

## **Hobbes's Laws of Nature in *Leviathan* as a Synthetic Demonstration: Thought Experiments and Knowing the Causes**

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### **Abstract**

The status of the laws of nature in Hobbes's *Leviathan* has been a continual point of disagreement among scholars. Many agree that since Hobbes claims that civil philosophy is a science, the answer lies in an understanding of the nature of Hobbesian science more generally. In this paper, I argue that Hobbes's view of the construction of geometrical figures sheds light upon the status of the laws of nature. In short, I claim that the laws play the same role as the component parts – what Hobbes calls the “cause” – of geometrical figures. To make this argument, I show that in both geometry and civil philosophy, Hobbes proceeds by a method of synthetic demonstration as follows: 1) offering a thought experiment by privation; 2) providing definitions by explication of “simple conceptions” within the thought experiment; and 3) formulating generative definitions by making use of those definitions by explication. In just the same way that Hobbes says that the geometer should “put together” the parts of a square to learn its cause, I argue that the laws of nature, considered jointly, are the cause of peace.

### **Introduction**

How should we understand Hobbes's claim that civil philosophy is a science? One approach sees Hobbes as fashioning civil philosophy according to the model of Euclidean demonstration. On such a view, one begins with an axiom, say, the definition of a law of nature in *Leviathan* XIV, and from that axiom derives the laws of nature found in chapters XIV and XV.<sup>1</sup> John Deigh (1996) has called this the “definitivist” understanding of the laws of nature. However, the definitivist account is difficult to hold alongside of Hobbes's own views about geometry and his harsh criticisms of Euclid. For example, since Euclid's definitions are not generative Hobbes

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<sup>1</sup> Deigh (1996). For discussion and criticism of this view, see Murphy (2000), Deigh (2003), and Hoekstra (2003). See Lloyd (2009, 151-210) for discussion of the definitivist, or as Lloyd calls it the “definitional,” view. The view advocated in this paper is closest to the “desire-based” derivation in her taxonomy; however, the present paper articulates the presentation of the laws of nature as a synthetic demonstration from simple conceptions.

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argues that “they ought not to be numbered among the principles of geometry” (EW VII.184).<sup>2</sup> Furthermore, the foundation of Hobbes's own geometry is not axiomatic at all, since Hobbes holds that even Euclidean axioms need to be demonstrated (OL I.72; OL I.119). Instead, Hobbes grounds geometry in what he calls definitions by “explication” of “simplest conceptions” such as BODY and MOTION.<sup>3</sup>

In this paper, I offer a new account of how Hobbes saw civil philosophy as scientific by linking this project with Hobbes's own geometry rather than Euclid's, what I call the *maker's knowledge view of Hobbesian civil philosophy*.<sup>4</sup> The motivation for connecting these two sciences is straightforward on Hobbesian grounds since for Hobbes these are both – and the *only* – instances of *scientia*. I argue that geometry and civil philosophy are founded in the same manner insofar as each begins with a thought experiment in which, by undergoing the experiment, one gains the principles of that science by means of definitions by explication of what Hobbes calls simple conceptions. In other words, for Hobbes civil philosophy follows the same procedure as geometry.

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<sup>2</sup> I cite Thomas Hobbes, *The English works of Thomas Hobbes*, 11 volumes, ed. by Sir William Molesworth, (London: John Bohn, 1839–1845) and Thomas Hobbes, *Thomae Hobbes malmesburiensis opera philosophica*, 5 volumes, ed. by Sir William Molesworth, (London: John Bohn, 1839–1845) as EW and OL, respectively, by reference to volume and page number.

<sup>3</sup> I capitalize all the letters of a word when referring to a conception/pharntasm and use single quotes when mentioning a name. In quotations of Hobbes's works, I preserve all original instances of italicization or capitalization. Hattab (2014, 477-478) agrees that Hobbes's first principles are not axioms but are instead definitions of simplest conceptions; however, Hattab claims that definitions of simples are “stipulative.” Instead of stipulation, I argue that Hobbes intends thought experiments to give us the explications of conceptions that we already possess from sense experience.

<sup>4</sup> For discussion of making and causal knowledge in Hobbes's geometry, see Jesseph (1996, 88ff). Some connection has been made between Hobbes and others who saw *making* as essential to scientific knowledge, for example, Bacon and Vico (Barnouw 1980; Gaukroger 1986). Pérez-Ramos (1989) argues that for Francis Bacon making – manipulating nature and producing works – is the ideal of scientific knowledge. However, there are significant differences between this understanding of Bacon and Hobbes. In particular, Hobbes holds that we possess maker's knowledge only in geometry and civil philosophy; as a result, he could never countenance, as Bacon does according to Pérez-Ramos, that we possess maker's knowledge in natural philosophy (the status of Hobbesian natural philosophy is discussed in more detail below).

The paper proceeds in three sections. In Section I, I discuss Hobbes's identification of *scientia* with causal knowledge and, specifically, with knowledge that can be acquired only by making something artificial. In Section II, I show how thought experiments function to provide definitions by "explication" in the service of a demonstration, and in this light I examine what I call the annihilation of the world thought experiment and the state of nature thought experiment. In Section III, I argue that these definitions by explication are used as the component parts – the "causes" – of the constructions in civil philosophy and geometry. I claim that the explicated definitions from the state of nature thought experiment are the principles for Hobbes's synthetic demonstration that the laws of nature cause peace. In just the same way that Hobbes says that the geometer should "put together" the parts of a square to learn its cause, I argue that the laws of nature, considered jointly, are the cause of peace. My aim in this paper is not to assess Hobbes's foundations for geometry or civil philosophy, nor to trace the history of the concepts that he employs; instead, my goal is to show that the same method is behind Hobbes's project to found both of these sciences.

