [livre 1, part 1, de sa métaphysique, chap. 13]; ce qui prouve sans commentaire, que si Dieu vouloit par une volonté éternelle, ainsi qu'il veut autres choses qu'il veut, il seroit possible qu'une chose fut et ne fut pas; à plus forte raison, qu'elle pensast et qu'elle n'existast pas. Donc de ce que je pense, il ne s'ensuit pas nécessairement, dans les principes des Cartésiens, que j'existe." Duhamel 1692, chap. 13.

[90] "On soutient au contraire, qu'il y a plusieurs propositions qui peuvent être connues avant celle-cy, et notamment que ces propositions générales, *Tout ce qui existe, existe nécessairement pendant qu'il existe*: *Tout ce qui agit, existe*: *Tout ce qui pense, existe*, peuvent être connues avant elle." Duhamel 1692, chap. 14.

[91] It is interesting to compare the above to the post-Cartesian pronouncements of Leibniz in *De Veritatibus, de Mente, de Deo, de Universo*: "I admit that the proposition 'I think' must occur first in the order of philosophizing; that is, if the primary truths are arranged in order, it will be first. For it is simpler to start from one subject of a primary proposition of experience than from its various predicates," Leibniz 1992, p. 57.

cogito is reflexive since it has thought and existence as its object.[92] In addition, it cannot be the case that general propositions presuppose all the particular propositions that could be subsumed under them.[93] We should point out that this is not something made up just to attempt to defeat the *cogito*, but a standard bit of scholastic philosophy. For example, one can read in Eustachius' 1609 *Summa Philosophiae quadripartita*:

> The intellect knows other things before it knows itself. For direct knowledge is prior to reflexive knowledge, and the intellect knows things other than itself by direct cognition, while it knows itself only by reflexive cognition … The intellect knows material substances before it knows immaterial and spiritual ones … The intellect has prior knowledge of composite substances than of their parts or differences. For confused cognition comes before distinct cognition, and composite substances are first of all known by a confused kind of cognition, while their parts are known only by distinct cognition. Accidents are known prior to substances. For accidents are generally accessible to the senses, but substances are hidden and not sensible in themselves; hence they are not so swiftly or easily known.[94]

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[92] Duhamel 1629, chap. 1. Here is Duhamel's full argument: "Parce que les propositions directes sont connues avant les réflexes, ce qui est connu directement, est plutost connu, que ce qui est connu par réflexion; car l'objet précède la connoissance ou l'idée dont il est l'objet, et la connoissance directe est l'objet de la réflexe: or les propositions générales, cy devant rapportées, sont directes, puisqu'elles tendent à un objet extérieur, et qui est en dehors de nous; car l'existence, l'action, et la pensée des autres de nous, est un objet extérieur; au contraire cette proposition, *je pense, donc je suis*, est réflexe, puisqu'elle a pour objet la pensée et l'existence, qui est en nous mêmes, et partant les propositions générales cy devant rapportées, précèdent cette proposition particulière, *je pense, donc je suis*."

[93] "Parce que les propositions générales supposent à la vérité quelques propositions singulières; mais il est certain qu'elles ne supposent pas toutes les propositions singulières: autrement les propositions générales exigeroient l'induction de toutes les particulières sans exception, ce qui est reconnu pour faux en matière nécessaire, dont il s'agit." Duhamel 1692, chap. 14.

[94] "Intellectus prius cognoscit res alias quam seipsum. Ratio est, quia cognitio directa prior est quam reflexa; intellectus autem cogniscit res alias a se directa cognitione: seipsum vero nonnisi reflexa … Intellectus prius cognoscit substantias materiales, quam immateriales et spirituales … Intellectus prius cognoscit composita substantialia, quam ipsorum partes aut differentias. Ratio est, quia cognitio confusa distinctam antecedit; ipsa autem composita cognoscuntur primo confusa cognitione, partes autem non nisi distincta … Accidentia prius cognoscuntur quam substantiae. Ratio est, quia accidentia sensibus patent ut plurimum; substantiae vero latent, nec sunt per se sensibiles, ideoque non tam cito nec tam facile cognoscibiles." Eustachius 1629, *Physica*, Pars III, Tract. 4, disp. 2, quaest. 6.

