

POLITICS IN HOBBS' MECHANICS:

A CASE STUDY IN THE SOCIOLOGY OF SCIENTIFIC KNOWLEDGE

by

William T. Lynch

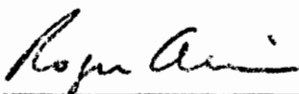
Thesis submitted to the Faculty of the  
Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE


in

Science and Technology Studies

APPROVED:



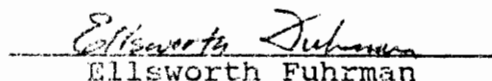
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Science and Technology Studies

(ABSTRACT)

A case study in the sociology of scientific knowledge is presented involving an examination of the development of Thomas Hobbes' mechanics in light of Hobbes' political views and the political context. Hobbes provides a good subject for research in the sociology of scientific knowledge for at least two reasons. First, Hobbes is a good case for examining the interaction between science and the broader political context. Given the controversial nature of Hobbes' political writings (supposedly grounded in his mechanics and aimed at resolving contemporary political problems), the possibility that political considerations entered into the production and reception of Hobbes' mechanics deserves attention. Second, applying new perspectives in the sociology of scientific knowledge can be shown to provide an unexpected payoff in helping resolve persistent disputes among intellectual and political historians regarding the interpretation of Hobbes' work. Specifically, a number of confusions about the relationship between Hobbes' political philosophy and his mechanical philosophy can be cleared up by

recognizing that his political views may have influenced his mechanics. The perspective of a general sociology of scientific knowledge provides an appropriate tool for overcoming the reluctance of many political and intellectual historians to examine the social roots of a scientific theory. Hobbes' goal of providing a political philosophy to resolve political turmoil, within the context of Hobbes' participation in discussions on mechanics and mechanical philosophy, resulted in the particular mechanical approach Hobbes embraced.

### ACKNOWLEDGEMENTS

I would like to thank my thesis committee for their support and for their help in narrowing down a large topic to a manageable level and for encouraging me to clarify the argument presented. Gary Downey, Moti Feingold, Skip Fuhrman, Bob Paterson, and especially my committee chair Roger Ariew have contributed immensely toward my continuing development in the field of science and technology studies. The positive environment for fruitful interdisciplinary work at the Center for the Study of Science in Society is an encouraging sign that the academic world need not be a collection of isolated and mutually irrelevant disciplines. A number of other faculty members affiliated with the Center have contributed in one way or another to this work. Explicit mention should be made of Alan Gabbey's help with an early paper on Hobbes and David Lux's helpful comments on proposal drafts. I also benefitted from discussion with Steve Fuller and look forward to his input on my Ph.D. committee. My graduate student colleagues have also contributed greatly to my intellectual development. I would especially like to thank Maarten Heyboer and Adam Serchuk both for their friendship and for their refusal to allow me to get away with indefensible assertions and vaguely formulated sophisms. I consider this thesis part of an ongoing dialogue with them, one that comes close to an ideal speech situation.

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## INTRODUCTION

This thesis applies the insights of a general sociology of scientific knowledge to the study of the development of Hobbes' mechanics. The development of approaches in the sociology of knowledge that do not exempt scientific knowledge from sociological scrutiny is outlined in Chapter One. It is argued that historical research can benefit from a greater attention to the social nature of scientific knowledge. Chapter Two concerns itself with applying the insights of this approach to a critique of the historiography of Hobbes. Political and intellectual historians are found to have systematically ignored the possibility that the content of science can be influenced by social or political factors. Historians who have addressed themselves to the relationship between Hobbes' natural philosophy and his political philosophy have generally argued either for a relationship where the natural philosophy forms the basis of the political philosophy or they have argued that there is no connection. The possibility that Hobbes' mechanical thought might itself be rooted in political considerations has not been systematically addressed.

The perspective of a general sociology of scientific knowledge provides an appropriate tool for overcoming the reluctance of many political and intellectual historians to examine the social roots of a scientific theory. It will be argued that Hobbes' goal of providing a complete philosophy

to resolve political turmoil influenced the particular form of mechanics that Hobbes would embrace. Chapter Three will discuss Hobbes' mature mechanical system in light of the general background of available positions on natural philosophy. Chapter 4 will detail the actual development of Hobbes' mechanics in light of his political and social context. This development will reveal an ongoing concern by Hobbes to eliminate the politically pathological effects of both logical absurdities in natural philosophy and political injuries in society. Descartes' approach to natural philosophy and other natural philosophical approaches are criticized by Hobbes for their tendency to undermine the natural reason that would ensure the maintenance of civil order. The position Hobbes comes up with to counter these approaches depends on this political critique and its application to ongoing natural philosophical discussions.

## Chapter One:

### The Development of an Empirical Sociology of Scientific Knowledge

The development of a systematic empirical sociology of scientific knowledge is generally considered to have begun in the 1970s, when a number of varying approaches began to treat scientific knowledge as fully subject to sociological explanation.<sup>1</sup> While the novelty and fruitfulness of these programs have been occasionally called into doubt,<sup>2</sup> the growing body of empirical literature treating scientific knowledge from a sociological perspective and the overcoming (or abandonment) of concerns over a priori objections to a comprehensive sociology of scientific knowledge may justify the claim to a "revolution" in the sociology of knowledge.<sup>3</sup>

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<sup>1</sup> See Karin D. Knorr-Cetina and Michael Mulkay, "Introduction: Emerging Principles in Social Studies of Science" in Knorr-Cetina and Mulkay (eds.), Science Observed: Perspectives on the Social Study of Science (Bristol: J.W. Arrowsmith, 1983), 1-17.

<sup>2</sup> Thomas F. Gieryn, "Relativist/Constructivist Programmes in the Sociology of Science: Redundance and Retreat," Social Studies of Science, 12 (1982), 279-97.

<sup>3</sup> For a summary of empirical evidence for the fruitfulness of a comprehensive sociology of scientific knowledge, see Steven Shapin, "History of Science and its Sociological Reconstructions," History of Science, 20 (1982), 157-211. Certain a priori objections still seem to occupy the attention of a certain segment of the philosophical community. See for example Larry Laudan's argument for an "arationality assumption" which would limit the scope of the sociology of scientific knowledge to explaining irrational episodes [Progress and Its Problems: Towards a Theory of Scientific Growth (Berkeley: University of California Press, 1977), pp.196-222; see also "The Pseudo-Science of Science?," Philosophy of the Social Sciences, 11 (1981), 173-98.]. For

As is the case with most revolutions, however, an adequate understanding of the state of the field and the nature of this "revolution" requires some understanding of the historical issues and concerns of the sociology of knowledge. "Revolutions" are perhaps more accurately understood as resulting from unmonitored developments taking place over a broader expanse of time than from any sudden, unprecedented "gestalt" shift.<sup>4</sup> This chapter will therefore discuss some of the main issues that have concerned the sociology of knowledge throughout its history insofar as they contribute towards articulating a tentative research agenda involving historical studies of scientific episodes. Given the vast amount of literature on the sociology of knowledge, the

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criticisms, see David Bloor, "The Strengths of the Strong Programme," Philosophy of the Social Sciences, 11 (1981), 199-213.

<sup>4</sup> Kuhn is typically attributed with putting forth an instantaneous change view of scientific revolutions. See for example Larry Laudan's criticisms in Science and Values: The Aims of Science and Their Role in Scientific Debate (Berkeley: University of California Press, 1984), pp.67-102. Laudan's criticisms may not be based on an accurate reading of Kuhn and also tend to conflate issues of continuity with issues concerning rationality and incommensurability. For a discussion of incommensurable revolutions as resulting from systematic miscommunication over an extended period of time, see Steve Fuller, Social Epistemology (Bloomington: Indiana University Press, 1988). It is interesting in this regard that Robert Merton identified a "Copernican revolution" in the sociology of knowledge as early as 1945, which, while not emphasizing applications to science, recognized the need for an approach that recognized "that not only error or illusion or unauthenticated belief but also the discovery of truth was socially (historically) conditioned" [The Sociology of Science: Theoretical and Empirical Investigations (Chicago: University of Chicago Press, 1973), p.11].

discussion will be necessarily selective and aimed at justifying the viability and fruitfulness of such historical case studies.

The term Wissenssoziologie, roughly translated as "sociology of knowledge," was used by Max Scheler in the early 1920s, and picked up by Karl Mannheim, becoming a specialty in sociology.<sup>5</sup> Before this time, however, the issues and concerns of the sociology of knowledge had been addressed by the classical sociologists. Marx, Durkheim, Weber, and others sought to treat in a systematic fashion the relationship between knowledge and social structure.<sup>6</sup> A number of diverse sources are considered to have contributed to the suspicion of the nature of intellectual products that forms the basis of the sociology of knowledge.<sup>7</sup> Of particular relevance is the rise of the concept of ideology. The term was first used by Destutt de Tracy and the "ideologues" in the aftermath of the French Revolution to designate a proposed science of ideas which would form the basis of all other sciences. The basis of this science was

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<sup>5</sup> Nico Stehr and Volker Meja, "Introduction: The Development of the Sociology of Knowledge" in Stehr and Meja (eds.), Society and Knowledge: Contemporary Perspectives in the Sociology of Knowledge (New Brunswick: Transaction Books, 1984), pp.3, 1.

<sup>6</sup> P. Hamilton, Knowledge and Social Structure (London: Routledge and Kegan Paul, 1974).

<sup>7</sup> Gunter W. Remmling, Road to Suspicion: A Study of Modern Mentality and the Sociology of Knowledge (New York: Appleton-Century-Crofts, 1967), pp.5-6.

to reject any concept of innate ideas in order that "[a] rational investigation of the origin of ideas, free from religious or metaphysical prejudice, would be the foundation of a just and happy society."<sup>8</sup> The term took on a pejorative connotation when Napoleon blamed his retreat from Moscow on that "cloudy metaphysics."<sup>9</sup>

The tradition of German idealism also was concerned with a critique of religion. Developing the thought of Hegel, Ludwig Feuerbach and other left-wing Hegelians developed a critique of religion as human alienation. In the work of Marx, these two traditions come together to form a robust concept of ideology that is more appropriately considered sociological. Larrain has argued that "[w]hen Marx finally came up with a general concept of ideology which subsumes not only religion but all forms of distorted consciousness within itself, he not only emphasized a negative connotation but also added to its critical force by introducing a new crucial element in its definition - the reference to historical contradictions in society."<sup>10</sup> Marx's innovation involved emphasizing that a critique of ideology ought to identify actual contradictions existing in the social world rather

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<sup>8</sup> David McLellan, Ideology (Minneapolis: University of Minnesota Press, 1986), p.6.

<sup>9</sup> Ibid.

<sup>10</sup> Jorge Larrain, The Concept of Ideology (London: Hutchinson & Co., 1979), p.33.

than engaging simply in an idealist critique.<sup>11</sup> The Marxist tradition has generally argued that the political and intellectual history of a particular epoch is built upon the peculiarities of the economic means of production and the social organization needed to organize it. The type of knowledge produced in a given society, according to this view depends on the social and economic means of production. Only with the arrival of a classless society brought about by the proletariat would knowledge avoid the distortions of ideology.<sup>12</sup>

The next stage in the development of the sociology of knowledge was its establishment as a distinct specialty in the social sciences. Beginning with Durkheim, Levy-Bruhl, and Mauss in France, the study of knowledge in sociological terms was carried out in a manner that largely divorced itself from any political program. Since this time, the sociology of knowledge has often been held to have

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<sup>11</sup> Karl Marx, "The Poverty of Philosophy" in Karl Marx and Frederick Engels, Collected Works, 50 volumes planned, (New York: International Publishers, 1975- ), 6 (1976), 105-212.

<sup>12</sup> Two distinct concepts of ideology can be distinguished here. On the one hand, ideology can be considered as opposed to science or justified knowledge; on the other hand, ideology can be related to the social interests that are served by the intellectual product in question. Engel's concept of "false consciousness" reveals an equivocation between these two concepts depending upon whether "false" is taken to contrast with true propositions or one's "true" interests. See Anthony Giddens, Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis (Berkeley: University of California Press, 1979), p.168.

implications for epistemological questions. Two basic approaches have been taken in the sociology of knowledge regarding its relationship with epistemology. One approach has been concerned with separating 'knowledge' from mere 'belief'. Such positivistic approaches, such as traditional Marxist approaches, sought to describe the means for avoiding ideological distortion. The anti-positivist approach, on the other hand, has tended to conflate 'knowledge' and 'belief'.<sup>13</sup>

Some elements of this anti-positivist approach emerge in Durkheim and Mauss' study of primitive classifications.<sup>14</sup> According to Durkheim and Mauss, the classification of the natural world in primitive cultures reproduces social classifications: "Far from it being the case ... that the social relations of men are based on logical relations between things, in reality it is the former which have provided the prototype for the latter."<sup>15</sup> According to this perspective, real social facts external to the individual are

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<sup>13</sup> Hamilton, Knowledge and Social Structure, pp.viii-ix.

<sup>14</sup> Emile Durkheim and Marcel Mauss, Primitive Classification (Chicago: University of Chicago Press, 1963). Durkheim and Mauss have been influential in the new sociology of scientific knowledge since they are not concerned with separating science and ideology. See David Bloor, "Durkheim and Mauss Revisited: Classification and the Sociology of Knowledge," Studies in History and Philosophy of Science, 13 (1982), 267-97.

<sup>15</sup> Ibid., p.82.

coercive in imposing themselves on the individual.<sup>16</sup> Their methodology is starkly empiricist so that their conclusions about primitive classifications are not applied reflexively to their own analysis.<sup>17</sup>

A concern with social chaos provides the foundation of other elements of the sociology of knowledge that advocate a positivist approach to the social, rather than the natural, world as the basis of science.<sup>18</sup> The paradigmatic case is the sociology of knowledge developed by Max Scheler, who first used the term Wissenssoziologie. In the post-World War I Weimar Germany environment, Scheler attacked the "cult of science," arguing that the sociology of knowledge should serve as the "foundation of all cultural politics" in order to enable resolution of the many ideological conflicts current in that social environment.<sup>19</sup> Scheler proposed that thought was determined by a combination of intellectual and material factors, in order to bring about a compromise between an understanding of cognition as socially rooted and a commitment to the existence of a realm of ideas independent

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<sup>16</sup> Hamilton, Knowledge and Social Structure, p.106.

<sup>17</sup> Hence, Durkheim, The Rules of Sociological Method (Glencoe: The Free Press of Glencoe, 1938), p.144, demonstrates "how the sociologist has to disregard the preconceptions which he had of facts, in order to face the facts themselves; [and] how he has to discriminate among them according to their most objective characteristics."

<sup>18</sup> Hamilton, Knowledge and Social Structure, p.75.

<sup>19</sup> Ibid., p.75.

of their social manifestation.<sup>20</sup> His distinction between Realfaktoren and Idealfaktoren represents his appropriation of the Marxist distinction between economic base and cultural superstructure, particularly as it was developed by Lukacs.<sup>21</sup> Unlike Lukacs, however, Scheler held that different "real factors" form the basis of knowledge and culture in different historical periods.<sup>22</sup>

Karl Mannheim was another non-Marxist in Weimar Germany influenced by Marxism and concerned with overcoming violent ideological conflict. Unlike Scheler, Mannheim put forth a comprehensive sociology of knowledge that did not hold to a transcendental or universal notion of truth - the truth-content of all ideas was to be related to their social contexts. Nevertheless, Mannheim sought to avoid the tendency towards nihilism in such a relativistic approach, by allowing that mathematical and scientific knowledge could attain a general validity and by arguing that social knowledge with a general validity could be obtained by the mediation of a relatively classless "free-floating intelligentsia." Mannheim's concern with the violent ideological conflicts in Weimar Germany following World War I led him to propose that classless intelligentsia could provide for a "science of politics" to mediate between

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<sup>20</sup> Ibid., p.76.

<sup>21</sup> Ibid., p.78.

<sup>22</sup> Stehr and Meja, "Introduction," p.3.

political blocs. Mannheim criticizes Marxist sociologists of knowledge such as Lukacs for failing to distinguish between "the problem of unmasking ideologies on the one hand and the sociology of knowledge on the other."<sup>23</sup> Although Mannheim contributed towards making the sociology of knowledge more than just a sociology of error, his critiques of formalistic, abstract epistemologies nevertheless remain non-empirical and philosophical in method. In addition to accusations of relativism, Mannheim has been accused of failing to clarify the connections between thought and society, in particular the imputation of analyzed thought structures to particular groups.<sup>24</sup>

Berger and Luckmann have put forth an approach that has more thoroughly conflated knowledge and belief, separating itself from all epistemic questions, while building upon the phenomenology of Schutz and Husserl.<sup>25</sup> This approach emphasizes the common sense construction of everyday reality.<sup>26</sup> In The Social Construction of Reality, Berger and Luckmann explicitly abandon the problem of ideology, arguing that the task of the sociology of knowledge should not be

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<sup>23</sup> Karl Mannheim, Ideology and Utopia: An Introduction to the Sociology of Knowledge (New York: Harcourt Brace and Company, 1936), p.310.

<sup>24</sup> Merton, Sociology of Science, p.31.

<sup>25</sup> See for example Alfred Schutz, The Phenomenology of the Social World (Northwestern University Press, 1967).

<sup>26</sup> Hamilton, Knowledge and Social Structure, p.135.

organized around the task of avoiding error, but should systematically study how reality comes to be constructed by the everyday activity of ordinary people. They go beyond Mannheim's criticisms of "debunking-style" sociology of knowledge in arguing for a thoroughgoing sociology of truth, rather than a sociology of error. Rather than focusing on epistemological questions theoretically and intellectual history empirically, Berger and Luckmann focus attention on the ways in which individual actors negotiate and construct the features of their everyday reality. This approach abandons the search for a transcendental framework, being unconcerned with Scheler and Mannheim's search for a generally valid social knowledge. For Berger and Luckmann, "[t]he sociology of knowledge must concern itself with everything that passes for "knowledge" in society."<sup>27</sup> Approaches related to this emphasizing the social construction of scientific knowledge at the micro-level of the scientific laboratory have been an important part of the new sociology of scientific knowledge beginning in the 1970s.<sup>28</sup>

Another tradition in the sociology of knowledge that has

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<sup>27</sup> Peter L. Berger and Thomas Luckmann, The Social Construction of Reality (New York: Anchor Books, 1966), pp.14-15.