### **I. Hobbes and *Scientia* as Knowledge of Causes**

A shortcoming of the debate in the literature, especially of the definitivist view, has been its focus on *Leviathan*, sometimes to the neglect of Hobbes's other works.<sup>5</sup> To remedy this deficiency, it is first necessary to contrast Hobbes's discussion of "science" in *Leviathan* with his stringent view in the broader corpus regarding what counts as *scientia*. The picture that we find of "science" in *Leviathan V* draws upon the preceding chapter "Of Speech" and appears to make science exclusively concerned with relationships among names:

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<sup>5</sup> Deigh (1996, 35 fn.) explicitly refrains from looking outside *Leviathan* because he views such use of Hobbes's broader work as methodologically suspect. Hoekstra (2003, 119-120) criticizes this methodological constraint.

By this it appears that Reason is not, as Sense and Memory, borne with us; nor gotten by Experience onely, as prudence is; but attained by Industry; first in apt imposing of Names; and secondly by getting a good and orderly Method in proceeding from the Elements, which are Names, to Assertions made by Connexions of one of them to another; and so to Syllogismes, which are the Connexions of one Assertion to another, til we come to a knowledge of all the Consequences of names appertaining to the subject in hand; and that is it, men call SCIENCE. (Hobbes 2012, 72).

The emphasis on names here and elsewhere upon “affirmations”<sup>6</sup> in the corpus has led some to understand Hobbesian science as a type of conventionalism.<sup>7</sup> Conventionalist practice of science requires making sure that one connects one term to another properly rather than, say, checking one's claims by experiment or experience. Seeming to lend support to this account, in *De Corpore* 3.8 Hobbes claims that “the first truths of all things arose from the decision of those who first imposed names on things ... For, to take an example, ‘Man is an animal’ is true because it was agreed to impose these two names on the same thing” (Hobbes 1981, 235; OL I.32).

However, Hobbes importantly adds to the definition from *Leviathan* V provided above: “...*Science* is the knowledge of Consequence, and dependence of one fact upon another: by which, out of that we can presently do, we know how to do something else when we will, or the like, another time (Hobbes 2012, 72). The reason why we can “do something else” with scientific

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<sup>6</sup> For example, in *Leviathan* IX Hobbes distinguishes between “*knowledge of Fact*” and “*knowledge of the Consequence of one Affirmation to another*” (Hobbes 2012, 124).

<sup>7</sup> For example, Martinich (1997; 2005); McNeilly (1968); Miller (1999, 157-58); Copleston (2003, 20-21); Madden (1960, 110); and Kneale and Kneale (1984, 311-312).

knowledge about some particular thing, he claims, is because we gain causal knowledge and “see how to make it” (Hobbes 2012, 72).

How can we reconcile what seem to be two irreconcilable views of science? Martinich (2005, 165) sees a “tension or contradiction” in Hobbes’s view of science: there seem to be both conventionalist aspects, where claims in science are true in virtue of the meaning of the terms, and what we might call causalist aspects, where the natural philosopher should seek to learn the causes of natural phenomena and, when able, make those phenomena happen.<sup>8</sup>

Some in the literature have criticized the conventionalist interpretation by arguing that simplest conceptions, which figure in Hobbes’s account in *De Corpore*, serve as the foundation of Hobbesian science, and that simplest conceptions received in experience do not depend upon human decision; instead, only the particular names that signify a conception are from human decision (Adams 2014a).<sup>9</sup> On this view, Hobbes’s apparent conventionalism relates to truth of sentences, and only the particular name chosen is determined by convention. Using the example above from *De Corpore* 3.8, the sentence ‘Man is an animal’ is true because humans agreed that the general name ‘Man’ would be imposed upon a group of relevantly similar conceptions, and these conceptions are a subset of the group upon which ‘Animal’ was imposed. However, the reason for this agreement among humans is due to characteristics of the *bodies* in the world (accidents) and their ability to cause relevantly similar conceptions in human perceivers. Humans could have chosen by convention the name ‘blue’ instead of ‘Man’. Holding this limitation regarding what qualifies as “conventional” allows Hobbes to be consistent when, for example, he

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<sup>8</sup> See also Malcom (2002, 17 and 154-155), who finds two competing views of scientific knowledge in the 1640s period when Hobbes is working on *Anti-White*: “the knowledge of causes, and the knowledge of definitional meaning.”

<sup>9</sup> For additional criticisms, see Jesseph (2010, 124) and Gauthier (1997).

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discusses “possible causes” for natural phenomena throughout *De Corpore* Part IV as well as when he speaks of “*Science*” as “*Conditionall*” in *Leviathan* IX (Hobbes 2012, 124).

But I need not attempt to adjudicate this debate regarding the conventionalist interpretation of Hobbesian science within this paper, or whether there is in fact a tension in Hobbes's view of science, for my focus will be upon the two sciences in which Hobbes explicitly says we have actual causal knowledge. There are only two instances of scientific knowledge in this stricter sense – geometry and civil philosophy – and they are unique because in these sciences we have access to causal knowledge as makers.<sup>10</sup> In all other sciences, we posit possible causes (Horstmann 2001; Adams 2016). Thus Hobbes distinguishes between sciences where we posit possible causes, such as the natural philosophy of *De Corpore* Part IV,<sup>11</sup> and the two sciences in which we know actual causes because we act as makers – geometry and civil philosophy.