Returning to Duhamel: his point is that a single item of knowledge cannot be essentially knowledge of itself, just as a single action or passion cannot act on itself or receive itself, and a single item of knowledge cannot have two formal objects. He concludes:

> From which it follows evidently 1. that thinking, as it is understood by the Cartesians in this proposition, "I think," is not represented essentially to the understanding without a different perception. 2. I do not perceive immediately the ideas in me, but objects external or internal to my mind, according to whether my knowledge is direct or reflexive. From which it follows, finally, that if by consciousness the Cartesians understand knowledge of their knowledge, consciousness is knowledge distinct from the first [knowledge] and can no more be accomplished without an idea than the first.[95]

Régis replied selectively to Duhamel; he denied the charge that the *cogito* is a petition of principle[96] and that one cannot separate knowledge of one's existence from other knowledge.[97] Again he rejected the argument

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[95] Duhamel 1629, chap. 1. Here is Duhamel's full argument: "Parce que celuy qui connoit les autres propositions connoissoit nécessairement et essentiellement connoissance d'elle-même: or il est impossible que la même conoissance soit essentiellement conoissance d'elle-même, car en ce cas l'action agiroit sur elle-même, ou la passion recevroit d'elle-même, puisque la conoissance est une action ou une passion: or il est impossible qu'une même action ou passion indivisiblement agisse sur elle-même, ou reçoive d'elle-même; et partant la conoissance, à moins qu'elle ne soit infinie dans le genre de conoissance ne peut être conoissance, d'elle-même.

Une même conoissance ne peut avoir deux objets formels differens: or si la conoissance d'un objet extérieur étoit conoissance d'elle même, elle auroit deux objets formels differens, sçavoir l'objet extérieur directement connu, et de plus elle-même pour objet intérieur connu par réflexion; et par conséquent la conoissance d'un objet extérieur, ne peut être conoissance d'elle-même."

[96] "Il est vray que quand je dis *je connois, je pense*, ce *je* suppose mon existence, car dans le fond mon existence et ma penseé font une mesme chose; mais cela n'empesche pas que je ne puisse dire sans contradiction que dans cette proposition *je pense* ce *je* signifie la pensée avant qu'il signifie l'existence, par la raison que je connois l'existence par la pensée, et que je ne connois pas reciproquement la pensée par l'existence; ce qui suffit pour eviter une petition de principe qui consiste à prouver une chose par elle-mesme, considerée en la mesme maniere, comme je l'ai expliqué dans la reponse à la censure de la phiosophie cartesienne, chap. 2, art. 5 & 6." Régis 1692, chap. 13.

[97] "j'avouë que les idées ne sont pas moins relative essentiellement à leurs objets qu'à leurs sujets; mais avec cette difference, que la relation qu'ils ont avec leurs objets considerez entant qu'existans, n'est que contingente et accidentelle. Car il arrive souvent que nous avons des idées dont l'objet n'existe pas actuellement, et comme l'on dit *a parte rei*: au lieu que la relation de nos connoissances à leurs sujets actuellement existans est necessaire et absoluë, n'estant pas possible de concevoir, qu'une connoissance existe separée d'un sujet qui connoit actuellement, et qui est par consequent existant. Ainsi ce n'est par merveille, si voulant déduire mon existence de l'existence de mes connoissances, j'ay plûtot consideré mes coinnaissances par rapport a leur sujet, que par rapport a leur

that the *cogito* does not follow necessarily given that God can make something think and not exist while it is thinking, denying that God can do such a thing.[98] On the question of whether the *cogito* is the first proposition known, he simply referred the reader to his previous response to Huet[99] (as he did for all questions about Cartesian doubt). We should note that Descartes replied to this criticism in advance and more forcefully than did Régis. According to Descartes, there are two senses of the word principle: "It is one thing to seek for a common notion so clear and so general that it can serve as principle for proving the existence of all beings, or *entities*, that are yet to be known," such as it is impossible for the same thing to be and not to be at the same time, "and another to search for a being whose existence is better known to us than that of any other, so that it can serve as principle for our knowledge of them."[100]

The debate continued; but we do not have to continue. Rather, we should ask: what does this all signify? Are these all simply atrocious arguments from awful philosophers? Perhaps, but most of these arguments have been repeated, in some guise or another, by philosophers

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objet; puisque le rapport qu'elles ont avec celuy-cy, consideré comme existant, n'est que contingent et accidentel, et que le rapport qu'elles ont avce l'autre, est absolu et necessaire." Régis 1692, chap. 13.