<sup>28</sup> See for example Bruno Latour and Steve Woolgar, Laboratory Life: The Construction of Scientific Facts (Princeton: Princeton University Press, 1986); and Karin D. Knorr-Cetina, The Manufacture of Knowledge (Oxford: Pergamon, 1981).

been influential in this new sociology of scientific knowledge is what has been termed the Frankfurt school. This approach grew out of Marxism and is represented by the thought of Horkheimer, Adorno, Marcuse, and Habermas. In particular, Habermas has been influential in adapting Marxism "as a critique of ideology, rather than a positive science."<sup>29</sup> According to Habermas, interests are always implicated in knowledge claims. The sciences generally do not reflect on their knowledge-constitutive interests, and this has allowed them to proceed with more confidence--"False consciousness has a protective function. For the sciences lack the means of dealing with the risks that appear once the connection of knowledge and human interest has been comprehended on the level of self-reflection."<sup>30</sup> When the myth of objectivism is exposed, there is the danger of such pathologies as fascist national physics and Soviet Marxist genetics. Nevertheless, Habermas argues that the objectivist illusion itself has its dangers, for it "lends countenance to the substitution of technology for enlightened action."<sup>31</sup> Objectivism is to be eliminated, then, not by a new and better theory, but rather by exposing what theory seeks to disguise--the connection between knowledge and interest.

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<sup>29</sup> Hamilton, Knowledge and Social Structure, p.60.

<sup>30</sup> Jurgen Habermas, Knowledge and Human Interests (Boston: Beacon Press, 1971), p.315.

<sup>31</sup> Ibid., p.316.

Interests are constitutive of knowledge, and cannot be separated, since cognition is inseparable from practical concern and fact is inseparable from value. There are three basic types of interests underlying knowledge corresponding to the three types of sciences: "The approach of the empirical-analytic sciences incorporates a technical cognitive interest; that of the historical-hermeneutic sciences incorporates a practical one; and the approach of critically oriented sciences incorporates [an] emancipatory cognitive interest."<sup>32</sup>

In the 1970s, scientific knowledge began to be subjected to systematic scrutiny in a way that did not exempt "true" or "rational" scientific knowledge from sociological inquiry. Although some work had been done before this time in treating scientific knowledge as growing out of social or economic causes, most notably by Marxists, this work was not systematically developed, nor were the implications for the nature of knowledge discussed. The work of Boris Hessen and J. D. Bernal discussed the development of modern science in terms of the economic base of modern capitalism.<sup>33</sup> The implication of such Marxist studies was generally taken to be that capitalism fundamentally distorted such knowledge, and

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<sup>32</sup> Ibid., p.308.

<sup>33</sup> B. Hessen, "The Social and Economic Roots of Newton's Principia" in Bukharin, N. et al. (eds.), Science at the Crossroads (London: Kniga, 1931); and J.D. Bernal, Science in History, 4 vols., (Cambridge: M.I.T. Press, 1971).

that this would be rectified in a socialist society. The picture of true knowledge as escaping social contamination remained; hence, systematic study of the ineradicably social character of knowledge was not developed.

Even though more sophisticated positions can be gleaned from previous writers, such as Marx and Mannheim, it is not clear that they consistently put forth such views and certainly they remained largely undeveloped by their followers. Even the Frankfurt school tended to accept certain conceptions of science that have been questioned, as can be seen in Habermas' discussion of an ideal speech situation as the goal of non-coercive knowledge.<sup>34</sup> Such a goal appears to accept that ideal knowledge should escape the fray of competing social interests.<sup>35</sup> Even though anti-positivistic sociologies of knowledge treated knowledge independently of the truth or falsity of the belief, they tended to either focus on common-sense, everyday knowledge or they deferred such questions to the traditional epistemologist.<sup>36</sup> By contrast, the new sociology of scientific knowledge has not deferred to the authority of the

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<sup>34</sup> Jurgen Habermas, Legitimation Crisis (Boston: Beacon Press, 1975), p.108.

<sup>35</sup> As Giddens, Central Problems, p.176, notes, Habermas and Mannheim "share an underlying similarity of orientation: each counterposes the study of ideology to the possibility of attaining consensus untainted by ideological distortions."

<sup>36</sup> See Berger and Luckmann, Social Construction, for the first and Merton, Sociology of Science, pp.7-40, for the second.

philosopher with regard to epistemic issues, but has instead increasingly called into question the legitimacy of the philosophical approach to the understanding of scientific knowledge.<sup>37</sup>

Ironically, it was developments in the philosophy of science that sparked much of this new sociology of scientific knowledge. Thomas Kuhn has been typically credited with undermining the logical positivist approach to the philosophy of science with The Structure of Scientific Revolutions.<sup>38</sup> Whereas the logical positivists aimed to outline a theory-

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<sup>37</sup> See for example Bloor, "Strengths of the Strong Programme"; discussions in James Robert Brown (ed.), Scientific Rationality: The Sociological Turn (Dordrecht: D. Reidel, 1984); and Bruno Latour, "The Author Responds: Latour to Oldroyd," Social Epistemology, 1 (1987), 347-52. Works like Steven Shapin and Simon Schaffer, Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life (Princeton: Princeton University Press, 1985) have called into question whether the losers in scientific disputes can be appropriately characterized as less rational. For a philosopher's response to the sociological challenge that misconstrues the new sociology of knowledge as aiming to demonstrate the irrationality of science, see Gary Gutting, "The Strong Programme: A Dialogue" in Brown (ed.), Scientific Rationality, 95-111. The confusions in this article are pointed out by Barry Barnes, "Problems of Intelligibility and Paradigm Instances" in Brown (ed.), Scientific Rationality, 113-25. For a philosopher that has developed a perspective that incorporates the contributions of the new sociology of scientific knowledge, abandoning many of the traditional concerns and approaches of the philosophy of science, see Fuller, Social Epistemology.

<sup>38</sup> Thomas S. Kuhn, The Structure of Scientific Revolutions (Chicago: University of Chicago Press, 1970). Note also the contributions of N.R. Hanson, Patterns of Discovery (Cambridge: Cambridge University Press, 1958); Stephen Toulmin, Foresight and Understanding (Bloomington: Indiana University Press, 1961); and W.V.O. Quine, "Two Dogmas of Empiricism" in From a Logical Point of View (Cambridge, Ma.: Harvard University Press, 1953).

neutral observation language, Kuhn argued that observations are always theory-laden, since the practice of science depends on the existence of a paradigm that structured the work of "normal science." Paradigms, built up from exemplars of a new, fruitful approach to the domain in question, may be displaced when anomalies prompt the construction of an alternative paradigm. Kuhn argued that the choice between paradigms could not be reduced to any kind of formal set of rules or a neutral observation language; indeed, competing paradigms were held to be radically incommensurable with each other, constituting distinct worldviews. A scientific revolution took place when one paradigm was abandoned and replaced with another, even though the new paradigm could not be shown to be superior to the old in accounting for empirical data.<sup>39</sup>

Needless to say, these claims were hotly disputed; Kuhn distanced himself from many of his claims as the result of criticism.<sup>40</sup> Nevertheless, in trying to preserve some comparability between competing perspectives and grounds for assessing the rationality of science, many critics of Kuhn actually accepted much of Kuhn's account. Lakatos and

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<sup>39</sup> Ibid.

<sup>40</sup> See Thomas S. Kuhn, The Essential Tension: Selected Studies in Scientific Tradition and Change (Chicago: University of Chicago Press, 1977), pp.293-319. For discussions of Kuhn's theory see Imre Lakatos and Alan Musgrave (eds.), Criticism and the Growth of Knowledge (Cambridge: Cambridge University Press, 1970).

Laudan, for instance, accepted that scientists work out of "research programmes" or "research traditions" that structure observation and theory choice while denying that radical incomparability results.<sup>41</sup> Other philosophers, most notably Paul Feyerabend, began to extend Kuhn's critique of traditional philosophy of science, arguing that science could not be characterized by any single method that would hold for all times and places and that resorting to propaganda to subvert a superior program might even be rational in order to overcome an entrenched observation language.<sup>42</sup>

The unintended consequence of these developments in philosophy of science was that sociologists began to claim a license to treat all scientific knowledge as subject to sociological explanation. The appropriation of the concepts of the theory-ladenness of observation and the underdetermination of fact by theory (the so-called "Duhem-Quine thesis") by sociologists set the stage for a thorough-going sociology of scientific knowledge.<sup>43</sup>

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<sup>41</sup> Imre Lakatos, "Falsification and the Methodology of Scientific Research Programmes" in Lakatos and Musgrave (eds.), Criticism, 91-195; Laudan, Progress and Its Problems.

<sup>42</sup> Paul Feyerabend, Against Method (London: New Left Books, 1977).

<sup>43</sup> See discussion in Knorr-Cetina and Mulkay, "Introduction." The "Duhem-Quine thesis" has become a label encompassing more than Duhem or Quine intended (and they intended very different things). See Roger Ariew, "The Duhem Thesis," British Journal of the Philosophy of Science, 35 (1984), 313-25. Larry Laudan, "Pseudo-Science," points out that the underdetermination of theory by observation does not imply that social elements are needed to achieve consensus.

One of the most influential approaches in this new sociology of science is the Edinburgh school, or "strong programme," in the sociology of knowledge.<sup>44</sup> The strong programme is characterized by four requirements that an adequate sociology of knowledge must meet: 1) causal accounts of belief must be sought, 2) the analysis is to be impartial with respect to the truth or falsity of the beliefs explained, 3) the same types of causes are to explain both types of belief, and 4) the analysis must be reflexive in applying to the explanation of the investigator's beliefs as well.<sup>45</sup> The strong programme investigator generally seeks to explain scientific knowledge and behavior in terms of the "interests" underlying them.

Although the suggestion that all knowledge should be subject to sociological explanation has been widely adopted in the new sociology of scientific knowledge, a number of

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However, the legitimacy of the social-cognitive distinction has been increasingly called into question by sociologists--see for example David Bloor, "The Sociology of Reasons: Or Why "Epistemic Factors" are Really "Social Factors" " in Brown (ed.), Scientific Rationality (1984), 293-324. Even if such a distinction is maintained, the concept of underdetermination allows for the possibility of social elements being implicated in even true scientific claims.

<sup>44</sup> Barry Barnes, Interests and The Growth of Knowledge (London: Routledge & Kegan Paul, 1977); D.C. Bloor, Knowledge and Social Imagery (London: Routledge & Kegan Paul, 1976); David Bloor, "Wittgenstein and Mannheim on the Sociology of Mathematics," Studies in History and Philosophy of Science, 4 (1973), 173-91.

<sup>45</sup> Bloor, Knowledge and Social Imagery (London: Routledge and Kegan Paul, 1976), pp.4-5.

criticisms of the strong programme have been made, particularly with respect to the use of the concept of "interests." Woolgar has argued that serious deficiencies exist in the explanatory ability of "interests" - the explication of such "interests" has proceeded unreflexively despite admonitions to engage in reflexive analysis.<sup>46</sup> Chubin and Restivo have criticized the tendency to claim that description should proceed with "impartiality" and "symmetry," while charging that others act in accordance with their interests, all while claiming a reflexive approach.<sup>47</sup> It will shortly be seen that this concern with the issue of reflexivity (i.e. applying sociological analysis to one's own explanations) has resulted in challenges to the appropriateness of traditional causal analysis in general; for now, the issue of the explanatory value of interests is at issue.

Callon and Law contrast the naturalism of the Edinburgh school with Woolgar's (and the ethnomethodologist's) preoccupation with reflexivity, and find both wanting. Noting with Woolgar that scientists themselves use imputations of "interest" in their rhetorical work, Callon and Law do not wish to limit themselves to discussing how

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<sup>46</sup> Steve Woolgar, "Interests and Explanation in the Social Study of Science," Social Studies of Science, 11 (1981), 356-94.

<sup>47</sup> Daryl E. Chubin and Sal Restivo, "The 'Mooting' of Science Studies: Research Programmes and Science Policy" in Knorr-Cetina and Mulkey (eds.), Science Observed, 53-83.

scientists impute interests to one another. Unlike Barnes, Callon and Law do not take interests as stabilized categories to be used by the sociologist to explain actions; rather, they "are concerned with the manipulation and transformation of interests, since [they] see all social interests as temporarily stabilized outcomes of previous processes of enrolment."<sup>48</sup> Interests are then seen not just as a way to organize and structure the empirical material, but are part of an active process by which the actor tries to impose order on the social world.

Although the scientific actor is continually imputing interests, it does not follow that all that can be discussed is the actor's use of interest talk, as Woolgar argues. Wallis and Bruce have argued that "accounts are hypothetical and susceptible to evaluation in ways which are at least as good as, even if they are not radically superior to, those of commonsense."<sup>49</sup> Developing this theme, a fruitful sociology of knowledge should recognize that actors are quite capable of rationalization of their own behavior and a failure to comprehend one's own motives, so that sociological explanation can benefit from its outside position with respect to the knowledge and behavior under study. Although

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<sup>48</sup> Michel Callon and John Law, "On Interests and Their Transformation: Enrolment and Counter-Enrolment," Social Studies of Science, 12 (1982), 615-25, p.622.

<sup>49</sup> Roy Wallis and Steve Bruce, "Accounting for Action: Defending the Common Sense Heresy," Sociology, 17 (1983), 97-11, p.93

the social sciences face what Giddens has called a "double hermeneutic," where the social scientist must seek to understand a "universe which is already constituted within frames of meaning by social actors themselves,"<sup>50</sup> it does not follow that the social scientist's explanations are no better or worse than those the actor gives. This can be seen in Marx's analysis of the knowledge of political economy. Since those who benefit from capitalism have an interest in obscuring the exploitative nature of that system, Marx argued that the proletariat could provide a superior (though still interested!) account of the dynamics of capitalism.<sup>51</sup>

The observation that the sociologist's interest-laden approach to the study of social phenomena might actually be a strength, rather than a liability suggests a way of dealing with the reflexivity issue that does not result in the abandonment of positive claims about historical causation. The challenge that the issue of reflexivity presents to the sociology of scientific knowledge can be seen by examining Harry Collins' relativist programme, which is similar to the

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<sup>50</sup> Anthony Giddens, New Rules of Sociological Method: A Positive Critique of Interpretative Sociologies (New York: Basic Books, 1976), p.162.

<sup>51</sup> Karl Marx, The Communist Manifesto (New York: International Publishers, 1948), p.29. The point can be made another way by referring to what Giddens, New Rules, p.161, has called the duality of structure, in which social structures are seen not only as constraining action, but as enabling it. It may be that certain insights can only be enabled by a community engaged in social science discourse which holds to a realist notion of truth as a regulative ideal.

strong programme except that it rejects the need for reflexivity. Critics of this position emphasizing the importance of a reflexive approach can be seen to incorporate a residual positivist bias. To overcome this bias, the appropriateness of a fallibilistic realist discourse for the practice of sociology will be suggested,<sup>52</sup> even while recognizing that the degree to which this discourse should be allowed to "invade" other discourses deserves serious reflexive investigation.<sup>53</sup>

Collins' empirical relativist programme in the sociology of scientific knowledge accepts the second and third requirements of the strong programme (impartiality and symmetry), but rejects the demands for causal analysis and

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<sup>52</sup> See Roy Bhaskar, The Possibility of Naturalism: A Philosophical Critique of the Contemporary Human Sciences (Sussex: Harvester Press, 1979), pp.203-5, vii., for an argument for a realist philosophy of social science that accepts the basic tenets of the strong programme.

<sup>53</sup> The issue of the extent to which sociological discourse should become a "totalizing discourse" seems to be the appropriate reflexive question. A realist discourse may be necessary for the effective practice of social scientists without it following that this discourse must become the standard to which social behavior in general is held. Michel Foucault, The Order of Things: An Archaeology of the Human Sciences (London: Tavistock, 1970) discusses how the human sciences came to construct knowledge that became an instrument of power by suppressing other discourses. Foucault's concerns provide a good starting point for this version of reflexivity, which promises to be a more fruitful approach in that it pays attention to the effect on the various audiences for sociological knowledge rather than the construction or linguistic form of that knowledge.

reflexivity.<sup>54</sup> Collins has interpreted the symmetry principle as implying that the natural world does not affect our interpretation of it. He advocates "special relativism" wherein the sociologist suspends taken-for-granted ways of understanding scientific behavior, but does not suspend a realist approach to the social world. He rejects the strong programme's reflexivity thesis in order to avoid the paralyzing difficulties that tend to accompany it, and to sidestep Laudan's criticism that his relativism is incompatible with his empiricism.<sup>55</sup> Gieryn argues that Collins' programme is a retreat to sociological reductionism, since "the fact that social and cultural factors are essential to the construction of scientific knowledge becomes [for Collins] sufficient reason to assume that they are the only relevant elements."<sup>56</sup>

Such criticisms are cogent, but many of the positive suggestions that avoid the radically asymmetric handling of actors' and analysts' accounts end up rejecting the possibility of providing third person accounts superior to

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<sup>54</sup> H.M. Collins, "Stages in the Empirical Programme of Relativism," Social Studies of Science, 11 (1981), 3-10; H.M. Collins, "What is TRASP? The Radical Programme as a Methodological Imperative," Philosophy of the Social Sciences, 11 (1981), 215-24.

<sup>55</sup> H.M. Collins, "Special Relativism - The Natural Attitude," Social Studies of Science, 12 (1982), 139-43. Collins is responding to Larry Laudan, "A Note on Collins's Blend of Relativism and Empiricism," Social Studies of Science, 12 (1982), 131-32.

<sup>56</sup> Gieryn, "Relativist/Constructivist Programmes," p.287.

the accounts of the actors themselves.<sup>57</sup> Such an approach undercuts the viability of sociological and historical explanation. For example, such an approach would demand that Galileo's explanation of why he came to believe in the Copernican system be accorded equal status with our own account of how he came to believe this. This is clearly unreasonable insofar as we have good reason to believe that Galileo had to accept crucial elements of the new conceptual scheme before he could make observations confirming his scheme.<sup>58</sup> Indeed, there are good grounds for believing that scientific papers and other scientific discourse cannot always be taken at face value.<sup>59</sup> Recognizing that certain interest-laden knowledge may be superior to other interest-laden knowledge depending on the subject studied suggests that sociologists need not abandon realist claims about the social world, particularly insofar as they can mobilize a critical outsider's perspective. The empirical study of reflexivity, then, would involve examining which interests

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<sup>57</sup> See for example Michael Mulkay and G. Nigel Gilbert, "What is the Ultimate Question? Some Remarks in Defense of the Analysis of Scientific Discourse," Social Studies of Science, 12 (1982), 309-19.