In linking *scientia* with knowledge of the causes, Hobbes explicitly aligns himself with Aristotle (cf. OL V.156).<sup>12</sup> In *De Corpore* 6.1, Hobbes distinguishes *scientia*, seeing it as knowing some effect through its causes (*scientia* τοῦ διότι), from “every other knowledge [*cognitio*], which is called τοῦ ὅτι” (Hobbes 1981, 289; OL I.59). When we know some effect through its causes, “we know what its causes are, in what subject they are, in what subject they

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<sup>10</sup> For sake of convenience, I use *scientia* to describe this more restrictive type of scientific knowledge, but Hobbes himself is inconsistent in his usage of *scientia*. Sometimes he distinguishes *scientia* from *cognitio* (see discussion in Adams 2014b, 420 fn. 26); however, other times he uses *scientia* for the more general form of “science”, for example, as the 1668 translation of “science” from the 1651 edition of *Leviathan* (cf. Hobbes 2012, 72-73).

<sup>11</sup> References to possible causes of natural phenomena occur throughout *De Corpore* Part IV. For example, in Hobbes offers a “possible cause of the light of the sun” in *De Corpore* 27 (OL I.365) and, generally, Hobbes advertises the project of Part IV as concerning how the phenomena “may be generated” and not how they are generated (*De Corpore* 25; OL I.316). It is beyond the scope of the present paper to discuss how Hobbes believes that suppositions in natural-philosophical explanations should be chosen. Adams (2016; 2017) argues that the causes that are supposed for natural-philosophical explanations are often “borrowed” from geometry. Hobbes also sometimes uses thought experiments in natural philosophy itself (see fn. 25 below).

<sup>12</sup> Although asserting the Aristotelian dictum, Hobbes admits only efficient causes as intelligible, even in mathematics (Jesseph 1999, 204).

introduce the effect, and how they do it” (Hobbes 1981, 289; OL I.59).<sup>13</sup> In *Six Lessons to the Professors of the Mathematics* (1656; hereafter *Six Lessons*), Hobbes identifies geometry and civil philosophy as the two sciences in which *scientia* can be achieved:

Geometry therefore is demonstrable for the lines and figures from which we reason are drawn and described by ourselves and civil philosophy is demonstrable because we make the commonwealth ourselves. But because of natural bodies we know not the construction but seek it from the effects there lies no demonstration of what the causes be we seek for but only of what they may be (EW VII.184).

Similarly, Hobbes claims in *De Homine* 10.5 that geometry is demonstrable because “the causes of the properties that individual figures have belong to them because we ourselves draw the lines” (OL II.93-94; Hobbes 1994, 41). Furthermore, he asserts that “politics and ethics... can be demonstrated *a priori*; because we ourselves make the principles—that is, the causes of justice (namely laws and covenants)—whereby it is known what justice and equity, and their opposites injustice and inequity, are” (OL II.94; Hobbes 1994, 42).

Being demonstrable, then, requires causal knowledge—knowledge of the actual causes, not merely possible causes.<sup>14</sup> Indeed, this is the reason that Hobbes argues in *Examinatio et Emendatio* (1660) that the term ‘demonstration’ should be reserved only for the reason ‘why’ (OL 4.38).<sup>15</sup> Actual causes are available only in geometry and civil philosophy since we make the objects of those *scientiae*.

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<sup>13</sup> Some have connected Hobbes’s views to Zabarella’s *regressus*, but there are significant differences between the two. Hattab (2014) argues that Hobbes’s method has affinity with Zabarella’s view of “method as order.”

<sup>14</sup> The issue of why Hobbes thinks geometers acquire knowledge of the causes is discussed in more detail below in section III.A.

<sup>15</sup> For discussion, see Jesseph (1999, 204–205).

## II. Using a Thought Experiment to Ground a Causal Science

The discussion in the preceding section was aimed at showing the importance of causal knowledge for Hobbes; whether we know actual causes, such as in geometry or civil philosophy, or posit possible causes, such as in natural philosophy, causes are central. Hobbes incorporates this distinction into his definition of 'philosophy' in *De Corpore* 1.2 by arguing that it can take two paths: "Philosophy is knowledge acquired through proper ratiocination of effects or phenomena from conceptions of their causes or generations, and again of generations which are possible, from known effects" (OL I.2).<sup>16</sup> Natural philosophy, such as what Hobbes offers in *De Corpore* Part IV, follows the second route insofar as we observe phenomena and then posit possible causes. However, the *scientiae* of geometry and civil philosophy follow the first route. How do we gain knowledge of actual causes in these two sciences so that we can ratiocinate the effects "from conceptions of their causes or generations"?

In this section, I will argue that Hobbes *could* have provided an analysis aimed at establishing the first principles (simple conceptions) of the two *scientiae*. Hobbesian analysis begins with a complex conception and shows how it is composed of simpler conceptions, ultimately ending in the conceptions that are simplest for that domain. As will be discussed below, Hobbes understands analysis as proceeding "from the sense-experience of things to universal principles" (OL I.71; Hobbes 1981, 313). Hobbes describes this process as "resolving" or "subtracting." For example, Hobbes analyzes the complex conception GOLD into SOLID, VISIBLE, and HEAVY and the complex conception MAN into FIGURATE, ANIMATE, and RATIONAL (OL I.59-61; for general discussion, see Adams 2014b). These would be further analyzed until simples such as BODY and MOTION were reached. If Hobbes had moved by

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<sup>16</sup> Hobbes provides slightly different definitions at *De Corpore* 6.1 (OL I.58) and *De Corpore* 25.1 (OL I.313). An early definition appears in Robert Payne's notes of *De Corpore* (Chatsworth ms. A.10; cf. Hobbes 1973, 463).