[98] "Les cartesiens n'ont point étably de principe duquel il s'ensuive que Dieu puisse faire que je pense et que je ne soit pas: il est vray que j'ai dit dans la Metaphysique liv. 1, part 1., chap. 13. qu'il n'y a point d'impossibilité avant le decret de Dieu, mais cela ne veut pas dire que Dieu puisse faire les choses absolument impossibles, comme, *que je pense et que je ne suis pas, tandis que je pense*; car au contraire c'est par là que j'ai prouvé qu'il ne les peut pas faire, parce que s'il les pouvait faire, il se pourrait contredire; ce qui repugne à l'idée d'un estre parfait." Régis 1692, chap. 13.

[99] "Comme les raisons que M. du Hamel; apporte pour prouver que cette proposition: *je pense, donc je suis*, n'est pas la premiere proposition, sont les mesmes que l'Auteur de la Censure de la philosophie Cartésienne a proposées dans le 7 art. du 1. chap. M. du Hamel nous premettra de la renvoyer à la Réponse qui a esté faite sur cet article." Régis 1692, chap. 18.

[100] *To Clerselier*, June or July 1646, AT IV, 444–445. Descartes continues: "In the first sense, it can be said that *it is impossible for the same thing to be and not to be at the same time*, is a principle. It can serve, in general, not strictly to make known the existence of anything, but only to bring it about that, when we know it, we confirm its truth by such reasoning: It is impossible that what is, is not; and I know that a certain thing is; hence I know that it is impossible for it not to be. This has very little importance and does not make us any the wiser. In the other sense, the first principle is that our soul exists, since there is nothing whose existence is better known to us." We should note that the argument is not lost on all seventeenth century authors; see the *Metaphysica* of Nicholas Lenfant, as reported by Jacob Schmutz, in 2008, pp. 423–424.

in the twentieth century. More importantly, we should recognize that these scholastic philosophers are issuing the same basic set of arguments, whether we are dealing with the inquisitors of Angers, Huet, or Duhamel. All these critics reject the *cogito* because they think of it as a bad argument: it is an enthymeme or it begs the question. None of them can bring themselves to think of the *cogito* as the first principle of knowledge. It just does not look like a first principle; it requires other knowledge (or premises) that themselves look more like first principles. None of them can think of the *cogito* as the simple intuition of one's existence, a moment in the process of doubt.

If one steps back for a moment, one finds out that these critics have something else in common. Though not in exactly the same way, all of them reject the method of doubt as a path to certainty. We have already cited the Anger dismissal of Cartesian doubt—it leads to atheism or at least to heresy—and Bourdin is legendary for having written the lengthiest set of Objections,[101] most of which is directed against the method of doubt: "The method is faulty in its principles … in the implements it uses … because it is deficient … The method goes astray by failing to reach its goal … by being excessive … through negligence … willfully," etc.[102] Duhamel's rejection of the method of doubt is exemplary:

> The Cartesians pretend to distinguish themselves from the Pyrrhonists in that they do not want to doubt for the sake of doubting, but to be certain, after a sufficient examination, of things about which they have doubts; instead the Pyrrhonists doubt for the sake of doubting, without ever being certain of anything.
>
> But it is clear that, once one doubts everything seriously and effectively, it is impossible to be certain of anything, whatever examination one might conduct, because, if one could be certain of something after such a serious doubt, it would be only by the evidence of the thing, since there is no other rule of human certainty other than the evidence of the thing, according to the Cartesians; now we suppose that they seriously doubt the most evident things, even their own thought and their own existence, and that consequently, it is clear that, after such a general and serious doubt, it would be impossible to be certain of anything, whatever examination one might conduct.
>
> That is why the Cartesians are to be distinguished from the Pyrrhonists in that they do not reason soundly when they say that after a general doubt

[101] Other than Gassendi's separately published *Disquisitio Metaphysica*. For more on Bourdin's *Seventh Objections*, see Ariew 1994 and 1995.

[102] AT VII, 527–536; CSM II, 358–365. See Ariew 1995.