<sup>58</sup> See Feyerabend, Against Method; Roger Ariew, "Galileo's Lunar Observations in the Context of Medieval Lunar Theory," Studies in History and Philosophy of Science, 15 (1984), 213-26.

<sup>59</sup> Steve Woolgar, "Writing an Intellectual History of Scientific Development: The Use of Discovery Accounts," Social Studies of Science, 6 (1976), 395-422; Michael Mulkay, "Norms and Ideology in Science," Social Science Information, 15 (1975), 637-56.

facilitate superior insights for a given subject matter.<sup>60</sup>

The identification of the "interests" of others can be facilitated by sociological and historical distance. One might read the following thesis as arguing for an influence on Hobbes' mechanics of political "interests." Such a reading can only amount to a sketchy outline of the basic form of the argument. The concept of "interest" can be seen as an appropriate explanatory gloss that the sociologist can legitimately employ.<sup>61</sup> What needs to be established in the course of investigation, however, is the causal structure of the development of the interested behavior. The concept of interest can only be the beginning of an explanation; a concrete account is needed of the social causes leading the actor to be concerned with certain issues and the precise role they play in the historical development under investigation. At no point in this more refined examination

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<sup>60</sup> See Donald T. Campbell, "Models of Language Learning and Their Implications for Social Constructionist Analyses of Scientific Belief" in Steve Fuller, Marc De May, Terry Shin, and Steve Woolgar (eds.), The Cognitive Turn: Sociological and Psychological Perspectives on Science (Dordrecht: Kluwer Academic Publishers, 1989), 153-58, p.153, for an argument that "a hypothetical comparison of social systems of belief retention and change implies the possibility of a modest, fallibilist, presumptive "sociology of scientific validity"."

<sup>61</sup> There has been a tendency among ethnomethodologists to deplore the use of "glosses" in describing science; the sociologist is urged to faithfully reproduce the laboratory environment in its full complexity. However, as Bruno Latour, "Will the Last Person to Leave the Social Studies of Science Please Turn on the Tape-Recorder?," Social Studies of Science, 16 (1986), 541-48, points out, the ethnomethodologists themselves cannot avoid "glosses" and cannot genuinely achieve a "theory-free" understanding of science.

can we appeal to a black-boxed cause labelled "interest."

## Chapter Two:

### A Sociological Critique of the Historiography of Hobbes

The aim of this chapter is to demonstrate the value of the sociology of knowledge as an analytical tool for critiquing historiographical discourse. The literature on the nature of Hobbes' philosophical "system" will be critiqued for problematical assumptions and ignored possibilities. The critique will address questions of plausibility, implicit assumptions, and appropriate criteria for a satisfactory historical explanation. By mobilizing the resources of a general sociology of knowledge, as outlined in Chapter One, new possibilities for empirical investigation based on a more plausible historiographical problemset will be suggested. Chapters Three and Four will actually address the empirical questions raised by this historiographical critique. The aim of this chapter is simply to demonstrate the usefulness of the sociological approach outlined in critiquing existing arguments and concerns.

Foucault has discussed the ways in which a given discourse structures the way questions can be posed. The "discourse" does not structure the truth-content of the issues discussed by a given community; rather, it structures the types of statements that can be assigned a truth value. A discourse functions to structure disagreement around a certain set of questions while disallowing recognition of

alternative ways of construing the phenomena in question.<sup>1</sup> Although discourses are generally not tied to specific disciplines for Foucault, we can apply the basic insight by noting that the discussions of the nature of Hobbes' system by political historians and political scientists involve a similar structuring of the relevant problems and alternatives available. The "discourse" of contemporary sociology of scientific knowledge can be used to critique the "discourse" of Hobbesian scholarship by revealing problematic assumptions of which the participants in the traditional Hobbesian discourse may not be aware. The approach to the study of knowledge in contemporary sociology of knowledge seems more

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<sup>1</sup> See Michel Foucault, The Birth of the Clinic: An Archaeology of Medical Perception (New York: Vintage Books, 1975), p.xix. "The restraint of clinical discourse (its rejection of theory, its abandonment of systems, its lack of a philosophy; all so proudly proclaimed by doctors) reflects the non-verbal conditions on the basis of which it can speak: the common structure that carves up and articulates what is seen and what is said. ... What counts in the things said by men is not so much what they may have thought or the extent to which these things represent their thoughts, as that which systematizes them from the outset, thus making them thereafter endlessly accessible to new discourses and open to the task of transforming them." Unlike Kuhn, there need be no fundamental agreement on ontology, methodology, or epistemology, since these may be the contested areas in question. The disagreeing parties together formulate a problemspace that may allow for quite sharp disagreement on a number of levels. However, this disagreement defines the relevant questions that can be asked in such a way that alternative formulations may be difficult to conceive. See Randall Collins, "Toward a Theory of Intellectual Change: The Social Causes of Philosophies," Science, Technology, & Human Values, 14 (1989), 107-40, p.107, for a discussion of the sociology of philosophy where it is concluded that "[n]ew positions are produced by competitive appropriation of prior ideas and by negation of preexisting positions along the lines of greatest organizational rivalry" (emphasis added).

plausible and better supported by the empirical evidence than traditional intellectual history (including most of the scholarship on Hobbes). However, the assumption of the superiority of the sociology of knowledge over intellectual history is not necessary for the critique outlined in this chapter to be effective. The critique of one discourse by another can be very fruitful and amounts to what can be called "reflexivity in action."<sup>2</sup>

The very possibility that the sociology of scientific knowledge has helped open up--namely, that the content of science itself can be affected by social and political factors--is a possibility that commentators on Hobbes have systematically ignored. This can be seen by analyzing the primary dispute among Hobbes scholars. The dispute concerns whether Hobbes' writings can be construed as a single, unified system or whether Hobbes' materialist physics is separate from his politics and ethics. The problem of abstracting Hobbes' "doctrine" and determining its "actual" nature is itself problematic. For now, let us grant that the nature of the relationship between Hobbes' mechanics and his political philosophy is an appropriately posed question. The

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<sup>2</sup> Bruno Latour, Science in Action (Milton Keynes: Open University Press, 1987) has advised us to study "science in action," but most discussions of reflexivity in science studies have focused on how we are to construct reflexive accounts ourselves. By contrast, "reflexivity in action" implies taking advantage of our outsider's perspective to a given discourse to create a measure of reflexivity that was not there before. We should then follow the effects of the reflexivity as it plays itself out "in action."

structure of the discourse on this question will be seen to systematically exclude the possibility that Hobbes' political philosophy influenced his mechanics.

The dispute on this question involves two basic positions, with a number of alternative formulations of each. The "traditional interpretation" asserts that Hobbes' materialist philosophy formed the basis for his psychology and political philosophy. Proponents of this position have differed as to whether this relationship is one of deduction or analogy, but have agreed that the primary direction of causality is from the mechanical philosophy to the political philosophy. Proponents of this position typically argue that Hobbes' system forms a complete whole and that his mechanics (or occasionally his epistemology) provides the thread linking the system together. Critics of this position have generally attempted to block the move that Hobbes' mechanical philosophy formed the basis of his political system, in order to argue that his mechanical philosophy was distinct from the rest of the system. The "Taylor-Warrender" interpretation, for example, argues that Hobbes was something of a traditional natural law theorist, who merely dressed up this traditional approach to politics with the new mechanical philosophy. Hence, the two parts of Hobbes' system are seen as distinct.

The position that is omitted in this discourse is the possibility that Hobbes' political philosophy might have

influenced his mechanics or mechanical philosophy. Whereas the "traditional" interpretation asserts that Hobbes' system forms a unified whole since his mechanics provides the basis for his politics, the critic of this interpretation argues for a sharp separation between the two since Hobbes' mechanical philosophy is taken not to be able to provide such a basis. The possibility that Hobbes' political system forms the basis of his mechanical system is ignored. This failure is due less to a weakness of logical argument than to accepted presuppositions of the discourse, in particular that science is driven by its own internal dynamic and cannot be genuinely influenced by political factors.

The traditional interpretation was supported by the layout of Hobbes' system into three parts -- Part One on Body (De Corpore), Part Two on Man (De Homine), and Part Three on the Commonwealth (De Cive). Each was to be built upon the foundation of the previous one.<sup>3</sup> Although these were not published (and presumably not written) in this order, Hobbes explains that this was necessary as a result of the pressing need for prompt publication of his political philosophy given the contemporary political turmoil. His account provided the major textual support for the traditional interpretation. As he put it in his preface to De Cive added for the 1647 edition:

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<sup>3</sup> Although Hobbes argued that the conclusions in De Cive could be detached from this basis and established independently.

You have seene my Method, receive now the reason which mov'd me to write this; I was studying Philosophie for my minde sake, and I had gathered together its first Elements in all kinds, and having digested them into three Sections by degrees, I thought to have written them so as in the first place I would have treated of a body, and its general properties; in the second of man and his speciall faculties, and affections; in the third, of civill government and the duties of Subjects . . . Whilst I contrive, order, pensively and slowly compose these matters, for I onely doe reason, I dispute not, it so happen'd in the interim, that my Country some few yeares before the civill Warres did rage, was boyling hot with questions concerning the rights of Dominion, and the obedience due from Subjects, the true forerunners of an approaching War; And was the cause which (all those other matters deferr'd) ripen'd, and pluckt from me this third part. Therefore it happens that what was last in order, is yet come forth first in time . . .<sup>4</sup>

Proponents of the traditional interpretation take Hobbes' statement here to justify interpreting his political philosophy as based in some manner on his mechanical philosophy.

George Croom Robertson challenged this interpretation of Hobbes' work in 1886 in a manner that would set the terms for much of the subsequent debate. Robertson argued that Hobbes could not have derived his political philosophy from his mechanical philosophy and hence the two are unrelated. As he expressed it, "[t]here can be little doubt, however Hobbes might wish by afterthought to connect his theory of Political Society with the principles of his general mechanical philosophy, that it sprang originally from a different line

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<sup>4</sup> Thomas Hobbes, De Cive: The English Version entitled in the first edition Philosophical Rudiments Concerning Government and Society, Howard Warrender (ed.) (Oxford: Clarendon Press, 1983), pp.35-6.

of consideration."<sup>5</sup> Specifically, direct analysis of concepts of justice and law, as well as the political circumstances of his time account for the political philosophy.<sup>6</sup> Since Robertson does not consider the possibility of an influence on Hobbes' mechanical thought by his political philosophy, his rejection of the traditional interpretation leads him to ascribe any apparent connection between themes in his political and mechanical thought as an "afterthought." This afterthought is the result of a desire to ground his unique political "philosophy" in the "science" of the day which he did not fully comprehend, since "when it is found that his general thinking has an interest and a value that must be denied to his special inquiries so far as they bear upon the physical world, we must after all class Hobbes, in the modern period, with philosophers like Locke and Kant rather than with men of science like Galileo and Newton."<sup>7</sup> This historiographical marginalization of Hobbes' mechanical philosophy enables many later commentators to consider his political philosophy as divorced from his unimportant mechanical philosophy.

By contrast, among those who pay attention to Hobbes' mechanical system in any detail (a much smaller group

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<sup>5</sup> George Croom Robertson, Hobbes (Edinburgh: William Blackwood and Sons, 1886), p.138.

<sup>6</sup> Ibid., p.138, p.v-vi.

<sup>7</sup> Ibid., p.80.

compared to those who focus exclusively on exegesis of Hobbes' political and moral thought), two approaches are found. Either they accept the traditional interpretation in some qualified form (as will be seen with Watkins, Goldsmith, and Spragens), or they consider his mechanical thought, though important in its own right, as separate from his political thought. This later position is taken in one of the few books to treat Hobbes' mechanical system exclusively. In Thomas Hobbes' Mechanical Conception of Nature, Frithiof Brandt declares explicitly at the start that "[w]e do not give any account of Hobbes as a philosopher of law, as we cannot see that this part of his thinking has had any great significance for his natural philosophy."<sup>8</sup>

Leo Strauss followed up Robertson's suggestion of a separation between the two components of Hobbes' philosophy in his analysis of Hobbes' political thought by emphasizing that Hobbes' mechanical philosophy was not only unrelated to his political philosophy, but that it interfered with its exposition. Setting a trend that would dominate much of subsequent Hobbes scholarship, Strauss warned that Hobbes' doctrine must be somehow extracted from the incomplete and contradictory formulations Hobbes himself gave it. Emphasizing that Hobbes' doctrine of 'right' stood between a purely moralistic and a purely naturalistic theory, Strauss

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<sup>8</sup> Frithiof Brandt, Thomas Hobbes' Mechanical Conception of Nature (Copenhagen: Levin & Munksgaard, 1928).

commented that "[a] full analysis of the significance of that philosophical application had, however, to be postponed; for before such an analysis could be made, it was necessary to remove the obstacles which stand in the way of even a mere recognition of the obvious fact that Hobbes' political philosophy starts from natural 'right', as distinguished from both natural 'law' and natural inclinations or appetites. These obstacles are mainly due to the fact that Hobbes tried to base his political philosophy on modern natural philosophy."<sup>9</sup> Hobbes' mechanical philosophy is taken to interfere with Hobbes' political philosophy and the interpreter is advised to overcome this in order to realize Hobbes' "obvious" doctrine.

In his argument for the separation between the two parts of Hobbes' philosophy, Strauss employs a view of the nature of science that he can juxtapose to the basis of Hobbes' actual view of man. It is Hobbes' "fundamental view of human life ... and not modern science, which is the real basis of his political philosophy. That view has its origin not so much in any learned or scientific preoccupation, but in actual experience of how men behave in daily life and in 'public conversation'."<sup>10</sup> Notice how "learned or scientific preoccupation" is opposed to "actual experience" and "daily

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<sup>9</sup> Leo Strauss, The Political Philosophy of Hobbes: Its Basis and Its Genesis (Oxford: Clarendon Press, 1936), p.xiii.

<sup>10</sup> Ibid., p.xiv.

life." This actual experience, rooted in a moral attitude, can have nothing to do with science as a result: "The moral attitude which underlies Hobbes's political philosophy is independent of the foundation of modern science, and at least in that sense 'pre-scientific'."<sup>11</sup>

Developing out of the idea of such a split between the political and mechanical components of Hobbes' work, a number of writers have put forth some form of a "natural law" interpretation. Greenleaf has summarized the basic position here as involving two components: "First, that the apparently scientific cast and mechanical-materialist basis of the entire range of Hobbes' mature thought are quite misleading as indications of its real character. Secondly, that the true nature of his ethical and political thinking derives essentially from the Christian natural law tradition."<sup>12</sup> Again, these logically independent statements are subtly linked together. A Christian natural law tradition exposes the "misleading" character of the mechanistic rhetoric. A religious tradition militates against any connection or compatibility with natural science.

A.E. Taylor put forth a moderate version of this in 1938 in his paper "The Ethical Doctrine of Hobbes." Arguing

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<sup>11</sup> Ibid., p.5.

<sup>12</sup> W.H. Greenleaf, "Hobbes: The Problem of Interpretation" in Maurice Cranston and Richard S. Peters (eds.), Hobbes and Rousseau: A Collection of Critical Essays (Garden City, N.Y.: Anchor Books, 1972), p.11.

against a crude interpretation of the formation of civil society as based on utilitarian self-interest, Taylor aims to separate Hobbes' mechanistic psychology of appetite and aversion from the true grounds of moral obligation. This obligation is based on a covenant that authorizes civil society and demands compliance with the terms of the covenant. Taylor then denies that Hobbes' theory of obligation could be derived from his mechanistic psychology, with the implication that Hobbes' natural philosophy remains separate from his theory of civil obligation. Thus, "[i]t is not a logical necessity of the system that we should also accept his egoistic moral psychology. Even if we reject this psychology in toto, so long as we grant the premises that civil society rests upon a 'covenant' to obey whatever shall be enacted as the 'law of the land', and that breach of covenant is always a violation of duty, the conclusion he wishes to draw will follow, viz., that I am only free to be guided by my personal opinion as to what is equity when the civil law has seen fit to leave me free."<sup>13</sup> Whatever the merits of Taylor's interpretation, the immediate separation drawn between Hobbes' natural science and his theory of obligation, following the rejection of a crude utilitarian interpretation, is symptomatic of the stereotypical conception of science that is appealed to. As if to

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<sup>13</sup> A.E. Taylor, "The Ethical Doctrine of Thomas Hobbes" in K.C. Brown (ed.), Hobbes Studies (Oxford: Basil Blackwell, 1965), p.45.

underscore the alleged separation, Taylor goes on to defend Hobbes from the charge of being an atheist. Seventeenth-century science is assumed to be crude, utilitarian, and "naturalistic" in a peculiarly modern sense.

The separation between Hobbes natural and political philosophies is continued in Warrender's elaboration of what has been termed the "Taylor-Warrender thesis."<sup>14</sup> The position is taken to an extreme in F.C. Hood's The Divine Politics of Thomas Hobbes. Attacking the notion that Hobbes' extensive references to scripture were insincere, Hood argues that Hobbes attacked theology as the queen of the sciences since this was injurious to the faith. According to Hood, Hobbes aimed to expose the limitations "not of Theology, but of scientific method."<sup>15</sup> The basis of Hobbes' criticism of School Divinity is held to be that it philosophizes about things that ought to be left to the Bible alone. Hood argues that there was nothing original in the content of Hobbes' moral thought and though he was a materialist, he was never fully a scientist:

In becoming a materialist, Hobbes did not cease to be a Christian; in becoming a scientist, if he ever did become one, he did not cease to be a deductive rationalist. Though he was a pioneer of a mechanist conception of nature, he completely failed to understand the development of empirical science that was taking place before his

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<sup>14</sup> See the essays in Brown (ed.), Hobbes Studies, for critical discussions of the Taylor-Warrender thesis.