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analysis to first principles and from first principles by synthesis in the civil philosophy of *Leviathan*, he would have begun by analyzing a peaceful commonwealth into the laws of nature and the bodies of that domain (humans) and their motions (passions). Then using these bodies and their motions as principles he would have synthetically constructed the peaceful commonwealth.

Instead of such analyses, I argue that Hobbes employs thought experiments to establish first principles because he holds that in a demonstration one should provide only a synthesis. A thought experiment thus functions as a short cut to the conceptual bedrock for the domain of interest, taking the place of an analysis so that the demonstration can proceed only by synthesis.<sup>17</sup> However, how can we be said to be moving from “known” causes, as in the first route of philosophy mentioned above, if we require a thought experiment to know these causal principles? Insofar as these known causes (simple conceptions) are contained as ‘parts’ in every conception received in sense experience, they are known to anyone with any sort of experience. Indeed, Hobbes claims in *De Corpore* 6.2 that

...the causes of the parts are better known than the causes of the whole. For the cause of the whole consists of the causes of the parts; and it is necessary that the components be known earlier than the composite. But by ‘parts’ I understand in this place not the parts of the thing itself but the parts of its nature, so that by the parts of a man, I do not understand head, shoulders, arms, and so on, but figure, quantity, motion, sensation, reasoning, and similar things, which are accidents

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<sup>17</sup> This paper will not consider the details of the debate between Sacksteder (1980; 1988) and Talaska (1988) regarding analysis and synthesis and the scope of what Hobbes calls *logistica*, in particular its relationship to natural philosophy.

which assembled at the same time constitute the whole man – not his bulk but his nature (Hobbes 1981, 291; OL I.60).

The purpose of a thought experiment is thus to “explicate” (Hobbes’s term, as will be discussed below) these simples, such as MOTION, that experienced individuals already know. We never experience simple conceptions qua simples, so we find them contained in our complex conceptions. Additionally, working through these thought experiments clarifies the relationships among conceptions, such as the relationships between TIME and MOTION and between HOPE and EQUALITY (discussed below).

I shall begin by discussing how thought experiments fit into Hobbes’s view of demonstration and definition by “explication” (section II.A), then proceed to discuss the thought experiment in *De Corpore* 7-8 that grounds geometry (section II.B), and finally the state of nature thought experiment that grounds civil philosophy in *Leviathan* (section II.C).

### *II.A Hobbesian demonstration*

Hobbes understands demonstration as showing the process of moving from principles to an end. He defines ‘demonstration’ in *De Corpore* 6.16: “A demonstration is a syllogism or series of syllogisms from the definitions of names all the way to the final conclusion” (OL I.76; Hobbes 1981, 323).<sup>18</sup> He claims that this understanding stems from the “origin of the name” insofar as it relates to “showing”: “...even though the Greeks used ἀποδείξις which the Latins translated as the word *demonstratio*, only for that reasoning in which they, having described certain lines and figures, put the thing practically before their eyes, which properly is ἀποδεικνύειν or *monstrare*” (OL I.76; Hobbes 1981, 323).

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<sup>18</sup> I have modified Martinich’s translation (Hobbes 1981) here and in quotations that follow this, using ‘demonstration’ rather than ‘proof’ for *demonstratio*.

Each syllogism in the series of syllogisms that make up a demonstration will be composed of definitions or of conclusions already derived from definitions (OL I.76). For example, in *De Corpore* 4.8 Hobbes offers the following syllogism when describing what corresponds in the mind to syllogistic reasoning:

Man is an animal;

An animal is a body;

Therefore, man is a body.

The mind evaluates the truth of the premises, as well as the connection between the premises and the conclusion, by means of definitions. For example, he argues that we evaluate the truth of the conclusion by imagining a man and conceiving that individual as in some place or occupying space. We then remember that whatever appears as such, by the definition of 'body' (discussed below), is called 'body' (OL I.44; EW I.50).

Hobbes furthermore claims the "entire method of demonstrating is synthetic" (OL I.71), and he defines synthesis as "ratiocination from the first causes of construction through the middle [causes] continued to the very thing itself" (OL I.254).<sup>19</sup> Hobbes uses 'ratiocination' in his definition of philosophy at *De Corpore* 1.2 (quoted above). He understands it as the general mental activity used in philosophizing: "And by ratiocination I understand computation [*computationem*]. To compute truly is to collect the sum of many things added together at once, or when one thing from another subtracted, to know the surplus" (OL I.3). Ratiocination refers to two "operations of the mind": adding things together (synthesis) or subtracting one thing from another (analysis) (OL I.3).

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<sup>19</sup> Talaska (1988, 214) has argued that Parts I-III of *De Corpore* are a synthetic demonstration.

What can Hobbes mean by this claim that a demonstration, understood as showing, will be synthetic only? Hobbes views demonstration as a form of teaching (*docere*) where the teacher shows the student the “tracks” by which the teacher discovered a conclusion. He claims that the ...method of demonstration will be the same as the method of discovery had been, except that the first part of the method, namely, that which proceeded from the sense-experience of things to universal principles, is to be omitted. For the latter things cannot be demonstrated, since they are principles; and as they are known by nature (as was said above in section 5), they do indeed need *explication*, but not demonstration (OL I.71; Hobbes 1981, 313; emphasis added).

Later, in *De Corpore* 20.6, Hobbes claims that “*Synthetica* is the art itself of demonstration” (EW I.310; OL I.252). The untaught individual without a teacher to demonstrate might discover by means of analysis from sense experience to principles, but this analysis should be omitted when a teacher offers a demonstration. Instead of a demonstration for the principles of a synthesis, an explication is needed.