> one can be certain of something, whereas the Pyrrhonists reason soundly and in conformity with their principles when they say that we cannot be certain of anything after having doubted everything.[103]

Huet, in contrast, rejects the method of doubt because he *is* a genuine skeptic, and would rather just wallow in doubt; yet he echoes a similar sentiment:

> Descartes and the skeptics believed that we must doubt; but Descartes stopped doubting when it was most necessary to doubt, namely with this principle, *I think, therefore I am*, which is not any less uncertain than all the other things that led him to doubt. The Skeptics continue to doubt this principle and believe that they have many reasons to doubt it. Descartes could not have reproached them if he knew their reason, which is that nothing appears clear enough to them to be admitted as true.[104]

However, without the method of doubt, the *cogito* becomes just another argument—and a mediocre one at that. In general, what is being criticized by all these scholars is the argument from Discourse IV, "I think, therefore I am," rather than the pronouncement of Meditation II: "this proposition, *I am*, *I exist*, is necessarily true whenever it is put forward by me or conceived in my mind."[105]

It does seem that the method of doubt and the *cogito* go hand in hand. The seventeenth-century scholastics who reject it reject the *cogito* as well.[106] And, of course, a real skeptic who embraces genuine doubt

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[103] Duhamel 1692, chap. 4; see also chapters 1–3.

[104] Huet 1689, chap. I, art. 14.

[105] AT VII, 25; CSM II, 17.

[106] Some Cartesians also rejected the method of doubt and modified—one could even say rejected—the *cogito* as well. Tad Schmaltz in his *Radical Cartesians* (2002) depicts the views of Robert Desgabets and Regis (propounding his own views) as defending three principal, ostensibly non-Cartesian theses: 1) the "indefectibility" or indestructibility of matter, 2) realism about the representative contents of ideas, and 3) a tight union of mind and body such that even pure thoughts require bodily processes. Adopting these theses undermined other Cartesian doctrines as well. As a consequence, they abandon the method of doubt, adopt fallibilism and a kind of empiricism, and reinterpret the *cogito*; they reject the proposition that the mind is better known than the body. Desgabets argues that "since the idea we have of our soul is only a representation, and if every idea did not necessarily have an existing object, then we could not conclude that we exist from the fact that we have an idea of ourselves, even when we have one." (*Réponse … touchant l'être objectif*, Desgabets 1985, p. 303) The *cogito* could only prove that I am an objective being, not that I am a substance. You can find similar views in Malebranche's *Search After Truth* III.II.7 (2006,

would reject the *method* of doubt (as the ability to examine things one doubts, even the most evident things, and become certain about them). Such a skeptic, Huet for example, would naturally also reject the *cogito*. Ultimately, the case of Huet should prevent us from speaking too readily of a crucial divide between scholastics, with their metaphysico-theological leanings, and moderns, with their interest in doubt and self-awareness. But we already knew that such a dichotomy would be simplistic, since many of the figures we count as moderns share what we perceive as the scholastics' metaphysico-theological leanings. We rank Leibniz and Spinoza as modern. They were endlessly fascinated and repelled by Descartes' philosophy, but, as we have said, they were not much interested in doubt and the *cogito*.[107]

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vol. I, pp. 463–469) and with Malebranchistes such as François de Lanion (see Lanion 2009); see also the discussion of the *cogito* by the Oratorian, Bernard Lamy, in chap. 9.

[107] For Leibniz on the *cogito*, see notes 81 and 93 above. There is the following interesting representation of the *cogito* in Spinoza's *Descartes' Principles of Philosophy*, Prolegomena:

> In whatever direction Descartes turns in order to doubt, he is forced to exclaim, "*I doubt, I think, therefore I am*." This truth discovered, he finds at the same time the foundations of all the sciences as well as the measure and rule of all other truths, namely: *whatever is as clearly and distinctly perceived as this is true*. That there can be no other foundation of the sciences than this, is more than sufficiently evident from the preceding. For we can call all the rest in doubt with no difficulty, but we cannot doubt this in any way. Concerning this principle, *I doubt, I think, therefore I am*, it should be noted in the first place that it is not a syllogism in which the major premise is omitted. If it were, the premises ought to be clearer and better known than the conclusion, "*therefore I am*." And if this were so, "*I am*" would not be the first foundation of all knowledge. Moreover, it would not be a certain conclusion, for its truth depends upon universal premises which the author had called in question. Therefore "*I think, therefore I am*" is a single proposition equivalent to "*I am thinking*."

For a discussion of the issue of Descartes' modernity, ancients and moderns, see Tom Sorell "Descartes' Modernity," in Cottingham 1994, pp. 29–47, and Des Chene 1995.

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