<sup>15</sup> F.C. Hood, The Divine Politics of Thomas Hobbes: An Interpretation of Leviathan (Oxford: Clarendon Press, 1964), p.3.

eyes.<sup>16</sup>

Here a stereotypical view of science is again employed to ensure that Hobbes' materialism does not attract too much attention in our attempts to understand Hobbes' political philosophy. The implication is that the two components of Hobbes' philosophy are unrelated and his mechanical thought is at best window dressing. An opposition between science and religion is taken for granted by Hood, since "[d]espite Hobbes's increasing absorption in science his view of the world, and of man's estate, remained fundamentally a religious one."<sup>17</sup>

Critics of interpretations emphasizing the separation of the two aspects of Hobbes' philosophy typically argue some variation of the traditional thesis. Rather than arguing that Hobbes' political doctrine was, or could be, deductively deduced from Hobbes' mechanical principles, they argue that his mechanical principles contributed to such a deduction when combined with other premises or that the influence was in the form of an analogy. The first position was argued for by J.W.N. Watkins. According to Watkins, Hobbes' political philosophy is rooted in the epistemological aspects of Hobbes' natural philosophy. For Watkins,

Hobbes ideas on nature, man, and civil society, hang together, form a system. Within this system, controlling positions are occupied by a number of philosophical ideas.

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<sup>16</sup> Ibid., p.19.

<sup>17</sup> Ibid., p.40, emphasis added.

Moreover--and this is my main thesis--those philosophical ideas collectively imply enough of his political theory to provide a drastic solution for the political problems posed for him by the Puritan Rebellion.<sup>18</sup>

Unlike the more orthodox versions of the traditional interpretation, Watkins argues that Hobbes' epistemological ideas did not deductively imply his political theory by themselves, but they did contribute to such a deduction:

A philosophical proposition cannot by itself entail a proposition having a political content which the former lacks. But the introduction of a philosophical theory a into an existing circle of statements b may make it possible to derive a new political conclusion c; in which case a implies that if b then c. Moreover, if c is controversial, whereas b consists of uncontroversial background assumptions (for instance, that men live in proximity to one another, that their resources are scarce, that it is physically possible for one man to kill another), then the philosophical idea bears the chief responsibility for the political conclusion, and the latter may be said, by a pardonable ellipsis, to be an implication of the philosophical idea. It is with this sort of objective connection that we shall mainly be concerned.<sup>19</sup>

In avoiding a simplistic version of the traditional interpretation, Watkins attempts to defeat the views of Strauss and Warrender.

Many of Watkins' arguments against Strauss and Warrender again imply an 'either-or' scenario that ignores the

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<sup>18</sup> J.W.N. Watkins, Hobbes's System of Ideas: A Study in the Political Significance of Philosophical Theories (London: Hutchinson University Library, 1973), p.1. Watkins uses 'philosophical' as a synonym for 'epistemological', noting that although Hobbes did not "use the word 'epistemology', we shall count as 'philosophical' those of his ideas, which are, from a modern standpoint, epistemological" (p.7).

<sup>19</sup> Ibid., p.10.

possibility of influence from Hobbes' political to his mechanical philosophy. The dispute centers around which portion of Hobbes' philosophy can claim temporal priority. Watkins first attempts to downplay the fact that Hobbes' De Cive (1642), the political part of his philosophy, was published well before the natural philosophical De Corpore (1655). Watkins emphasizes Hobbes' stated intention to produce the works beginning with their natural philosophical grounds, but that political contingencies forced him to publish his political work first. Furthermore, Watkins claims that Strauss has ignored the "Little Treatise" which sets forth Hobbes' mechanical views as early as 1630 and before 1636.<sup>20</sup> Watkins also attempts to demonstrate that the political content of Hobbes' introduction to his Thucydides translation (1629) is meager.<sup>21</sup> The structure of this dispute assumes that temporal priority for Hobbes' natural philosophy counts for a connection between Hobbes' philosophies, while temporal priority for Hobbes' political philosophy counts against such a connection. The possibility that temporal priority for Hobbes' political philosophy could count as evidence for a political influence on his natural philosophy is not considered.

Similar arguments are made by both Goldsmith and

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<sup>20</sup> The attribution to Hobbes is debatable; see the discussion in Chapter Four.

<sup>21</sup> Ibid., pp.14-17.

Spragens in defenses of similar forms of the traditional interpretation. Goldsmith argues that "Hobbes attempted to create a philosophic system which embraced the science of natural bodies and extended the methods of that science to human actions and political bodies."<sup>22</sup> Goldsmith then evaluates Hobbes' political theory as suffering the defects of Galilean science in that it has no criteria of "falsifiability." Nevertheless, "Hobbes's success outweighs his failings," Goldsmith concludes, since "[u]pon the methods and assumptions of Galilean natural science, he proposed a new understanding of political society."<sup>23</sup>

Spragens puts forward a version of the traditional thesis that he feels gets around objections that Hobbes could not have derived his political philosophy from his mechanical philosophy. According to Spragens, Hobbes' mechanical philosophy implied his political philosophy by way of an analogy, rather than by strict deduction. Accepting Watkins argument that Hobbes' natural philosophical ideas were necessary but not sufficient components leading to his political philosophy, Spragens elaborates on the analogical influence which he identifies:

I argue that Hobbes's political ideas were in fact significantly influenced by his cosmological perceptions, although they were not, and could not have been, completely derived from that source. I also suggest that

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<sup>22</sup> M.M. Goldsmith, Hobbes's Science of Politics (New York: Columbia University Press, 1966), p.228.

<sup>23</sup> Ibid., p.242.

this influence of Hobbes's conception of 'nature' on his view of politics was accomplished largely by means of analogical permeation. That is, conceptual patterns and models developed to deal with natural phenomena became prisms through which he perceived human and political phenomena.<sup>24</sup>

Again influence from Hobbes' mechanical to his political thought is defended, against those who advocate a split between the two, by expanding the possible mechanisms for that influence.

Much of the literature on Hobbes has been shown to systematically ignore the possibility that Hobbes' political thought might have influenced his mechanical thought. This historiographical oversight, structured in part by unexamined conceptions of the nature of scientific knowledge, has been identified by employing the basic insights of a general sociology of scientific knowledge (as outlined in Chapter One). The value of critiquing implicit structuring of the terms of debate in a given field is demonstrated by the opening up of a basically ignored possibility in Hobbesian scholarship. The remainder of the thesis will demonstrate that this uncovered possibility pays off in the form of a more adequate understanding of the causes underlying the development of Hobbes' mechanics.

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<sup>24</sup> Thomas A. Spragens, Jr., The Politics of Motion: The World of Thomas Hobbes (Great Britain: University Press of Kentucky, 1973), p.7.

### Chapter Three:

#### Space and Time in Hobbes' Geometry and Physics

Hobbes proposed a perspective on the nature of mathematical knowledge that differed from the approach of Aristotle and the medieval scholastics in that it collapsed the distinction between a physical mathematics and an abstract mathematics. Hobbes did this in a way that was also at odds with those who contributed to the "geometrization of space," such as Descartes and Galileo.<sup>1</sup> Hobbes' approach, rather than applying an abstract geometry (with perfect points, lines and surfaces) to physical questions, involved the "physicalization of geometry." For Aristotle, the mixed mathematical sciences, which included optics, harmonics, and astronomy, were distinguished sharply from geometry proper: "While geometry investigates physical lines but not qua physical, optics investigates mathematical lines, but qua physical, not qua mathematical."<sup>2</sup> For Hobbes, however, even geometry is the investigation of actual physical bodies; hence, geometry ceases to be distinguished by its non-physical subject matter. Hobbes' discussion of these matters appears to be influenced by positions on mixed mathematics similar to those of fourteenth-century scholastics.

To gain a clearer understanding of Hobbes' discussion of

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<sup>1</sup> Alexandre Koyre, Galileo Studies (Sussex: Harvester Press, 1978).

<sup>2</sup> Aristotle, "Physics," Bk. 2, Ch. 2 in W.D. Ross (ed.), The Works of Aristotle (Oxford: Clarendon Press, 1930).

geometry and its relationship with physics, it will be useful to discuss Hobbes' views on place, time and infinite divisibility. Hobbes' views on infinity, time and place are strongly related to his views on mathematics. His views appear to be modifications of positions held by various fourteenth-century scholastics, such as those of William Ockham, John Buridan, Gregory Rimini, and Albert of Saxony. Such medieval discussions found their way into early seventeenth-century scholastic textbooks or other derivative sources. These texts are a possible mechanism of influence on Hobbes, although there is no direct evidence for this.<sup>3</sup> In any event, comparison with these views will facilitate an understanding of how Hobbes' views on geometry, place, and time differed from available developed alternatives.

Fourteenth-century developments of Aristotle's discussion of mathematics led a number of scholastics to consider geometry in two different ways. On the one hand, they denied that indivisible points or non-three-dimensional bodies actually exist (though we can ignore minor deviations in treating physical questions). On the other hand, they allowed that points, lines, and surfaces can be appropriately imagined by the mind for the sake of strictly mathematical

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<sup>3</sup> See Charles B. Schmitt, "The Rise of the Philosophical Textbook" in C.B. Schmitt, Quentin Skinner, and Eckhard Kessler (eds.), The Cambridge History of Renaissance Philosophy (Cambridge: Cambridge University Press, 1987).

knowledge.<sup>4</sup> Hobbes tended to collapse this distinction between a physical and an abstract geometry, but followed closely fourteenth-century approaches to the more physical geometry, as well as infinity and place in general. The positions to be discussed can be seen in many of the more sophisticated scholastics including Ockham and Gregory of Rimini, but their most sophisticated expression is in the writing of John Buridan. What is surprising is the extent to which Hobbes' writings on geometry, infinity, and place parallel the carefully reasoned discussion of these topics in Buridan. Examining the parallels with Buridan's positions will enable a clearer understanding of Hobbes' approach, although a direct influence is very unlikely.<sup>5</sup>

The major difference seems to be that Hobbes denies that geometry should be treated in two separate ways. Buridan talks of geometers as treating perfect lines, surfaces, and

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<sup>4</sup> Pierre Duhem, Medieval Cosmology: Theories of Infinity, Place, Time, Void, and the Plurality of Worlds, Roger Ariew (trans.), p.32, notes with respect to Buridan: "Buridan ... juxtaposes two conceptions of geometry, a geometry that considers points, lines, and surfaces as nothing but constructions of the mind, and a physical geometry in conformity with reality, that only treats bodies."

<sup>5</sup> Affinities in approach suggest only the possibility of influence, which in this case would be very indirect since Buridan's writings were not extensively published in the sixteenth and seventeenth centuries. Buridan's discussions on infinity, place, and geometry were summarized by Albert of Saxony, whose works were widely printed beginning in the sixteenth century. These discussions were included in many of the scholastic textbooks of the seventeenth century as a result. Hobbes would likely have been familiar with these discussions through these and other sources.

points in a fictive way, as if there were such things, in addition to treating them as abstracted from body when discussing physical bodies (i.e. small breadth and width of a body allows one to consider the body as a line). The approach Hobbes takes appears to be similar at first sight. The crucial difference is that Hobbes does not talk of geometers as ever engaging in fictive discussions where the concepts of point, line, and surface are treated apart from bodies. The subject of geometry for Hobbes is always body. A point is taken as a physically existing, dimensional body where the quantity is ignored or "not considered." There is no fictive discourse where completely non-dimensional entities can be discussed.

In Hobbes' examination of Thomas White's De Mundo, a manuscript from 1642-43, Hobbes emphasizes that infinite divisibility or the lack of three dimensions in any body is impossible. He criticizes White's discussion of bodies as containing surfaces and surfaces containing lines. White's assertions that 'A line is in a surface' and 'A surface is in a body' are rejected by Hobbes on the following grounds:

Everyone familiar with geometry knows that each part of a body is body, every part of a surface is surface, and, similarly, that every part of a line is line. From this it is obvious that a line is not in a surface, nor a surface in a body in the way that a smaller magnitude is in a greater or an infinite magnitude.<sup>6</sup>

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<sup>6</sup> Thomas Hobbes, Thomas White's De Mundo Examined, Harold Whitmore Jones (trans.), (London: Bradford University Press, 1976), p.37.

To correct this equivocation, Hobbes then explains what is actually meant by length, breadth, and thickness. For Hobbes, "[l]ength relates to the path described by the motion of any body, whose size is not being considered."<sup>7</sup> Such a body is designated by a small mark, "not because a point can be so small that it has no quantity but because they wanted as small an object as possible to be seen where size was not to count."<sup>8</sup> Points are not in fact dimensionless, although we ignore the fact that it is further divisible since we are considering situations "where size was not to count." This parallels Buridan's discussion of points:

By stating that the point is indivisible we do not mean to say that it is so, nor that the proposition is literally true; but we say that it is so in another fashion, following the imagination of the mathematicians, as if it were indivisible. Not that one believes that it is so, but that when we measure, we arrive at the same conclusions as if it were so.<sup>9</sup>

For both Hobbes and Buridan, a body can be appropriately treated as a point in geometrical proofs where the dimensionality of the body does not affect the results, that is, "where size [is] not to count" such that "when we measure, we arrive at the same conclusions as if it were [indivisible]." Thus, Buridan's physical geometry, where "we measure" bodies, parallels Hobbes' geometry.

Hobbes, however, does not accept an abstract, fictive

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<sup>7</sup> Ibid., emphasis added.

<sup>8</sup> Ibid., emphasis added.

<sup>9</sup> Cited in Duhem, Medieval Cosmology, p.31, emphasis added.

geometry that Buridan juxtaposes to this physical geometry. Buridan's discussion of fictive geometry not corresponding to body, as in the use of epicycles and eccentrics, would be anathema to Hobbes. For Buridan,

this fashion of positing or imagining epicycles and eccentrics is useful for calculations, in order to know the locations of the planets, the relations holding between them and us; that is all astronomers demand. It is therefore possible for us to use such imagined things even though it is not this way in reality.<sup>10</sup>

This goes beyond ignoring or not considering the dimensionality of a point in that deliberate fictions are used. Rather than abstracting from real bodies, this involves positing models that could not possibly physically produce the effects observed. It is not just that "size is not to count" for the epicycle, but that the epicycle in no way corresponds to the physical reality of rotating orbs.

This is incompatible with the very notion of philosophy for Hobbes:

PHILOSOPHY is such knowledge of effects or appearances, as we acquire by the ratiocination from the knowledge we have first of their causes or generation; And again, of such causes or generations as may be from knowing first their effects.<sup>11</sup>

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<sup>10</sup> Ibid., pp.31-32, emphasis added.

<sup>11</sup> Thomas Hobbes, The English Works of Thomas Hobbes of Malmesbury, Sir William Molesworth (ed.), 11 vols., (London: John Bohn, 1839-1845), I, p.3. The 1656 translation reprinted in the Molesworth edition is quoted here since it is adequate for the argument made. See Aloysius Martinich's modern translation in Isabel C. Hungerland and George R. Vick (eds.), Computatio Sive Logica (Part I of De Corpore), (New York: Abaris Books, 1981), p.175, to get a better sense of Hobbes' position as expressed in the 1655 Latin De Corpore:

Philosophy is knowledge of effects gained from understanding actual causes or knowledge of actual causes gained by examining effects; never is it knowledge of effects or appearances understood in terms of fictive causes. In attributing the beginning of astronomy to Copernicus, Hobbes argues against treating astronomy in a non-physicalist way. In the Epistle Dedicatory to De Corpore, Hobbes equates astronomy with celestial physics:

I know ... that the hypothesis of the earth's diurnal motion was the invention of the ancients; but that both it, and astronomy, that is, celestial physics, springing up together with it, were by succeeding philosophers strangled with the snare of words. And therefore the beginning of astronomy, except observations, I think is not to be derived from further time than from Nicolaus Copernicus; who in the age next preceding the present revived the opinion of Pythagoras, Aristarchus, and Philolaus.<sup>12</sup>

Proper philosophy does not allow fictive discourses--even in geometry, real bodies are the object of study.

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"Philosophy is the knowledge, acquired through correct reasoning, of effects or phenomena from the conception of their causes or generations, and also of generations which could exist from the knowledge of their effects." Note that although this indicates that we discover possible causes for effects found, it is still not a case of fictive causes, as Hobbes makes clear later when discussing the construction of geometrical figures. The method we identify for generating the figure, though not necessarily the one which actually generated it, will be "still one which could have done it" (p.183). This suffices for the above argument.

<sup>12</sup> Ibid., p.vii-viii. See also Thomas Hobbes, Leviathan, C.B. Macpherson (ed.), (Middlesex: Penguin Books, 1968), p.682: "So the Astronomer, from the Rising, Setting, and Moving of the Sun, and Starres, in divers parts of the Heavens, findeth out the Causes of Day, and Night, and of the different Seasons of the Year."

Given Hobbes' physicalist geometry, we might ask what his concept of place or space was and how this relates to his geometry. In Part II of De Corpore, "The First Grounds of Philosophy," where Hobbes sets out his approach to natural philosophy, we can see that the concepts of space and time that he employs are strongly constrained by his complete materialism, given that it encompasses even the knowledge that geometry gives us.<sup>13</sup> He begins by imagining that the

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<sup>13</sup> William Sacksteder, "Hobbes: The Art of the Geometricians," Journal of the History of Philosophy, 18 (1980), 131-146, argues that Hobbes was not a materialist, but it seems that Sacksteder confuses our knowledge of the world, which is always tied to the proper use of names, and the nature of the world itself. Sacksteder (p.135) argues that "[o]utside of science, we perceive bodies, and we give them proper names. But no science computes individual bodies themselves." First, we never perceive bodies themselves but we do perceive accidents of real bodies. Also, an accident is not strictly "our manner of conceiving bodies" if that is taken to imply that we can conceive these bodies in whatever way we choose; rather it refers to the fact that accidents are meant to explain "that faculty of any body, by which it works in us a conception of itself" (Hobbes, E.W., I, p.103). Thus, our perception of accidents is a much less active process than Sacksteder implies by describing accidents as "our manner of conceiving bodies," it is rather "the manner of our conception of body" (p.104). Accidents are not bodies, but we can say that "an accident is in its subject, not as any part thereof, but so as that it may be away, the subject still remaining" (p.104). We can assign names with which to reason with to four different things which must be kept distinct (which Sacksteder does not do): bodies, accidents, phantasms, and names (Hobbes, Computatio, p.273). None of this conflicts with Hobbes' basic explanatory principle: "The subject of philosophy, or the matter upon which it reflects, is every body of which any generation can be conceived and of which composition and resolution has a place, that is, every body that can be generated or understood to have some property" (p.189). There is, then, a contrast between knowledge of singulars and knowledge of universals, corresponding to things "better known to us" (i.e. "knowledge acquired by means of the senses") and things "better known to nature" (i.e. "the knowledge which is

world is annihilated leaving only a single man to engage in philosophical reflection. Although the world is gone, philosophy is possible given what remains, namely "the memory and imagination of magnitudes, motions, sounds, colours, &c. as also of their order and parts."<sup>14</sup> These memories are merely figments or phantasms of the objects that caused them. Although these are nothing but phantasms, "yet they will appear as if they were external, and not at all depending upon any power of the mind."<sup>15</sup> The point of this exercise is not to engage in any kind of Cartesian doubt as to the actual

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acquired to reason") (p.292.).