It seems that Hobbes means something close to the etymology of ‘explicate’, something like an unfolding, but related to what we do with conceptions when we inspect their contents. Indeed, Hobbes uses a similar notion later in *De Corpore* 6.14 when he gives the definition of ‘definition’. There he defines ‘definition’ as “a proposition, the predicate of which is the resolution of the subject, when it can be done, and is its explication when it cannot be done” (OL I.74; Hobbes 1981, 319).<sup>20</sup> When defining by resolution is impossible, we reach a definitional regress stopping point by explicating the word in question. Since Hobbesian names used properly

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<sup>20</sup> The *Latin Works* edition (OL.74) follows the 1650 edition and uses *exmplicativum* here, which Martinich (1981, 319) renders as ‘explicate’. Schuhmann (1999, 68) corrects the misspelling in *De Corpore* from *exmplicativum* to *exmplificativum*, reflecting the spelling that Hobbes provides in a quotation of this passage in *Examinatio et Emendatio* (cf. OL IV.38).

signify our conceptions, lest we commit an absurdity, we explicate by unfolding the contents of conceptions received in experience.

It will be useful to mention some examples of explication. Hobbes identifies the “highest causes” in *De Corpore* 6.5 and provides some examples in the following article. He claims that “the causes of universals (those of which there are any causes at all) are obvious *per se* or known to nature, as they say” (OL I.62; Hobbes 1981, 295). Examples that Hobbes provides in this discussion include BODY, PLACE, and MOTION, and these can serve as principles for a demonstration when we have their explications: “When, therefore, universals and their causes (which are the first principles of knowledge τοῦ διότι) are known, we have first their definitions (which are nothing other than the explications of our simplest conceptions)” (OL I.62; Hobbes 1981, 295).<sup>21</sup>

What will count as an explication of a simplest conception? Hobbes provides the following example of PLACE: “...whoever correctly conceives what a place is...must know the definition: that a place is a space which is completely filled or occupied by a body” (OL I.62; Hobbes 1981, 295).<sup>22</sup> Although Hobbes understands these universals as manifest *per se*, he does not hold that every person has in fact correctly conceived BODY or PLACE; indeed, Hobbes

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<sup>21</sup> Hobbes seems to use ‘cause’ in this quotation in the following way: when we have the correct definitions of “our simplest conceptions”, we then know the cause of those very conceptions. For example, when we know that “a place is a space which is completely filled or occupied by a body” (OL I.62; Hobbes 1981, 295), we know what causes the simplest conception PLACE, namely, bodies filling space. For an argument that Hobbes’s philosophical method aims at knowledge of the causes of our *conceptions* of things, not at the cause of things themselves, see Hattab (2014, 474).

<sup>22</sup> Boonin-Vail (1994, 32) argues that definitions of these simples, in this case the definition of PLACE, are propositions “whose truth depends upon [their] correspondence to reality,” but Hobbes could not hold that we evaluate them in this way. We would not look simply to “reality,” as it were, to judge this definition, since we will never encounter PLACE qua PLACE in experience. Instead, we discover the conception PLACE as it is contained within each of our conceptions of individual bodies. Thus the one who “correctly conceives” the definition of place can do so only by either an explication by means of a thought experiment or by an analysis from a conception of a particular body (discussed below).

holds that *misconception* is possible.<sup>23</sup> How then do we arrive at the correct explication and avoid misconception?

Part of the answer to this question is reflected in one Hobbes's broader projects in *Leviathan*: showing how to avoid absurdity by "meditating" upon one's conceptions to be sure that each name used signifies a conception received in sense experience. For example, in *Leviathan* XII Hobbes argues that those who pay attention to their own conceptions "by their own meditation, arrive to the acknowledgment of one Infinite, Omnipotent, and Eternall God, chose rather to confess he is Incomprehensible" (Hobbes 2012, 168). When we examine our conceptions, we discover that we lack any such conception for God as infinite, omnipotent, and eternal.<sup>24</sup> Thus, he argues in *Leviathan* III that we avoid "absurd speeches" when we recognize that "the Name of God is used, not to make us conceive him; (for he is *Incomprehensible*; and his greatnesse, and power are unconceivable;) but that we may honour him" (Hobbes 2012, 46).

Avoiding absurdity thus involves checking whether a name used signifies a conception received in sense experience. Most of the time, we define non-absurd names by resolving them into their component parts. We resolve, for example, 'man' into 'body', 'animated', and 'rational' (OL I.4; EW I.4). Defining 'man' as "animated rational body" corresponds to linkages that are present at the conceptual level for MAN, which linkages exist even apart from us having names with which to signify them (e.g., see the discussion of ratiocination even if "no words were imposed" at *De Corpore* 1.3; OL I.3; Hobbes 1981, 176-177). As we craft definitions, we must take care that each of these component parts (names), as well as the linkages made between

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<sup>23</sup> For example, he argues in *Anti-White* III.5 that Aristotle's definition of place is not true (Hobbes 1973, 120).

<sup>24</sup> Similarly, Hobbes holds in *Elements of Law* XI.2 that although "we can have no conception or image of the *Deity*..." we do have a conception "that *there is a God*" (1650, 132). This conception is one of God as first cause, and any time that we attempt to ascribe attributes to God the names that we use, such as 'omnipotent', "*signifie* [only] either *our incapacity*, or *our reverence*" (1650, 134).

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them in definitions, signify conceptions and conceptual connections received in experience. For example, if we define 'man' as "animated rational flying winged body" we have not used any absurd names, since each name considered singly signifies conceptions received in experience; however, we have made a linkage between names not present in conceptual linkages from experience.