Similar confusions beset Tom Sorell's claim ("Descartes, Hobbes and the Body of Natural Science," The Monist, 71 (1988), 515-25, p.524) that "it is anachronistic to suppose that [Hobbes] was a physicalist." Sorell argues against this by noting that Hobbes "regarded civil philosophy as more of a science than physics. In Hobbes's view the science par excellence was geometry, not physics" (p.524). While this is true, since as Sorell notes, both geometry and civil philosophy are our own constructions unlike physics, it does not follow that Hobbes was not a physicalist, since these constructions always refer to constructions made with real bodies (to which we then assign names and construct our proofs). Sorell fails to recognize this since he applies an anachronistic understanding of geometry to Hobbes's account. Hobbes's geometry is itself physicalist (in addition to being constructed and hence the exemplary science). An early draft of De Corpore (Ms. 5297, reprinted as Appendix II Hobbes, De Mundo Examined, p.449) makes clear the physicalist ontology that underlies Hobbes thought: "there is nothing that truly exists in the world but single individual bodies producing single and individual acts or effects from law, rule or form and in order or succession." Of course, we must also realize that it would be anachronistic to expect that Hobbes would have to be accountable to our modern concerns with "reductionism." The problem may never have occurred to Hobbes.

<sup>14</sup> Hobbes, E.W., I, p.92.

<sup>15</sup> Ibid.

existence of the world beyond the individual reasoner, however.<sup>16</sup> The processes of sensation in the actual world are to be understood by this thought experiment and the existence of the external world is never called into doubt. For the man reasoning when the world is annihilated, reasoning consists merely in assigning names to phantasms and reckoning by subtracting and compounding these names.<sup>17</sup> This thought experiment then allows Hobbes to realize that, after all, this is all that reasoning consists of when the world is not annihilated, for "though all things be still remaining in the world, yet we compute nothing but our own phantasms."<sup>18</sup>

Having reduced reasoning to reckoning with (names of) phantasms by this thought experiment, he uses the same approach to understand the nature of space. Our conception of space involves the phantasm of the now annihilated world where we do not consider any specific body. Rather we "consider, not that the thing was such or such, but only that

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<sup>16</sup> As Richard Tuck, "Hobbes and Descartes" in G.A.J. Rogers and Alan Ryan (eds.), Perspectives on Thomas Hobbes (Oxford: Clarendon Press, 1988), 11-41, p.39, points out, Hobbes was likely concerned with resolving the hyperbolic doubt introduced by Descartes, which he overcomes by realizing that our changes in perception are only understandable if caused by other bodies in motion. Nevertheless, this sidesteps by fiat the possibility of deception as to the world's existence being caused by an evil demon. Hence, in the thought experiment discussed, Hobbes is never genuinely calling into doubt the existence of the world, but seeking to understand the nature of perception itself.

<sup>17</sup> Hobbes, E.W., I, p.92. See also the discussion of names in Hobbes, Computatio, pp.193-221.

<sup>18</sup> Ibid., p.92.

it had a being without the mind."<sup>19</sup> Hobbes sees this manner of conceiving of the concept of space as eliminating a number of confusions. Notice that although in the De Corpore Hobbes advocates a plenist position, he does not need to resort to an Aristotelian notion of place, where the innermost element of the surrounding body (or alternately, the outermost element of the contained body) is the place of that body. As a result, he is not subject to the difficulties assimilating the concept of place to our intuition that bodies move from one place to another even in cases where the containing body accompanies it and maintains the same relationship with the contained body: "For no man calls it space for being already filled, but because it may be filled; nor does any man think bodies carry their places away with them, but that the same space contains sometimes one, sometimes another body; which could not be if space should always accompany the body which is once in it."<sup>20</sup> This is compatible with Hobbes' plenism only because the conception of space is entirely an imaginary concept where our mind considers the phantasms of things without considering any particular accidents that in fact necessarily occur with the materials that initially caused the phantasms: "SPACE is the phantasm of a thing existing

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<sup>19</sup> Ibid., p.93.

<sup>20</sup> Ibid., p.93. Space refers to the (imaginary) concept by which we understand only the accident of magnitude which may or may not be filled by a body, whereas when this space corresponds with the phantasm of magnitude of any specific body, we understand it as the place of that body (p.105).

without the mind simply; that is to say, that phantasm, in which we consider no other accident, but only that it appears without us."<sup>21</sup>

Notice the strong connection with Hobbes' discussion of geometrical points. Just as points are real bodies that we reason about by not considering their dimensionality, space is a concept that we reason with whereby we do not consider the accidents that necessarily inhere in any material thing. We conceive of space as an empty receptacle that can accept different bodies not because there is such a thing actually existing, but because we can conceive of things divorced of all the accidents that actually constitute them excepting only their existence outside of us. There is no space that could be devoid of body; space is the name we give to the phantasm of the world divorced from the various accidents. The various accidents are "not considered."

In addition to criticizing the basic Aristotelian conception of place, Hobbes also appears to be criticizing Descartes' indefinite space. With typical indignation at the failings of other philosophers, Hobbes notes that his discussion of space "is of itself so manifest, that I should not think it needed any explaining at all, but that I find space to be falsely defined by certain philosophers, who infer from thence ... that the world is infinite (for taking space to be the extension of bodies, and thinking extension

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<sup>21</sup> Ibid., p.94.

may increase continually, he infers that bodies may be infinitely extended)."22 Since Descartes identified space with the extension of bodies, his geometrization of physics conflates real bodies and a certain type of phantasm. We can compound phantasms indefinitely in our reckoning, but it does not follow that real bodies are so compounded. Hobbes' physicalist approach to geometry implies that space is a phantasm, the world is not necessarily infinite (even though geometry is the primary science), and the concept of a vacuum is a contradiction.

If space is a concept we have because bodies cause phantasms of their magnitudes in our minds, time is a concept resulting from bodies imposing phantasms of their motion on our minds.<sup>23</sup> Here Hobbes claims that he is not differing significantly from Aristotle's explication of time as depending on motion. However, the fact that Hobbes employs only a physicalist geometry resulting in the phantasmal nature of time actually means his linkage between time and motion avoids many of the conceptual problems that plague Aristotle's parallel linkage. Specifically, Hobbes avoids having to find some reference motion to refer the passage of time to, since time is merely a phantasm and not a real property of the material world itself. Given that motion involves a body being "first here then there," his complete

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<sup>22</sup> Ibid., p.93.

<sup>23</sup> Ibid., p.94.

definition of time is "the phantasm of before and after in motion."<sup>24</sup> As Hobbes puts it, "seeing all men confess a year to be time, and yet do not think a year to be the accident or affection of any body, they must needs confess it to be, not in the things without us, but only in the thought of the mind."<sup>25</sup> It is not clear from the text that Hobbes even realized that his account of sensation allowed him to avoid these problems, since he claimed to have proceeded in this case "without receding much from the common opinion, or from Aristotle's definition." He also reconciles Aristotle's definition that "time is the number of motion according to former and latter" with his own by noting that "numbering is an act of the mind."<sup>26</sup> But this is already to collapse Aristotle's approach to mathematics to Hobbes' own view that mathematics involved reckoning with names assigned to various phantasms. Hobbes' particular understanding of geometry appears to have led him to misread Aristotle as in basic agreement with his position on this point. However, he does note that another commonly accepted definition, namely that "time is the measure of motion," suffers from the fact that we can "measure time by motion [but] not motion by time."<sup>27</sup>

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<sup>24</sup> Ibid., p.95.

<sup>25</sup> Ibid., p.94.

<sup>26</sup> Ibid., p.95.

<sup>27</sup> Ibid., p.95. Here Hobbes appears to differ from Buridan's position. According to Buridan (quoted in Duhem, Medieval Cosmology, p.326), "time is the first movement; in

Although Hobbes' definition of time may have differed from Aristotle's more drastically than Hobbes recognized, it could be that he differed less from the "common opinion," if we take this to refer to certain fourteenth-century scholastic discussions on time and space. The conceptual difficulties in Aristotle's doctrines of place and time were dealt with in ways suggestive of Hobbes' approach. Since they did not eliminate abstract, non-physicalist geometry from consideration as Hobbes did, these scholastics tended to juxtapose place properly speaking with place improperly speaking, equivalent place, or some such concept. The problems in finding a place for the outermost celestial sphere and of reconciling the intuition that while bodies can move place remains immobile were addressed by developing an understanding of how the relative relationship with some fixed place (usually the final heavenly sphere) meant that in some sense it was appropriate to talk of the body as being in the same place, even if the air containing it moved.<sup>28</sup> By this method, they tried to preserve a sense in which place remains immobile; this Hobbes did more systematically by fully abstracting from reference to any body per se. Paralleling the dual approach to geometry, Buridan and Albert of Saxony juxtaposed the Aristotelian notion of place with a

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fact, the role of time is to be the measure of movements."

<sup>28</sup> See Duhem, Medieval Cosmology, pp.179-268, for a discussion of the development of this approach.

concept of place that referred to the relative relationship between a body and some given fixed place. As Buridan observes:

It is a common thought, to which all agree, that the towers of Notre Dame are today in the same place they were when they were built, even though the air surrounding them is renewed constantly, even though the intermediary bodies that make up the distance between these towers and heaven have changed frequently. This appears to be a difficult matter, but in reality it is a very simple matter: in fact, the terms, the same, which we apply to the place of these towers must not be taken in their proper and essential sense; one must admit that the words, the same, here designate the equality of distance either to the earth, or to heaven, or to some body, with respect to which we judge the rest or movement of other bodies.<sup>29</sup>

Likewise, Albert of Saxony notes that:

One can then say that a body remains immobile when it remains in the same place, understanding the word place, in its formal sense, and taking the words, the same, not literally but as signifying equivalent. . . . In this sense I can say that I am now in the same place as when I started the lesson, because the distance between the lunar orb and me has a length which equals the length it had then, and that it is the same for the distance between one of you and me.<sup>30</sup>

The tendency to conceive of one version of "place" as a conception of our own based on the relative relationships we perceive to some extent parallels Hobbes' position (with the exception that Hobbes eliminated the need to refer even to the ultimate heaven), though he abandons the Aristotelian notion of place that Buridan and Albert of Saxony juxtaposed to this equivalent place. For Hobbes, "real place" apart

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<sup>29</sup> Ibid, pp.241-42. Note also that "the ultimate sphere has a place in virtue of the order that it presents with respect to its center, which is the earth" (p.246).

<sup>30</sup> Ibid., p.249.

from the mere accident of extension is not needed.<sup>31</sup> Similar approaches were taken to the concept of time in referring all time to the motion of the ultimate sphere.<sup>32</sup>

At this point, it should be pointed out that we have only discussed Hobbes' geometry, despite the fact that we have discussed the magnitude and motions of real bodies. For Hobbes, geometry is the study of "motions simpliciter [in and of themselves]" and forms a necessary prelude to the study of physics and moral philosophy.<sup>33</sup> Physics consists of two parts: the study of "the paths of motions generated and obvious" (roughly mechanics) and the study of "the paths of motion internal and invisible" (i.e. the causes of sensible qualities and the sense-experience itself).<sup>34</sup> To get clear on Hobbes' scheme, we should keep in mind that philosophy demands that we be able to give possible causes for the generation of effects. This applies to geometry in that we

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<sup>31</sup> See Hobbes's discussion, E.W., I, p.31, in which he refers to extension as "that which some call real space." Hobbes is clearly hesitant about using such terminology and equates it with extension (conceived as a solid). There is no real place that contains a body, there is only the accident of extension in a body, the phantasm of which is identified with the name "place."

<sup>32</sup> Ockham (quoted in Duhem, Medieval Cosmology, p.320) comes the closest to avoiding necessary reference to an actually existing motion: "If there were several equally first heavens and several first movements, there would, in reality, be several times; but all these times would be a single time by equivalence (per equivalentiam), meaning that these multiple times would make up a single time for measuring."

<sup>33</sup> Hobbes, Computatio, p.301.

<sup>34</sup> Ibid.

must be able to determine how a geometrical figure could be generated. Motion plays a crucial role in this respect since "a line is made from the motion of a point and a surface from the motion of a line."<sup>35</sup> Again, the point that forms the starting point is not dimensionless, but a physical body where "size is not to count." Thus, in geometry we study "what effects, what kinds of figures, and what kind of properties of these things exist when motions have been added, multiplied, subtracted, divided in the same way."<sup>36</sup>

Only after we have established the nature of bodies in motion in a general way do we consider how these bodies interact with each other, that is, how bodies in motion effect motion and various accidents in other bodies. Physics treats of the motion of whole bodies and of parts:

[S]ince motion can be in the several parts of a body in such a way that the whole does not give up its place, we must inquire in the first place what kind of motion effects motion in the whole; that is, given some body colliding with another body which is at rest or which is already moved with some motion, in which way and with what velocity the body will be moved after the collision; and what motion the second will generate in a third, and so forth. That part of philosophy which treats of motion arises from the contemplation of these things. . . . [Next] we come to the inquiry of those things which occur from the motion of the parts. For instance, in what does the fact consist that the same things do not seem to the senses to be the same, but rather changed? Thus, sensible qualities are investigated in this place, such as light, color, transparency, opacity, sound, odor, flavor, heat, cold, and similar things.<sup>37</sup>

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<sup>35</sup> Ibid., p.299.

<sup>36</sup> Ibid., p.297.

<sup>37</sup> Ibid., p.297-99.

Geometry and physics constitute the two areas of natural philosophy which "can be explicated by proof properly speaking," although moral philosophy, "in which the motions of minds are considered" should be built upon this foundation.<sup>38</sup>

Although space is an imaginary concept of our minds, the bodies that are held to fill this space are real and independent of our thought. Imagining that something is created to replace the world we imagined annihilated, we can recognize the properties of this body that coincides with our imaginary space. A body is a real thing existing apart from us that is somehow "placed in and subjected to imaginary space, that it may be understood by reason, as well as perceived by sense."<sup>39</sup> A body, then, "is that, which having no dependance upon our thought, is coincident or coextended with some part of space."<sup>40</sup> Apart from this, the body cannot be said to have real properties independently of our perception; the accidents we associate with bodies are not part of the thing itself, but rather "the manner of our conception of body."<sup>41</sup>

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38 Ibid., p.299-301.

39 Hobbes, E.W., I, p.102.

40 Ibid.

41 Ibid., p.104. Hobbes distinguishes his position from that of "most men [who] will have it be said that an accident is something, namely, some part of a natural thing, when, indeed, it is no part of the same" (p.103). See also Ms. 5297, an early draft of De Corpore, printed in Thomas White's

Hobbes argued that matter in general is conserved. Generation and corruption can only apply to the accidents associated with matter and not to the underlying matter itself. A tree can cease to be a tree but it cannot cease to be matter; the accident 'tree' is no longer applied where it once was formerly. This clarifies the distinction between bodies which are objective and accidents which are subjective:

But it is manifest, that all other accidents besides magnitude or extension may be generated and destroyed; as when a white thing is made black, the whiteness that was in it perisheth, and the blackness that was not in it is now generated; and therefore bodies, and the accidents under which they appear diversely, have this difference, that bodies are things, and not generated; accidents are generated, and not things.<sup>42</sup>

Matter cannot be generated or destroyed since this is not conceivable by nature; however, all qualities associated with any body except its extension can be generated or destroyed as a result of motion. When we abstract away from all the accidents associated with matter, we have no positive description to give other than that bodies possess extension.<sup>43</sup>

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De Mundo Examined, where Hobbes states that "[a]n accident is not a part of natural things" (p.452).

<sup>42</sup> Ibid., pp.116-17.

<sup>43</sup> Ibid., p.159: "Materia prima, therefore, is body in general, that is, body considered universally, not as having neither form nor any accident, but in which no form nor any accident but quantity are at all considered, that is, they are not drawn into argumentation."

To apply the understanding of bodies in motion to the interaction of bodies requires a comparison of the motions of contiguous bodies. Motion is measured not just by swiftness or speed, but by the magnitude of the matter so moved. That is, a body's motion or force is a measure of its "swiftness applied to every smallest particle of magnitude."<sup>44</sup> Motion cannot be brought about in a body at rest nor can a body in motion come to rest unless this is brought about by another body touching it. This is justified by means of the intuition that if something is to move from rest in one direction rather than another, there must be some difference to account for this which must be located outside the body. Otherwise, for a body at rest, "the reason of its motion one way would be the same with the reason of its motion every other way, wherefore it would be moved alike all ways at once; which is impossible."<sup>45</sup> The same principle applies to a moving body that comes to rest; something outside it must account for why it stops now rather than another time.<sup>46</sup>

Rest cannot cause anything; as a result, a perfectly resting body offers no resistance to a moving body. If resistance is observed, this must be attributed to an

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<sup>44</sup> Ibid., p.114.

<sup>45</sup> Ibid., p.115.

<sup>46</sup> Ibid.: "For if we suppose nothing to be without it, there will be no reason why it should rest now, rather than at another time; wherefore its motion would cease in every particle of time alike; which is not intelligible."

insensible motion of the body or its parts. Hobbes' concept of conatus (which he generally translated as endeavour) enables this wholly motion-oriented physics to explain resistances, pressures, and weight. Endeavour is defined as "motion made in less space and time than can be given; that is, less than can be determined or assigned by exposition or number; that is, motion made through the length of a point, and in an instant or point of time."<sup>47</sup> Hobbes is quick to emphasize that the point of space or time is not indivisible, as discussed above. Therefore it is inappropriate to consider Hobbes' concept of endeavour as a true predecessor to infinitesimals. As with Hobbes' geometric points, his endeavour is motion small enough so that its quantity can be ignored in argumentation. The role endeavour plays in Hobbes' physics is a crucial one since it enables him to apply his understanding of all change as caused by motion to questions where motion is not normally considered. In his mature system, endeavour is propagated to infinite distance no matter how small the endeavour. Furthermore, this occurs in an instant of time as he demonstrates by appeal to a plenum. In Hobbes' earlier work, including the critique of Thomas White's De Mundo, Hobbes accepted the possibility of a void. In the De Corpore, however, he argues that the void is

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<sup>47</sup> Ibid., p.206. The term endeavour is used in the 1656 English translation of De Corpore as a translation for conatus. Hobbes first used "endeavour" in the context of his discussion of appetites and aversions in the 1640 Elements of Law, written in English.

inconceivable. Nevertheless, he claims that the instantaneous propagation of endeavour to infinite distance would hold in the void as well as in a plenum:

All endeavour, whether strong or weak is propagated to infinite distance; for it is motion. ... Besides, it reaches in any instant to any distance, how great soever. For in the same instant in which the first part of the full medium removes that which is next it, the second also removes that part which is next to it; and therefore all endeavour, whether it be in empty or in full space, proceeds not only to any distance, how great soever, that is, in an instant. Nor makes it any matter, that endeavour, by proceeding, grows weaker and weaker, till at last it can no longer be perceived by sense; for motion may be insensible; and I do not here examine things by sense and experience, but by reason.<sup>48</sup>

By the concept of endeavour, Hobbes is able to explain all natural phenomena in terms of matter in motion, sensible or insensible.