If we need to resolve 'man' further than "animated rational body," we may do so, but eventually we will reach a point where resolution is no longer possible because we have reached a name that signifies a simple conception. These simples, such as BODY, are non-absurd, since each will be contained in conceptions received in experience, but we must provide an explication for each of them that we use. Thought experiments for Hobbes help us gain such an explication whereby we can know that we have not misconceived, and these simple conceptions can then serve as the principles for our demonstration by synthesis. In the following two sections, I will discuss two thought experiments that I claim do just this: what I call the annihilation of the world thought experiment in *De Corpore* 7-8 and the state of nature thought experiment in *Leviathan*. For the sake of clarity in the connection that I hope to make between the two thought experiments, I will identify three steps that Hobbes takes in these thought experiments: in step 1, Hobbes asks the reader to imagine a scenario by privation; in step 2, the reader's attention is drawn to features of the bodies within the imagined scenario; and in step 3, Hobbes adds something to the imagined scenario and considers what follows from its addition.

### *II.B The annihilation of the world thought experiment to ground geometry*

Part II of *De Corpore* is entitled "The First Grounds of Philosophy." Hobbes understands the function of first philosophy as providing a theory of body by means of our phantasms and not of

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being qua being (Leijenhorst 2002, 101). Thus, Hobbes begins *De Corpore* chapter 7.1 by identifying his goal of providing an account of the “teaching of natural philosophy.” Hobbes claims that first philosophy of this sort, which will serve as the foundation for geometry and, ultimately, for natural philosophy, begins best from “privation.”<sup>25</sup> The privation to be considered is a situation in which the entire universe has been destroyed save for one lone individual (Step 1). Implicit in this starting point is that the world that caused the conceptions that remain in the man's mind did exist at one time (Sorell 1995, 92).

Having been asked to consider such a scenario, the reader examines the features of the body in that system (Step 2). We are first asked what would be available to ratiocinate upon for the lone individual who remained. Hobbes asserts that all the “ideas,” or phantasms, of the things that this individual had seen or otherwise perceived would remain for him: “Therefore, to these [phantasms] he would impose names, these he would subtract and compound” (OL I.82; EW I.92).<sup>26</sup> This lone individual would be in a position similar to everyday experience, for when examining the world around us “we compute nothing but our phantasms” (Ibid.). Astronomy is a case in point: when we measure motion in astronomy we do not ascend into the heavens; instead, “we do so quietly in our closet or in the dark” (Ibid.). We use names that signify phantasms, but we are really examining phantasms, and connections between them (as already discussed).

Although we may use signs in first philosophy, such as ‘body’, those signs are shared memorials

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<sup>25</sup> Hobbes uses a brief thought experiment by “privation” in *Dialogus Physicus* (1661, 1668) when speaker A articulates the view that since simple circular motion is congenital to the Earth it is also to congenital to each “one of its atoms” (OL IV.253; for additional privational thought experiments that Hobbes offers, see *Anti-White*, Hobbes 1973, 117 and *Elements of Law* 1650, 4-5). Speaker A supports this claim by asking what would result if the Earth were “annihilated by divine omnipotence or if half this Earth were removed to some other distant place beyond the fixed stars” (see discussion in Adams 2017, 91). Leijenhorst (2002, 110, fn. 49) sees the annihilation thought experiment in *De Corpore* 7-8 as an “argumentative device” wherein we *suppose* that annihilation has happened, which as a mere supposition Hobbes can consistently hold alongside his claim in *Anti-White* XIII.8 that “the universe or a part of it cannot perish, unless it has been supernaturally annihilated by God” (Hobbes 1973, 193; Hobbes 1976, 145) and in *Dialogus Physicus* Speaker A's reference to “divine omnipotence.”

<sup>26</sup> Hobbes uses ‘conception’, ‘phantasm’, and, to a lesser extent, ‘idea’ interchangeably; my usage reflects this.

that signify conceptions, such as BODY. The difference between this remaining individual and those in the everyday world is that he has only ideas from past experiences.

Regardless of which conception this individual examined, he would find contained within it the conception SPACE. This conception would be a “mere phantasm” (OL I.82; EW I.93), since it would not, when considered, be caused by an external body. As a result, this conception is “imaginary” SPACE, defined as “the phantasm of an existing thing, so far as it is existing, i.e., when no other accident of a thing is considered except that it appears outside of imagining” (OL I.82; EW I.94).<sup>27</sup> In other words, imaginary SPACE is the phantasm that arises when considering the complex conception of any body whatsoever and finding contained within that conception the conception that the body that caused it existed outside of the perceiver's imagination. Similarly, Hobbes identifies imaginary SPACE as the “image, or phantasm of a body” in *Anti-White* III.1 (Hobbes 1973, 117).

The next after-effect of past experiences discovered is TIME. Just like “a body leaves a phantasm of its magnitude in the mind” (OL I.83; EW I.94), resulting in imaginary SPACE, a previously-experienced moving body leaves the phantasm of TIME. As a result, when ratiocinating upon some of his conceptions, this lone individual in the thought experiment would discover MOTION contained within them.<sup>28</sup> MOTION just is the “idea of a body crossing, now through this, now through that space in continual succession” (Ibid.).<sup>29</sup> Hobbes is explicit that the

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<sup>27</sup> For discussion of Hobbes on imaginary space, see Jesseph (2016, 136; 2015) and Slowik (2014).

<sup>28</sup> Not all complex conceptions of particular bodies will contain MOTION; some will contain REST. Hobbes acknowledges that unlike the accident of extension, without which we cannot conceive a body, there are accidents shared by some but not all bodies, including resting, being moved, color, and so on (*De Corpore* 8.3; OL I.93). Slowik (2014, 78) suggests that motion and rest are disjunctive properties of bodies insofar as one or the other is always possessed by a body.