Resistance is made possible in Hobbes' physics by endeavour. Resistance is "the endeavour of one moved body either wholly or in part contrary to the endeavour of another moved body, which toucheth the same."<sup>49</sup> Without such a contrary endeavour, the smallest motion imaginable will move any body at rest. Hobbes justifies this with his customary manner of demanding that effects remain commensurate with

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<sup>48</sup> Ibid., pp.216-17. As Brandt, Mechanical Conception, pp.308-9, points out, Hobbes' proof of instantaneous propagation is given only for the case of the plenum, although Hobbes claims to have demonstrated it for both the plenum and the void. It may be that Hobbes' late conversion to the impossibility of void was sparked by a concern to preserve the infinite extension of endeavour so that it might be employed in astronomical discussions and the like.

<sup>49</sup> Ibid., p.211.

causes:

For if by that impetus it do not at all move it out of its place, neither shall it move it with double the same impetus. For nothing doubled is still nothing ... Wherefore, when a point is at rest, if it do not yield to the least impetus, it will yield to none; and consequently it will be impossible that that, which is at rest, should ever be moved.<sup>50</sup>

In contrast to Descartes' system, "rest does nothing at all, nor is of any efficacy; and ... nothing but motion gives motion to such things as be at rest, and takes it from things moved."<sup>51</sup>

The exact quantitative relationships between colliding bodies is not dealt with clearly by Hobbes. He appears to be operating with some kind of "contest" view of mechanics whereby the body with the greatest motion or force (speed times quantity) wins out over the other passing on its excess motion to the body with less motion. For among other considerations regarding motion, Hobbes mentions one in which "motion is considered ... from the effect only which the movent works in the moved body, which is usually called moment."<sup>52</sup> The implications of his definition are not made

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<sup>50</sup> Ibid., p.212.

<sup>51</sup> Ibid., p.213. Hobbes contrasts his position with Descartes': "There is one that has written that things moved are more resisted by things at rest, than by things contrarily moved; for this reason, that he conceived motion not to be so contrary to motion as rest. That which deceived him was, that the words rest and motion are but contradictory names; whereas motion, indeed, is not resisted by rest, but by contrary motion" (p.125).

<sup>52</sup> Ibid., p.214.

clear, but it seems Hobbes envisioned that both bodies would emerge from the collision with the speed of the greater body. For Hobbes, "moment is the excess of motion which the movent has above the motion or endeavour of the resisting body."<sup>53</sup> The direction of the moved body is that of the body or bodies that caused it to move: "All endeavour tends toward that part, that is to say, in that way which is determined by the motion of the movent, if the movent be one; or, if there be many movents, in that way which their concurrence determines."<sup>54</sup>

On the whole, Hobbes avoids coming to any precise quantitative mechanical laws, being content to observe qualitatively the effect of magnitude and velocity: "When two movents are of equal magnitude, the swifter of them works with greater force than the slower, upon a body that resists their motion. Also, if two movents have equal velocity, the greater of them works with more force than the less."<sup>55</sup> Generally, Hobbes uses his concept of endeavour to translate his understanding of matter in motion to the explanation of

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<sup>53</sup> Ibid.

<sup>54</sup> Ibid., p.215. Hobbes allows exceptions as when a body affects a part of the body it touches such that "the force of the movent may be so placed, as that the body moved by it may proceed in a way almost directly contrary to that of the movent, as we see in the motion of ships" (p.339).

<sup>55</sup> Ibid., p.217.

apparently static phenomena.<sup>56</sup>

In the De Corpore, Hobbes includes a discussion of appetite and aversion in his section on physics. Here the usefulness of Hobbes' mechanical heuristic (i.e. all change is caused by matter in motion) in his political writings is made clear. The crucial concept of endeavour provides the means of translating individuals in a state of nature into bodies in motion towards or away from that which attracts or repels them. Beginning while still an embryo, the human endeavours to avoid pain and seek pleasure. "And this first endeavour, when it tends towards things as are known by experience to be pleasant, is called appetite, that is, an approaching; and when it shuns what is troublesome, aversion, or flying from it."<sup>57</sup> As more experience is gained, creatures deliberate, weighing the relative pains and pleasures of a course of action before endeavour towards or away from it.<sup>58</sup> This deliberation, when coupled with humans' natural reason, enables Hobbes' state of nature to be overcome, establishing civil society.

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<sup>56</sup> Brandt, Mechanical Conception, p.304, summed up the usefulness of this concept for Hobbes: "It is ... by means of this concept, wanting in exactness as it is, [that] Hobbes thinks he has found a plausible explanation by means of motion, satisfactory to him, for a fairly large group of phenomena. Nay, it may even be said that only by means of the conatus concept does Hobbes succeed in fully applying his doctrine of motion by which even the static is made kinetic."

<sup>57</sup> Hobbes, E.W., I, p.407.

<sup>58</sup> Ibid., p.408.

Hobbes' vision of natural philosophy was undoubtedly a rather peculiar one, even by seventeenth-century standards. For Hobbes, the world consisted of matter and motion, and geometry must be constructed along these lines. Real bodies with real magnitudes are set into motion to generate figures. Space and time end up being phantasms whereby we abstract away from all accidents of bodies except their independent existence and succession of place, respectively. His doctrine of endeavour as motion smaller than can be given (but proceeding to infinity and not infinitesimal) provides a concept he can employ in his psychology of appetites, which provides one of the metaphors for his state of nature. This turns out to be one of many metaphors that Hobbes can mobilize in his political philosophy by appealing to his geometry and physics.

## Chapter Four:

### Hobbes and the Politics of Rational Mechanics

Thomas Hobbes had a clear political agenda throughout most of his life that is reflected not only in his civil philosophy, but in his whole philosophical endeavor including his work in natural philosophy. By emphasizing that changing sensations could only be caused by real bodies in motion, Hobbes was able to avoid Descartes' doubt as to the independent existence of the world.<sup>1</sup> It will be argued that Hobbes' critique of available natural philosophical positions was motivated by an underlying political concern with violations of natural reason that he believed were undermining the political order. His particular approach to mechanics reflects this concern within the context of conceivable positions in natural philosophy at the time. In particular, his political agenda enabled him to arrive at a coherent, positive approach to mechanics.

Evidence will be presented suggesting that Hobbes' concern with political obligation is long-standing and does not alter drastically. His interest in natural philosophy appears to have been a somewhat later development and will be shown to reveal influences from his political concerns. The politically motivated discussion of natural reason in Hobbes'

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<sup>1</sup> Richard Tuck, "Hobbes and Descartes," p.37, has argued that Hobbes' solution to Descartes' "hyperbolic" doubt accounted for Hobbes' status as an important philosopher in the Mersenne circle.

analysis of the state of nature will be discussed, and it will be shown that the same type of approach is undertaken for similar reasons when Hobbes discusses his mechanical philosophy. Descartes' phenomenology of certainty as an epistemic device is seen by Hobbes as politically pathological, encouraging private conscience over reason. Appeal to concepts like incorporeal substance and indivisible points are seen as irrational and a motion based physics is outlined which emphasizes the proper use of language. This proper use of language is necessary to avoid a natural philosophy which reinforces subversive tendencies. Incorporeal substances and other absurdities allow irresolvable theological disputes to spill over into the natural realm, with unhappy political consequences.

Hobbes' political agenda involved an attempt to defeat attacks on the legitimacy of sovereigns without relying on a concept of divine right (which could easily be called into question by those claiming access to revelation). This agenda entails cutting off appeals to concepts such as individual conscience and divine right when discussing political obligation, while still providing grounds for normative claims. Hobbes accomplishes this by discussing the role of natural reason in overcoming a state of nature and establishing civil society where a strong sovereign ensures civil peace. In his political writings, Hobbes attacks pernicious errors that anyone employing natural reason, even

in a state of nature (logically prior to either revelation or civil society), should be able to recognize as absurdities. His Preface to the Reader, added to the second edition of De Cive in 1647, clarifies any misunderstandings of his motives his presentation may have provoked, emphasizing the errors it seeks to remedy:

How many Kings (and those good men too) hath this one error, That a Tyrant King might lawfully be put to death, been the slaughter of? How many throats hath this false position cut, That a Prince for some causes may by some certain men be deposed? And what blood-shed hath not this erroneous doctrine caused, That Kings are not superiours to, but administrators for the multitude? Lastly, how many rebellions hath this opinion been the cause of, which teacheth that the knowledge whether the commands of Kings be just or unjust, belongs to private men, and that before they yeeld obedience, they not only may, but ought to dispute them?<sup>2</sup>

By outlining a theory of political obligation that appeals to natural reason, cutting off irresolvable theological disputes, Hobbes hoped to get around the passions that interfere with this natural reason.<sup>3</sup>

Hobbes' approach to mechanical questions reveals a

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<sup>2</sup> De Cive, pp.30-31.

<sup>3</sup> Later in this preface, Hobbes deals with objections to his position by analyzing the "passions" that interfere with its acceptance. This passage is reminiscent of Bacon's idols (Hobbes worked for Bacon for a brief period): "These things I found most bitterly excepted against: that I had made the civill powers too large, but this by Ecclesiasticall Persons; that I had utterly taken away liberty of conscience, but this by Sectaries; that I had set Princes above the civil Laws, but this by Lawyers; wherefore I was not much moved by these mens reprehensions, (as who in doing this did but do their own business) except it were tye those knots so much faster" (De Cive, p.37).

parallel concern with his approach to political questions. That is, Hobbes was concerned to eliminate not only civil injuries but also dangerous absurdities, both of which amount to the same thing in thwarting natural reason, thereby leading to dangerous conflict. The breach of any contract has the status of a logical absurdity for Hobbes; it is this tactic that allows him to base laws of nature on human reason which are binding even in the state of nature (thereby allowing civil society to emerge). This common concern with eliminating political absurdities or injuries provides the mechanism for his understanding of moral obligation.<sup>4</sup> In his political works, when discussing the violation of contracts in the state of nature, he employed this parallel to motivate a sense of obligation independent of either revelation or private conscience:

And there is some likeness between that, which in the common course of life we call Injury; and that, which in the Schools is usually called Absurd. For even as he, who by Arguments is driven to deny the Assertion which he first maintain'd, is said to be brought to an Absurdity; in like manner, he who through weaknesse of mind does, or

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<sup>4</sup> Taylor, "Ethical Doctrine," p.38, has emphasized the connection between logical absurdities and injuries in a state of nature in his interpretation of Hobbes' political thought. Taylor argues that the implications of this are that Hobbes anticipates Kant's deontological ethical theory with the result that Hobbes' ethical doctrine is divorced from his psychological (and more broadly materialistic) premises. As discussed in Chapter Two, however, this presumes that Hobbes' psychology can only be relevant to his ethical theory if the latter is a crudely utilitarian doctrine. Setting aside dangerous anachronistic comparisons to Kant, Hobbes can be seen as relying on natural reason (rather than a self-interested contract) to achieve peace given an egoistic psychology.

omits that which before he had by Contract promis'd not to doe, or omit, commits an Injury, and falls into no lesse contradiction, then he, who in the Schools is reduc'd to an Absurdity. For by contracting for some future action, he wills it done; by not doing it, he wills it not done, which is to will a thing done, and not done at the same time, which is a contradiction. An Injury therefore is a kind of absurdity in conversation, as an absurdity is a kind of injury in disputation.<sup>5</sup>

As a result, Hobbes' political agenda which is concerned with overcoming threats to the peace and stability of the land manifests itself both in his political philosophy and in his mechanical philosophy. Appeals to nonsensical concepts thwart our natural reasoning which is concerned with achieving peace (the fundamental precept of nature grounded in our desire for self-preservation). Concepts which thwart this aim in any arena of thought are shown to have politically pathological consequences -- concepts ranging from divine right and individual prerogative to incorporeal substance and indivisible points threaten the peace by contributing to injuries and absurdities. Hobbes' contributions to mechanics are rooted in his conception of geometry and motion, and result in part from a political critique of nonsensical natural philosophy. Descartes' philosophy provided a prime example of a politically dangerous natural philosophy. Of particular danger is Descartes' phenomenology of certainty which bypasses natural reason and allows for absurd and injurious challenges to

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<sup>5</sup> De Cive, p.63. This parallels almost exactly a similar passage in the Elements of Law from 1640 (E.W., IV, p.96). The connection is made in Leviathan, p.191, as well.

peace based on individual certainty which has nothing to do with reason. This political critique of Descartes' project is manifested in Hobbes' mechanical system and accounts in large measure for his status as an important philosopher in the Mersenne circle.<sup>6</sup>

Hobbes' long standing political views can be characterized as involving a commitment to a strong sovereign government (preferably a monarchy) and a concern with defeating theologically motivated challenges to civil authority. Hobbes' translation of Thucydides in 1629 represented his attempt to demonstrate the dangers of democracy. With the 1628 Petition of Right, which raised the issue of the relationship between the rights of the subject and the prerogative of the sovereign that would play such an important role in future political discussions, Hobbes was led to publish his translation to uphold the prerogative of the King.<sup>7</sup> He claimed later in his Vita that in translating Thucydides, "[h]e pointed out how inadequate democracy is, and how much wiser one man is than the multitude."<sup>8</sup> This aim is confirmed by his introduction to the translation. In discussing Thucydides' political judgments, Hobbes appears to

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<sup>6</sup> Tuck, "Hobbes and Descartes," p.37.

<sup>7</sup> See discussion in Miriam K. Reik, The Golden Lands of Thomas Hobbes (Detroit: Wayne State University Press, 1977), pp.37, 106-109.

<sup>8</sup> Hobbes, "The Life of Thomas Hobbes of Malmesbury" translated by J.E. Parsons, Jr. and Whitney Blair, Interpretation, 10 (1982), 1-7, p.2.

accept them, particularly those referring to the dangers of democracy and competing interests in the political arena:

For his opinion touching the government of the state, it is manifest that he least of all liked the democracy ... with their crossing of each other's counsels, to the damage of the public; ... Nor doth it appear that he magnifieth anywhere the authority of the few: amongst whom, he said, every one desireth to be the chief; and they that are undervalued, bear it with less patience than in a democracy; whereupon sedition followeth, and dissolution of the government. ... but more he commendeth it, both when Peisistratus reigned (saving that it was an usurped power), and when in the beginning of this war it was democratical in name, but in effect monarchical under Pericles.<sup>9</sup>

Note that Hobbes appears to be concerned already that the effects of monarchy are established more than that a legal or divine right monarchy must hold. Indeed, the "crossing of each other's counsels" that requires a strong ruler is at least suggestive of the state of nature that would play a crucial role in Hobbes' mature political philosophy.

Hobbes also appears to have already been concerned with how religious authorities might interfere with political life. With unrealized irony, Hobbes observes that Thucydides' "opinions, being of a strain above the apprehension of the vulgar, procured him the estimation of an atheist."<sup>10</sup> The reason for this false accusation is that Thucydides "taxeth Nicias for being too punctual in the observation of the ceremonies of their religion, when he overthrew himself and his army, and indeed the whole dominion

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<sup>9</sup> Hobbes, E.W., VIII, pp.xvi-xvii, emphases added.

<sup>10</sup> Ibid., p.xv.

and liberty of his country, by it."<sup>11</sup> It was unfair to consider Thucydides an atheist based on this judgment, since he praised Nicias' worship elsewhere. Religion is commendable so long as it does not lead to political ruin.

Further evidence for the existence of a clear political viewpoint can be seen in a letter Hobbes received from an individual named Aglionby, dated November 18, 1629. Aglionby reports on the latest news, including a Committee of Lords investigating a manuscript which is said "to advance the liberty [of the subject] and defeat the prerogative [of the King]," found among a few of the Lords. Aglionby then relates the response of the Lords and the actions taken with a tone that suggests that he and Hobbes were in agreement regarding the appropriateness of action taken against such a subversive position. Aglionby notes that Lord Sommerset "hath engaged himself in a business which nothing concernes him, namely the Liberty of the Subject." He further observes: "I told you it was a MS., therefore Sir Robert Cotton must have his share and they say he also is committed. He may now learn that imprisonment is almost as old as Liberty, of which himself may become a very ancient precedent." The Lord of Essex is also sent for, "a man of the sword, that is to say one of whom there is no use in peace." With strong invective, Aglionby comments finally on the investigation of "a certain seditious physician called

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<sup>11</sup> Ibid.

Dr. Turner one who disputes of all rule, but obeys none; ... Now let the Dr. look how he can purge himself; if he be laid up, all his physic will hardly make him soluble for there is no such binder as the Kings displeasure."<sup>12</sup> It seems unlikely that Aglionby would write with such obvious pleasure at the possible punishment of those involved in defending the liberty of the subject unless they both were in general agreement on the importance of a strong ruler.

It is this same concern with threats to the civil order posed by proponents of liberty and conscience that would motivate Hobbes' political writings. The Earl of Devonshire would actually attempt to nominate Hobbes for election to the Short Parliament in 1640 so that Hobbes might be able to further his views. His views were circulated in the manuscript entitled the Elements of Law in 1640 and the conflict between Parliament and the King heated up so much that Hobbes fled to Paris in November of 1640. Reflecting on this in his Vita, Hobbes would remark that 1640 was "when an amazing plague swept through our land, as a result of which countless of our learned men later perished. Whoever was infested by this plague thought that he alone had discovered divine and human right."<sup>13</sup>

His commitment to a strong ruler may be connected with

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<sup>12</sup> Printed in Ferdinand Tonnies, Studien zur Philosophie und Gesellschaftslehre im 17. Jahrhundert (Stuttgart: Frommann-Holzboog, 1975), pp.143-44.