<sup>29</sup> Were Hobbes being consistent with terminology, he might call the conception of MOTION implicated at this stage in the thought experiment *imaginary* MOTION since when considered it would not be caused by a moving body but would only be an after-effect (like imaginary SPACE). This would also imply that the conception of TIME offered at this stage of the experiment is imaginary. Such a distinction would help make sense of his later definition

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phantasm TIME is conceptually dependent upon motion, preventing us from claiming that “time is the measure of motion.” Instead, “we measure time by motion, not motion by time” (OL I.84; EW I.95). For example, we measure the passing time of a day by the motion of shadow around the sun dial. Here it seems that the thought experiment is not merely aiding in the explication of the conceptions TIME but in doing so clarifying its relationship to other conceptions such as MOTION. We thus have discovered that bodies in motion would have left two after-effects in the mind of the lone individual: the magnitude of any body leaves the phantasm of imaginary SPACE, and the motion of some bodies leaves MOTION and from this TIME.

These definitions of imaginary SPACE, MOTION, and TIME have been explicated insofar as they were learned by examining the contents of particular conceptions. Were the lone individual to continue ratiocinating, additional definitions that would be discovered include PART, understood as a relation of one section of imaginary SPACE compared with the larger SPACE that contains it, and DIVISION, which is understood as “nothing else but to consider one and another within the same” (OL I.84; EW I.95). After these, the individual could gain ONE, NUMBER, COMPOUND, and WHOLE. Each of these conceptions is understood in terms of imaginary SPACE.

*De Corpore* 8.1 begins step 3 of the thought experiment as Hobbes departs from considering only the lone individual by reintroducing one body: “Let us suppose next that one of the things be put back, or created once more” (OL I.90; EW I.102). The reader discovers two things: first, this thing, whatever it may be, would have no dependence upon the individual's imagination (mind independent); and second, it would be a part of imaginary SPACE such that it would be “coincident and coextended” with it (OL I.90; EW I.102) (extended). Note that we can

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of (real?) MOTION in *De Corpore* 8.10, which relies upon a body being reintroduced for the lone individual to consider and the definition of PLACE that he develops (discussed below).

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make sense of PART only since it was defined earlier in chapter 7 with reference to imaginary SPACE. Hobbes identifies the resulting conception BODY with the name 'body' (OL I.91; EW I.102) and provides a definition that makes use of these two aspects of the recreated thing.

The account of PLACE relates to the distinction Hobbes makes between imaginary SPACE and the extension, or real SPACE, of a body in *De Corpore* 8.4-5. Unlike imaginary SPACE, Hobbes argues that extension does not depend upon our thinking (OL I.93; EW I.105); instead, the magnitude of a body causes this conception. To further distinguish PLACE from real SPACE, he argues that PLACE is the part of imaginary SPACE which is coincident with the magnitude of some body. He distinguishes PLACE from MAGNITUDE by having the reader consider what happens when a body is moved; its magnitude is retained but its place is not. From this account of PLACE we define MOTION caused by the body returned to the thought experiment for step 3: "motion is a continuous abandoning of one place and acquiring of another." Recall that TIME is an after-effect of bodies' motion, but the lone individual would not yet have been able to formulate a definition of the motion of an *existing* body even so (see fn. 29). This is only possible now with the conception PLACE explicated. Oddly, unlike in the case of imaginary/real SPACE, Hobbes provides no account of real TIME after a body is reintroduced.<sup>30</sup>

Notice that imaginary SPACE is the fundamental conception in Hobbes's first philosophy from which he explicates more complex conceptions such as real SPACE, BODY, PLACE, and MOTION. It might seem strange to claim that imaginary SPACE is conceptually fundamental since Hobbes believes it to be caused by bodies. Why would Hobbes see this conception as

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<sup>30</sup> Gorham (2014, 95ff) argues that Hobbes needs real TIME as a corollary to imaginary TIME (see fn. 29 above); he suggests that just as real SPACE (extension) is an essential attribute of body, real TIME could be 'succession' as the essential attribute of motion (for argument against, see Leijenhorst 2002, 134-137).

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foundational when it is caused by bodies, which are *ontologically* fundamental? Bodies in motion are certainly Hobbes's ontological fundamentals; however, Hobbes's aim in the experiment is to unearth—to explicate—our most simple conceptions caused by moving bodies. Hobbes's view that only bodies in motion exist in the world is an assumption for which he does not argue, and his goal is to show which conceptions are caused by experiences of those bodies. Given that aim, imaginary SPACE emerges as conceptually fundamental. Section III.A discusses how these conceptions explicated in the experiment are put to use in geometrical definitions as we build up from BODY and MOTION considered simply to complex geometrical figures, but first I shall consider the state of nature thought experiment.

### *II.C The state of nature thought experiment to ground civil philosophy*

The state of nature thought experiment in *Leviathan* XIII is perhaps the most notorious aspect of Hobbes's philosophy. Ioannis Evrigenis comments that its prominence is somewhat “paradoxical” since he claims that it “falls far short of [Hobbes's] stated standards of precision” in *Leviathan* (Evrigenis 2016, 222). The standards that Evrigenis has in mind are the careful definitions that Hobbes provides in the preceding chapters, and he suggests that “it is precisely because it violated those standards that [it]...became so successful” (Ibid.). However, viewed alongside the annihilation of the world experiment from first philosophy we see that imprecision (and by means of that imprecision success) cannot be Hobbes's intent. Instead, Hobbes provides a thought experiment to explicate simple conceptions and then (as will be argued in Section III below) proceeds synthetically from those simples as principles. In other words, the state of nature experiment enables Hobbes to omit “the first part of the method, namely, that which

proceeded from the sense-experience of things to universal principles” (OL I.71; Hobbes 1981, 313).