<sup>13</sup> Hobbes, "Life," p.3.

his life long involvement with and employment by the Cavendish family. Following Hobbes' graduation from Magdalen College, Oxford in 1608, he was hired by William Cavendish, then Baron of Hardwick, later the first Earl of Devonshire, to tutor his son William. He accompanied William, the future second Earl of Devonshire, on a tour of the Continent. The first Earl died in 1626 and the second in 1628. After temporary employment with Sir Gervase Clifton tutoring his son and involving another trip to the continent, Hobbes was reemployed by the Cavendish family to tutor William Cavendish, the third Earl of Devonshire, whom he would accompany on another tour of the Continent from 1634 to 1636. Some time in the early 1630s Hobbes was introduced and began to correspond with another William Cavendish, the Earl (and later Duke) of Newcastle and his brother, the mathematician Sir Charles Cavendish.

In addition to making possible his introduction to philosophers both in England and on the Continent, these associations provided employment and friendship with a strongly Royalist noble family.<sup>14</sup> The third Earl of Devonshire supported the King financially and politically and was impeached by Parliament.<sup>15</sup> The Earl's attempt to nominate Hobbes to the Short Parliament testifies to his

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<sup>14</sup> Hobbes would later tutor the future Charles II while in Paris.

<sup>15</sup> Reik, Golden Lands, p.210.

confidence that Hobbes would support the Royalist cause. Charles Cavendish (1620-1643), the brother of the Third Earl of Devonshire, was a Royalist Colonel who won victories at Grantham, Ancaster, and Burton on Trent, before he was defeated and killed at Gainsborough in 1643. John Aubrey remarked of Cavendish that "the King's Cause lived with him, the King's cause died with him; when Cromwell heard that he was slaine, he cried upon it we have donne our Businesse."<sup>16</sup> Likewise the Duke of Newcastle held command and fought for the Royal cause with his brother Sir Charles Cavendish (1591-1654) for a period before leaving for the Continent.<sup>17</sup> Hobbes' dependence on the Cavendishes for intellectual contacts and employment, given his disdain for the universities and his refusal to take holy orders, may provide the context for Hobbes' support of a strong sovereign and his opposition to interference in civil matters by spiritual authorities.

Against this background, the Thucydides translation and the letter from Aglionby suggest that Hobbes' support of a strong ruler predates his involvement with natural philosophy by at least a couple of years. The "Little Treatise," discovered by Tonnie and attributed by him to Hobbes, is

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<sup>16</sup> John Aubrey, Aubrey's Brief Lives, Oliver Lawson Dick (ed.) (Ann Arbor: University of Michigan Press, 1957), p.59.

<sup>17</sup> Margaret Cavendish, Duchess of Newcastle, The Life of William Cavendish, Duke of Newcastle, C.H. Firth (ed.) (London: George Routledge & Sons, 1890), viii-xiii; Aubrey, Brief Lives, p.58.

generally considered to have been written between 1630 and 1636.<sup>18</sup> However, the attribution to Hobbes is most likely misplaced, as Richard Tuck has recently pointed out.<sup>19</sup> The tract, found among Sir Charles Cavendish's papers, was taken to be Hobbes' first exposition of the mechanical point of view. Although there are some elements that could be considered "Hobbesian," the tract has a rather different tone than any work by Hobbes.

The similarities to Hobbes' later doctrine included a commitment to the principle that matter cannot be self-moved; its expression, however, introduces an unclear notion of an agent being able to move a patient "by active power inherent in it selfe" in addition to local motion.<sup>20</sup> Although a body must be touching another body to cause it to move, it need not be in motion itself as long as it possesses this active power. The document does support a "contest" theory of motion also found in Hobbes, as well as similar discussions of good, bad, and appetite.<sup>21</sup> On the other hand, there is much discussion of inherent forms and inherent accidents,

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<sup>18</sup> See Brandt, Mechanical Conception, pp.47-50, for dating.

<sup>19</sup> Tuck, "Hobbes and Descartes," pp.16-18.

<sup>20</sup> Thomas Hobbes, "Little Treatise" in Ferdinand Tonnies (ed.), Elements of Law (London: Simpkin, Marshall, 1889), p.193.

<sup>21</sup> Ibid., pp.209-10. For the contest mechanics, see p.210: "But if B be of greater force than C, then C shall not move A; because A is moved allready by B, the stronger Agent; and consequently C shall not be perceiv'd."

which is contrary to Hobbes' later work.<sup>22</sup> Indeed, the crucial contention as to the subjectivity of sensible qualities, that Hobbes would claim he had mentioned in conversation with the Earl of Newcastle and Sir Charles Cavendish in 1630, is not clearly expressed in the Short Tract.<sup>23</sup> Unlike Hobbes' comment in a 1636 letter that light and color "are but the effects of ... motion in the brayne,"<sup>24</sup> the Short Tract appears to suggest that light, color, and heat are somehow still there when not perceived. This represents a sort of middle position -- the qualities are not in the objects, but there is more to them than just motion in the brain: "Light, Colour, Heat, and other proper objects of sense, when they are perceiv'd by sense, are nothing but the severall Actions of Externall things upon the Animal Spirits, by severall Organs, and when they are not actually perceiv'd then they be power of the Agents to produce such actions."<sup>25</sup> The qualities are not seen as inhering in the objects, but still exist as the "power" to

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<sup>22</sup> Ibid., pp.195, 193.

<sup>23</sup> Hobbes to Mersenne, March 30, 1641, in Tonnies, Studien, 115-119.

<sup>24</sup> Hobbes to Earl of Newcastle, October 10, 1636, in Historical Manuscripts Commission, 13th Report Part II, Manuscripts of the Duke of Portland (1893), p.130.

<sup>25</sup> Hobbes, "Little Treatise," p.206, emphasis added.

effect perception.<sup>26</sup>

Tuck has argued that the tract should not be attributed to Hobbes, but to Robert Payne or perhaps Sir Charles Cavendish. He suggests that the handwriting of the tract resembles that of Payne and that Payne, a good friend of Hobbes and Cavendish, was respected by Hobbes for his philosophical contributions.<sup>27</sup> This would appear to be supported by his interaction with Hobbes, Cavendish, and Newcastle. Payne was the Earl of Newcastle's chaplain and was involved in the correspondence concerning optics that centered around Newcastle at Welbeck Abbey. It will be useful to discuss briefly the correspondence, particularly between Hobbes and Newcastle. It appears that the first evidence we have of Hobbes' interest in either mechanics or optics (apart from the "Little Treatise") is from Hobbes' letter to Newcastle of January 26, 1634, where Hobbes relates his difficulty in obtaining Galileo's Dialogues, as he had promised.<sup>28</sup>

After that, Hobbes appears to become increasingly engaged in optical discussions, particularly regarding experiments by Walter Warner. The exchanges take place during Hobbes' third tour of the Continent, when he met

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<sup>26</sup> According to Tuck, "Hobbes and Descartes," p.17, this was "an anti-Aristotelian modification of the traditional theory; but it was very different from Hobbes' later theory."

<sup>27</sup> Tuck, "Hobbes and Descartes," p.18.

<sup>28</sup> HMC, 13th Report, p.124.

Mersenne, the mathematician Claude Mydorge, and others. In another Hobbes-Newcastle letter from August 25, 1635, Hobbes thanks the Earl for a gift and reassures him that his respect is intellectual, not financial, in nature, noting that "yet my love to you is just of the same nature that it is to Mr. Payne, bred out of private talks, without respect to your purse."<sup>29</sup> This is significant in this context, since it is entirely possible that Hobbes and Payne's discussions account for the similarities between the "Little Treatise" and Hobbes' later doctrines while allowing for the notable differences in content and style. Hobbes might have indeed mentioned the concept of motion as explaining light and heat as early as 1630 as he claimed, without authoring the "Little Treatise." If this were the case, it is reasonable to suppose that Hobbes might not have had a worked out view on these matters, since he does not express them in his 1634 letter to Newcastle, nor in the 1635 letter, but waits until a letter of July 29, 1636. It is also quite possible that Hobbes did not express his view denying the reality of sensible qualities in 1630 as he later claimed, making the claim only in the context of a priority dispute with Descartes. Whatever the case, it appears implausible that Hobbes had any kind of worked out view in natural philosophy until 1636 at the earliest, unless the "Little Treatise" was

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<sup>29</sup> Ibid., p.125.

in fact written by Hobbes.<sup>30</sup>

Further evidence for Payne's authorship can be found latter in the same 1635 letter. When discussing Warner's optical experiments, Payne's competence is emphasized while Hobbes appears as still somewhat of an enlightened outsider to the debate. Hobbes notes: "I understand not how Mr. Warner will demonstrate those inventions of the multiplyinge glasse and burning glasse so infinite in vertue as he pretends; if he know the art already, a little time will serve to make the demonstration, especially to Sir Charles and Mr. Payne, who are not scrupulous to grant him any reasonable suppositions, and understand as much as he in any thing demonstrable."<sup>31</sup> Hobbes goes on to note that he "thinke[s] Mr. Payne will do more that way then Mr. Warner."<sup>32</sup> He then discusses the potential for Payne to contribute to the understanding of passions (which are discussed in the "Little Treatise!"):

For the soule I know he has nothinge to give your Lordship any satisfaction. I would he could give good reasons for the facultyes and passions of the soule, such as may be expressed in playne English, if he can; he is the first--that I ever heard of--could speake sense in that subject.

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<sup>30</sup> Note that if it wasn't by Hobbes, it need not have been written before 1636, since Brandt's dating depends on Hobbes' espousal of a mediumistic perspective on October 10, 1636 rather than on the emanationist perspective espoused in the "Little Treatise." See Brandt's discussion, Mechanical Conception, p.48.

<sup>31</sup> Hobbes to the Earl of Newcastle, August 25, 1635, in HMC, 13th Report, p.126.

<sup>32</sup> Ibid.

If he cannot I hope to be first.<sup>33</sup>

It would seem likely that Hobbes did not write the "Little Treatise," and Payne stands out as a very likely candidate.

The image that appears to emerge from this is that Hobbes immersed himself in discussions about natural philosophy only beginning in 1634. By 1636, he had staked out the basic approach that would characterize his mature natural philosophy. In a letter to the Earl of Newcastle, he propounds his basic intuition regarding the significance of the motion of bodies and asserts that physics is not perfectly demonstrable (presumably in contrast to geometry, as in his mature philosophy):

In thinges that are not demonstrable, of which kind is the greatest part of naturall philosophy, as dependenge upon the motion of bodies so subtile as they are invisible, such as ayre and spirits, the most that can be atteyned unto is to have such opinions, as no certayne experience can confute, and from which can be deduced by lawfull argumentation, no absurdity, and such are your Lordships opinions in your letter of the 3rd of July which I had the honor to receive the last weeke, namely. That the variety

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<sup>33</sup> Ibid. In truth, the "he" here is ambiguous -- it could still be referring to Warner, although the previous quotation appears to act as a transition to speaking about Payne. If it refers to Warner, it can still be noted that Hobbes speaks of his hope to address the concept of passions, which would seem to imply that he had not already written anything as substantial as the "Little Treatise." Given that everything post-1636 of Hobbes' puts forward a mediumistic theory, this would imply that the "Little Treatise" would have to have been written after this letter and before the letter in which he argues for an mediumistic view (i.e. between August 25, 1635 and October 10, 1636), allowing also for time for Hobbes to decide to change his mind. Even if this unlikely scenario is the case, it would seem that the earliest written natural philosophical work by Hobbes would have been no earlier than late 1635, at least six years after Hobbes' politically motivated translation of Thucydides.

of thinges is but variety of locall motion in the spirits or invisible partes of bodies. And that such motion is heate.<sup>34</sup>

Hobbes at this point, prodded in part by correspondence and discussion with Newcastle, sets forth his view emphasizing the necessity of matter in motion as the principle underlying spirits, air, and heat. As he makes clear in his next letter from October 16, 1636: "But whereas I use the phrases, the light passes, or the colour passes or diffuseth itselfe, my meaning is that the motion is onely in the medium, and light and colour are but the effects of that motion in the brayne."<sup>35</sup> His basic principles have been put forth, although he has not elaborated a system yet; rather he has put forth opinions as to the nature of the natural world that he will try to articulate over the next nineteen years.<sup>36</sup>

Given his recent immersion into natural philosophical disputes, we might wonder why Hobbes felt compelled to latch onto these principles. Having demonstrated a prior concern with political stability and theological threats to it, it seems quite possible that Hobbes latched onto bodies in motion as an explanatory principle which might enable him to deal with spirits in material terms, thereby cutting off

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<sup>34</sup> Letter from July 29, 1636, HMC, 13th Report, p.128.

<sup>35</sup> Ibid., p.130.

<sup>36</sup> Hobbes notes in his later Vita that Mersenne approved of him and introduced him to many of his circle before his return to England at the end of 1636: "From that time on, I, too, was counted among the philosophers." ("Life," 10 (1982), 1-7, p.2).

appeal to "incorporeal substances." His later elaborations depend on this motivation coupled with the actual context of natural philosophical disputes, as we will see first with Descartes and then with Thomas White. It seems clear at this point that his interest in natural philosophy should be dated to the period between 1634 and 1636, at the end of which he was able to put forward tentative opinions on these matters but no worked out philosophy.

The critiques of Descartes' and Thomas White's natural philosophies reveal a ruthless concern with eliminating absurdities, such as incorporeal substance, that provide ammunition to the theologies undermining the political order. Of particular danger was Descartes' grounding of philosophy upon clear and distinct ideas. According to Hobbes this provided a license for individual conscience over (what he felt to be) the rational recognition of the need for strong sovereignty. Hobbes' anonymous comments on Descartes' Meditations in 1641 evidence this concern and its connection with his complete materialism.<sup>37</sup>

It seems likely, given Hobbes' political agenda, that he was driven to embrace a thorough going materialism coupled

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<sup>37</sup> Thus, although Hobbes' dispute with Descartes may have been concerned with the priority of the recognition of subjectivity of secondary qualities, as Tuck suggests, this is not likely to be the most important reason for the feud. I would follow Helen Hervey, "Hobbes and Descartes in the Light of Some Unpublished Letters of the Correspondence between Sir Charles Cavendish and Dr. John Pell," Osiris, 10 (1952), 67-90, p.83, in emphasizing the metaphysical (in this case, more broadly, political) nature of the dispute.

with a careful attention to appropriate philosophical language. In the objections, Hobbes articulates the fundamentals of his approach in the course of critiquing Descartes' philosophy. One can identify the political function of his materialist critique by noticing those elements of Descartes' philosophy that Hobbes critiques and noticing how they depend on his political agenda. For example, Hobbes does not approve of Descartes' cogito argument--resolving doubt as to my existence by appealing to the fact that I think does not resolve the question of what is the nature of that which thinks:

From the fact that I am exercising thought it follows that I am, since that which thinks is not nothing. But, where it is added, that is the mind, the spirit, the understanding, the reason, a doubt arises. For it does not seem to be good reasoning to say: I am exercising thought, hence I am thought, or I am using my intellect, hence I am intellect. For in the same way I might say, I am walking, hence, I am the walking.<sup>38</sup>

Accusing Descartes of assuming that the thinking self is not corporeal, rather than proving it, Hobbes gives him a proof of the nature of the thinking self based on the correct use of language:

It is quite certain that the knowledge of this proposition, I exist, depends upon that other one, I think, as he himself correctly shown us. But whence comes our knowledge of this proposition, I think? Certainly from that fact alone, that we can conceive no activity apart from its subject, e.g. we cannot think of leaping apart from that which leaps, of knowing apart from a

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<sup>38</sup> Elizabeth S. Haldane and G.R.T. Ross (trans.), The Philosophical Works of Descartes, II, (Cambridge: Cambridge University Press, 1931), p.61.

knower, or of thinking without a thinker.

And hence it seems to follow that that which thinks is something corporeal; for, as it appears, the subjects of all activities can be conceived only after a corporeal fashion, or as in material guise, as M. Descartes himself afterwards shows, when he illustrates by means of wax, this wax was understood to be always the same thing, i.e. the identical matter underlying the many successive changes, though its color, consistency, figure and other activities were altered.<sup>39</sup>

Given Hobbes' claim that language works by a stringing together of names and philosophy involves a reduction of complex names into simple ones until a sentence is analytically true or false, Hobbes attempts to reduce a non-material thinking self to an absurdity, showing that even Descartes must finally appeal to corporeal talk to explain the thinking self.

This becomes the major source of contention between the two philosophers, with Descartes insisting that "substances are of two kinds, spiritual and corporeal."<sup>40</sup> This contrast involves their differing views of philosophical proof--here Hobbes rejects appeal to justification based on private understanding rather than public appeal to rational analysis of what names refer to. Appealing to clear and distinct ideas is too dangerous an approach. For Hobbes, "[t]here is a great difference between imagining, i.e. having some idea, and conceiving with the mind, i.e. inferring, as the result

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<sup>39</sup> Ibid., p.62.

<sup>40</sup> Ibid., p.63.

of a train of reasoning that something is, or exists."<sup>41</sup> Hobbes is able to maintain the corporeality of thinking selves precisely by cutting off appeal to considerations beyond the language we use to label perceptions:

But what shall we now say, if reasoning chance to be nothing more than the uniting and stringing together of names or designations by the word is? It will be a consequence of this that reason gives us no conclusion about the nature of things, but only about the terms that designate them, whether, indeed, or not there is a convention (arbitrarily made about their meanings) according to which we join these names together. If this be so, as is possible, reasoning will depend on names, names on the imagination, and imagination, perchance, as I think, on the motion of the corporeal organs. Thus mind will be nothing but the motions in certain parts of an organic body.<sup>42</sup>

Now Hobbes extends his attack by cutting off appeals to any precise understanding of Angels or God, since the names can only refer to images based on perceptible things. Here we see Hobbes' political agenda coming through in his attempt to undermine the possibility for theological challenges in the political realm. He rejects Descartes' discussion of an idea of God in one's soul as nonsensical since ideas are phantasms or images, which must be caused by material bodies. Names like 'Angel' and 'God' are basically empty; they are constructed since, "believing that created beings exist that are the ministers of God, invisible and immaterial, we give the name of Angel to this object of belief, this supposed being, though the idea used in imagining an Angel is,

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<sup>41</sup> Ibid., p.65.

<sup>42</sup> Ibid., p.65.

nevertheless, constructed out of the ideas of visible things."<sup>43</sup> We cannot be said to have a clear understanding of Angels; believing in them we assign a name to which we connect images not actually referring to Angels but to "the image of a flame, now that of a fair winged child."<sup>44</sup>

From the principle that truth involves manipulation of names of images necessarily caused by real corporeal bodies, Hobbes is able to meet his political aim of cutting off any positive appeals to a worked out description of spirits or God which could be employed to undermine political authority. It is not that we do not believe in God, but that we can have no conception of Him that could serve any positive role in argumentation. Our images of God are false and incomplete, based on phantasms caused by corporeal bodies. Given this view, any appeal to God in a political context could only amount to sacrilege and error. When discussing "the most holy name of God; we have no image, no idea corresponding to it. Hence we are forbidden to worship God in the form of an image, lest we should think we could conceive Him who is inconceivable. Hence it appears that we have no idea of God."<sup>45</sup>

This sets up Hobbes' attack on the most dangerous part of Descartes' philosophy, namely, the phenomenology of clear

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<sup>43</sup> Ibid., p.67.

<sup>44</sup> Ibid.

<sup>45</sup> Ibid., p.67.

and distinct ideas which plays such a pivotal role in his philosophy. Hobbes objects to Descartes' conflation of strong belief and logically demonstrated truth. Commenting on his proof of existence, Descartes notes that "I could not indeed refrain from judging that what I understood so clearly was true; this was not owing to compulsion by some external force, but because the consequence of the great mental illumination was a strong inclination of the will, and I believed the above truth the more willingly and freely, the less indifferent I was towards it."<sup>46</sup> Hobbes argues that while mental illumination may cause one to believe something, this has nothing to do with whether the belief is true or not:

This term, great mental illumination, is metaphorical, and consequently is not adapted to the purposes of argument. Moreover everyone who is free from doubt claims to possess a similar illumination, and in his will there is the same inclination to believe that of which he does not doubt, as in that of one who truly knows. Hence while this illumination may be the cause that makes a man obstinately defend or hold some opinion, it is not the cause of his knowing it to be true.<sup>47</sup>

Furthermore, Hobbes aims to divorce the will from logical compulsion, since logical proof convinces us whether we wish to believe the conclusion or not. For while "[i]t is true that affirming and denying, maintaining or refuting propositions, are acts of will; but it does not follow on

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<sup>46</sup> Ibid., p.75.

<sup>47</sup> Ibid.

that account that internal assent depends on the will."<sup>48</sup>

It is precisely this distinction between will and logical compulsion that makes possible Hobbes' development of laws in the state of nature that lead to civil society. Prior to the critique of Descartes (1641), the 1640 manuscript The Elements of Law (developed into the De Cive of 1642), Hobbes discussed the compulsions that natural reason enforce on us in the state of nature to seek to avoid the calamities associated with this state. In the state of nature, before any covenants are made, everyone has equal right to all things. This right is unprofitable, "for although any man might say of every thing, This is mine, yet could he not enjoy it, by reason of his Neighbour, who having equall Right, and equall power, would pretend the same thing to be his."<sup>49</sup> The result is "that the naturall state of men, before they entr'd into Society, was a meer War, and that not simply, but a War of all men, against all men." Given that men are by nature equal and each by natural right aims to protect his life, the state of nature is unprofitable. Fear drives us to seek to overcome this state.

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<sup>48</sup> Ibid.

<sup>49</sup> Hobbes, De Cive, p.49. Cf. also The Elements of Law, XIV. 10 (reprinted as Human Nature and De Corpore Politico in E.W., IV; the first chapter of De Corpore Politico corresponds to chapter 14 of the Elements. See Ferdinand Tonnies' edition). Warrender's edition of De Cive provides cross-references to the Elements which parallels almost exactly the discussion of the state of nature that we will be looking at.).

Laws of nature holding in this state lead us to make contracts and eventually construct civil society. A law of nature, binding even in this state of nature, is the result of the dictate of natural reason and not the agreement of men; our passions (i.e. our will) may lead us to conflict but our natural reason compels us to seek peace, honor contracts, and the like. We cannot base the laws of nature on the agreement of wise nations for this does not specify who would judge this; the general consent of mankind does not work either, since then no one could be held to violate such a law short of fools and children.<sup>50</sup> Furthermore, "Men condemme the same things in others, which they approve in themselves; on the other side, they publickly commend what they privately condemme."<sup>51</sup> The Laws of Nature must have the status of logical truths, the negation of which leads one to absurdity; otherwise there could be no compulsion taking hold against what one might will. "Therefore the Law of Nature ... is the Dictate of right Reason, conversant about those things which are either to be done, or omitted for the constant preservation of Life, and Members, as much as in us lyes."<sup>52</sup>

Violations of the laws of nature are shown to be absurdities that natural reason, when properly spelled out, compels us to recognize. Covenants are enforced by appeal to

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<sup>50</sup> Ibid., p.51.

<sup>51</sup> Ibid., p.52.

<sup>52</sup> Ibid., p.52.

natural reason, the violations of which amount to a contradiction of one's will. In the state of nature, "[t]he promises therefore which are made for some benefit received (which are also Covenants) are Tokens of the Will ... whereby the liberty of non-performance is abolished, and by consequence are obligatory; for where Liberty ceaseth, there beginneth Obligation."<sup>53</sup> As we have noted above, Hobbes draws the parallel between logical absurdities and injuries or violations of a contract, since it amounts to willing something done and not willing it done and is therefore a contradiction or violation of natural law.

The scope of natural law is continually extended using this parallel between absurd philosophical language and injuries in the state of nature. Before any civil society emerges, natural law nevertheless leads us to avoid causing others to repent of gifts, render ourselves useful to others, forgive repenters, punish with an eye towards the future only and not out of vengeance, and a number of other obligations based on natural reason. This natural reason is not strictly prudential self-interest as in the stereotypical interpretation of Hobbes' doctrine. Rather, it points to contradictions between certain actions and prior actions or wills on the part of oneself or others.<sup>54</sup>

Thus, "to him that will not pardon the penitent, and

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<sup>53</sup> Ibid., p.56.

<sup>54</sup> Ibid., pp.66-67.

that gives further caution, peace it selfe it seems is not pleasing; which is contrary to the naturall Law."<sup>55</sup> Likewise "if any man will contend on the other side for superfluities, by his default there will arise a Warre, because that on him alone there lay no necessity of contending, he therefore acts against the fundamentall Law of Nature: Whence it follows (Which wee were to shew) that it is a precept of nature; That every man accommodate himself to others."<sup>56</sup> Continuing on in this manner, Hobbes notes that it violates natural reason to declare hate for another since the reproach may provoke fighting unnecessarily.<sup>57</sup> It is inappropriate to claim more right unto oneself in a state of nature since this also offends others provoking dangerous conflict as well.<sup>58</sup> This concern with bringing about and preserving peace that Hobbes was concerned with throughout his life was argued for by appeal to reason; this reason was applied equally to political and natural philosophical matters, since violating reason could endanger peace in either realm. For Hobbes, "the first dictate of Reason is Peace; All the rest are means to obtain it, and without which Peace cannot be had."<sup>59</sup>

In his critique of Thomas White's De Mundo, Hobbes

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<sup>55</sup> Ibid., p.67.

<sup>56</sup> Ibid., pp.66-67.

<sup>57</sup> Ibid., p.67.

<sup>58</sup> Ibid., p.69.

<sup>59</sup> Ibid., p.70.

continues this concern with appropriate reasoning and the dangers to be avoided by its pursuit. Hobbes discusses more extensively his separation of God, angels and the like from the realm of positive philosophy. For Hobbes, using natural reason to enquire into the articles of faith is injurious to both philosophy and faith. Those who "believe that a consequence of the definition of 'body' is that body was created, or that a consequence of the definition of 'incorporeal' is that it existed for ever" do not correctly make use of philosophical language.<sup>60</sup> Beyond this they are led into theological error,

for theologians hold that the world was created in such a way that it could have been eternal if God had not willed the contrary. But he who would demonstrate that the world was created should also show that this was necessary, i.e. that it could not have been otherwise; hence that God, although desiring that the world be coeternal with Himself, was yet unable to perform that which the theologians consider would belie His omnipotence.<sup>61</sup>

Showing that attempted philosophical proofs of the creation of the world would inappropriately undermine theological authority, as evidenced by medieval theological discussions on the omnipotence of God, gives Hobbes the upper hand in eliminating theological disputes from philosophical discussion.

Religion is undermined by such attempted proofs, since it replaces faith by arguments in realms where this is

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<sup>60</sup> Hobbes, De Mundo Examined, pp.305-6.

<sup>61</sup> *Ibid.*, p.306.

dangerous. This is because the articles of faith are given to us on authority; if natural reasoning encounters conflict with such authority, we must appeal to our inability to understand the received truth (thereby immobilizing it for public argument!):

I say that the philosopher is indeed free to enquire into the nature and cause of motion, but that as the investigation proceeds he will stumble upon a proposition that is now held by the Christian faith and that seems to contradict a conclusion he has established earlier. He can infer (if he has previously reasoned correctly): 'I do not understand under what meaning of terms that proposition is true'. So, for instance, he says: 'I do not see, or it is beyond my grasp, how that which is not moved moves something else, or how that which exists is not in a place, or how something incorporeal sees, hears, understands, wills, loves, hates, etc.' This is the attitude both of a balanced mind and, as I have said, of one that reasons correctly. But he cannot conclude that it is false; for how can anyone know whether a proposition is true or false that he does not understand?<sup>62</sup>

This approach of the "balanced" mind is remarkable for its affected piety coupled with the immobilization of any philosophical discussion of such dangerous topics as natural right or incorporeal substance.

It should be noted at this point that although Hobbes' political agenda surfaces explicitly here and there in his critique of Thomas White's De Mundo and the later De Corpore, it is not the case that it is ubiquitous. That is, it is not argued that every critique making use of his mechanical heuristic is directly concerned with his political agenda or that this agenda is all that is involved in the number of

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<sup>62</sup> Ibid., pp.307-8.

issues that Hobbes engages. Although the motivation for this heuristic is politically rooted, it is undertaken in the context of ongoing natural philosophical disputes. Furthermore, such a politically motivated heuristic underdetermines the distinct position Hobbes embraces. The prevalence of appeals to this heuristic do testify to the importance Hobbes attributed to it and the usefulness he saw for it in natural philosophical debate. The fundamental commitment to all change being caused by the motion and collision of matter is appealed to again and again in the course of his critique of White's positions. Many of these discussions are incorporated later in his De Corpore of 1655.

We see appeals to Hobbes' concept of conatus or endeavour in his 1642-43 critique that are developed more fully in the De Corpore. As discussed in the previous chapter, the concept of conatus allows Hobbes' intuition that all change is caused by motion to be applied to cases where motion is not always observable.<sup>63</sup> Furthermore, it is the appeal to motion caused by motions we cannot observe that allows Hobbes to reject the Aristotelian distinction between natural and violent motion. Rejecting White's contention that nature is 'the principle of motion', Hobbes argues that by nature bodies have the capacity to move in any direction whatever. "'Natural motion' is therefore that to which a

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<sup>63</sup> Ibid., p.149. As in the De Corpore, "conatus is ... motion in actuality, even though the motion be very small and indistinguishable by the eye."

mobile body from its very definition may have a proved or inferred potential. Consequently to every body every possible movement is natural."<sup>64</sup> Even earth must be able to move upwards "because the nature of body is to be moved in any direction."<sup>65</sup> Therefore, a violent-natural distinction among motions is inappropriate: "In a word, 'that which can become' is natural; and there is a difference between 'natural' and 'vehement' only because a motion whose cause we do see clearly we call 'vehement'."<sup>66</sup>

Hobbes demonstrates that circular motions can have contraries in addition to the linear contraries accepted by Aristotle, in order to defeat Aristotle's sublunary-celestial distinction. Even allowing that only linear motions have contraries, it does not follow that sublunar materials are necessarily mixtures. Here Hobbes mobilizes a rather peculiar distinction between contrary motions that repel and lateral motions that break: "For a mixture is caused by the breaking of the whole into particles; but it is lateral motion, not opposed motion in the same line, that conduces to the breakage. Things that meet in motions diametrically opposed repel, [but] do not shatter, one another."<sup>67</sup> This suggests that although Hobbes' application

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<sup>64</sup> Ibid., p.71.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

<sup>67</sup> Ibid., p.74.

of his basic mechanical heuristic is politically motivated, the details of the application may be largely determined by the position he seeks to refute. In order to defeat Aristotle, Hobbes suggests that only lateral motions break while contrary bodies necessarily repel. Either this position, its negation, or some intermediate position would have satisfied Hobbes' mechanical heuristic. The position Hobbes adopts among those positions compatible with his agenda seems largely determined by the positions of those whom he wishes to defeat.

Most of the explanations of physical phenomena in De Mundo Examined basically parallel the explanations in De Corpore. The measure of motion is a multiple of speed and magnitude, as in De Corpore: "I call the greater motion of both, not the velocity or the motion of the greater weight, but the motion made greater by the velocity's being multiplied into the weight." Likewise, rest plays no role since all resistance is due to motions:

But all bodies at rest are equally at rest, for rest does not admit of greater and lesser. So all [instances of] resistance would be equal. But it is clear that one resistance is greater than another. Therefore resistance cannot consist in rest; so it consists in contrary motion.<sup>68</sup>

Gravity is conceived as motion of the whole or of the parts if the body as a whole is not moving:

Gravity has been fairly generally accepted as being

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<sup>68</sup> Ibid., p.195.

nothing else but the endeavour of certain bodies towards the centre of the earth. This striving is a motion either of the entire body (as when the whole falls), or of the parts of that in which the parts move forward, even if the whole body is not yet advanced.<sup>69</sup>

The contest vision of collision is also found already in De Mundo Examined, for "[n]ot every motion, but only the one that is either the greater or equal, cancels out every contrary motion."<sup>70</sup> The major change involved Hobbes' disallowing the possibility of a vacuum in De Corpore which he had allowed as late as 1648.<sup>71</sup>

Given such an extensive draft of material that would later form the bulk of De Corpore, it is remarkable that twelve to thirteen years elapsed between the De Mundo Examined and the 1655 De Corpore. There are a number of likely reasons for this delay that have little to do with the mechanical components of Hobbes' thought. In his autobiography, Hobbes states that he was working on putting together De Corpore from 1642 to 1646.<sup>72</sup> However, with the exodus of Royalists from England, Hobbes was increasingly preoccupied by political concerns. As he put in his autobiography, "I am unwilling to allow great and foul

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<sup>69</sup> Ibid., p.125. I use the term 'endeavour' rather than 'tending' to translate conatus, in keeping with Hobbes' usage.

<sup>70</sup> Ibid., p.77.

<sup>71</sup> Hobbes to Mersenne, February 17, 1648, in Tonnies, Studien, pp.132-34.

<sup>72</sup> Hobbes, "Life," p. 4.

offenses to be ascribed to the commands of God, and I decided as soon as possible to show that the divine laws are innocent."<sup>73</sup> Hobbes was occupied in putting out another edition of De Cive and working on his Leviathan, published in 1651. He was also engaged in tutoring the Prince of Wales (the future King Charles II) in exile. In a letter to Sorbiere on June 1, 1646, Hobbes explained the delay in De Corpore that his friends had been pushing him to publish: "Part of the reason why I am taking so long over the first section of my Elements is simply laziness; but more importantly I am not satisfied with how I have explained my meaning. For I am trying to repeat in Metaphysics and Physics what I hope I have done in moral philosophy--that is, leave no foothold for a critic to stand on."<sup>74</sup>

In addition to this desire to utterly defeat any critics, we can also attribute delays to Hobbes' geometrical discussions, particularly his attempt to square the circle that would engender the dispute with Wallis. Also, in 1647, Hobbes became severely ill and nearly died. Following his recovery, Hobbes continued work and in August 1648, Sir Charles Cavendish believed publication would follow within a

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<sup>73</sup> Ibid.

<sup>74</sup> Ferdinand Tonnies, "Siebzehn Briefe des Thomas Hobbes an Samuel Sorbiere nebst Briefen Sorbiere's, Mersenne's u. Aa.," Archiv fur Geschichte der Philosophie, 3 (1890), 58-71, 192-232, p.69.

year.<sup>75</sup> A year later, Hobbes still appears to be almost ready, but is concerned with his geometrical demonstrations. In a letter from October 5, 1649, Cavendish again appears optimistic of prompt publication: "I received a letter latelie from Mr: Hobbes, which puts me in hope wee shall have his philosophie printed the next springe; he writes to me of hopes to find a right line aequall to a parabolic line."<sup>76</sup> Hobbes did not publish De Corpore until 1655, with the English translation published the following year.

Whatever the delays, De Corpore reveals the same concern with eliminating absurd speech that contributes to perversions of natural reason. In addition to the extended geometrical demonstrations, De Corpore also embraced a plenist position which he had not seen as necessary as late as 1648.<sup>77</sup> Otherwise, we may safely conclude that Hobbes' position did not extensively change from that of the De Mundo Examined. The natural philosophical part of Hobbes' political agenda is evident still in the conclusion of the De

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<sup>75</sup> Sir Charles Cavendish to Dr. John Pell, August 2, 1648, in Hervey, "Hobbes and Descartes," p.84: "Mr. Hobbes hath more leasure to studie and I hope we shall have his within a twelve-month."

<sup>76</sup> Printed in Hervey, "Hobbes and Descartes," p.86

<sup>77</sup> Is it a coincidence that Hobbes would embrace a plenist position only after Descartes death in 1650? Perhaps Hobbes felt compelled by reason of the ongoing controversy with Descartes to maintain the possibility of void, which he felt free to reject when his opponent was no longer around to accuse him of stealing the idea, as Descartes had done with respect to the subjectivity of secondary qualities.

Corpore where Hobbes summarizes what it is he has aimed to do. His demonstrations he thinks are made from possible hypotheses which can account for the phenomena in question. He opposes this to those who propose explanations making use of hypotheses which are inconceivable: "For as for those that say anything may be moved or produced by itself, by species, by its own power, by substantial forms, by incorporeal substances, by instinct, by antiperistasis, by antipathy, sympathy, occult quality, and other empty words of schoolmen, their saying so is to no purpose."<sup>78</sup> Hobbes' mechanics and the mobilization of his mechanical heuristic in natural philosophical explanations constituted a systematic attempt to eliminate such absurdities and injuries.

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<sup>78</sup> Hobbes, E.W., I, p.531.

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