Like the annihilation experiment, in the state of nature thought experiment the reader is first asked to imagine a situation of privation (step 1); the reader reflects upon what would result were civil society destroyed. Thus, to learn the “natural condition of Mankind,” the experiment considers human bodies devoid of their artificial civil relationships. The first property of “natural” human bodies (step 2) that the reader learns is that

Nature hath made men so equall, in faculties of body, and mind; as that though there bee found one man sometimes manifestly stronger in body, or of quicker mind then another; yet when all is reckoned together, the difference between man, and man, is not so considerable... (Hobbes 2012, 188).

Considering any of these human bodies results in discovering that EQUALITY is contained in its conception. The EQUALITY Hobbes has in mind is evident from the fact that “the weakest has strength enough to kill the strongest...” (Hobbes 2012, 188). We learn next that “[f]rom this equality of ability, ariseth equality of hope in the attainning of our Ends” (Hobbes 2012, 190).

The reader has so far learned that an accident of all natural human bodies is EQUALITY of strength and mind and that this accident causes human bodies to be moved in a certain way by the passion of HOPE. Since Hobbes considers passions as motions, or more precisely as the “interiour beginnings of voluntary motions” which are endeavors (Hobbes 2012, 78), what we have learned now is how all of these bodies move. It is an assumption that all bodies in this privational scenario that human bodies devoid of civil relationships are moved in one way or another by PASSIONS. From their EQUALITY, they also have “appetite with an opinion of attaining” (Hobbes 2012, 84) what they desire, which is the passion HOPE. The relationship of

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EQUALITY to HOPE is similar to the relationship of MOTION to TIME in the annihilation thought experiment. As TIME is conceptually dependent upon MOTION (discussed already), HOPE is conceptually dependent upon EQUALITY. Both EQUALITY and HOPE are accidents of all of the bodies in the system being considered (the state of nature), but we only understand HOPE in terms of EQUALITY.

Having discovered the universal accident of bodies in this system (EQUALITY) and their basic motions (PASSIONS), including the passion of HOPE, the experiment adds something back into to the scenario (step 3). We now consider the addition of competing appetites (and competing hopes) in a situation that has a relative scarcity of resources: “And therefore if any two men desire the same thing, which nevertheless they cannot both enjoy, they become enemies” (Hobbes 2012, 190). The result of such competing desires is that “diffidence” of one to another leads each individual to “secure himself by Anticipation” with the goal of being able to “master the persons of all men” (Hobbes 2012, 190). This situation leads individuals to find “no pleasure...in keeping company” with one another and is “called Warre; and such warre, as is, of every many, against every man” (Hobbes 2012, 190-192). The state of WAR also prevents the things necessary for commodious living, such as industry and navigation (Hobbes 2012, 192). WAR thus is a feature of the privational scenario when we consider what results from the addition of competing desires and a relative scarcity of resources.<sup>31</sup>

Hobbes steps briefly outside of the thought experiment by considering a potential objection that the “inference” made in the thought experiment does not align with experience. Some individual, “not trusting this Inference, made from the Passions,” might want to have it “confirmed by Experience” (Hobbes 2012, 194). Hobbes replies that the fact that individuals

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<sup>31</sup> I thank an anonymous referee for emphasizing the role of scarcity at this stage of the thought experiment.

lock their doors and chests confirms the inference. Given my claim that in a demonstration a thought experiment serves as a shortcut in place of an analysis, Hobbes's reply here might seem odd.

If all that is required to reach the same conclusion regarding humans' natural state is to have each person "consider within himselfe, when taking a journey, [that] he armes himselfe, and seeks to go well accompanied..." (Hobbes 2012, 194), then why would Hobbes not simply have requested that the reader to do that? I suggest that we understand Hobbes as amenable to reaching the same conclusion by multiple methods,<sup>32</sup> something he notes in *De Corpore* 6.7:

Civil philosophy is connected to moral [philosophy] in such a way that it can nevertheless be detached from it; for the causes of the motions of minds are not only known by reasoning but also by the experience of each and every person observing those motions proper to him only (Hobbes 1981, 301; OL I.65).

Thus, one can reach the same conclusion – what Hobbes identifies as the "principles of civil philosophy" – when one proceeds by synthesis from first principles or when one who "has not learned the earlier part of philosophy, namely, geometry and physics" arrives at these principles by analysis from his or her everyday experiences (Hobbes 1981, 301; OL I.65). Such analysis according to the latter route might propose a question such as "whether such and such an act is just or unjust" (Hobbes 1981, 303; OL I.66). By resolution of 'unjust' into 'fact' and 'against the laws', and resolution of these further, Hobbes claims that "one finally arrives at the fact that the

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<sup>32</sup> Hobbes is similarly sanguine to various methods in geometry being used for different purposes, even while preferring some over others: "But because there are many means by which the same thing may be generated, or the same problem constructed, therefore neither do all geometricians, nor doth the same geometrician always, use one and the same method" (EW I.312; see discussion in Jesseph 2017).

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appetites of men and the motions of their minds are such that they will wage war against each other unless controlled by some power” (Hobbes 1981, 303; OL I.66).

Hobbes's reply to the individual who does not “trust” the “inference” in *Leviathan* XIII fits this latter route. Such an individual receives confirmation of the conclusion by checking his experience and seeing that the conclusion is grounded in claims about the appetites of human bodies. However, where does the state of nature thought experiment fall within the schema of *De Corpore* 6.7? It seems neither a synthesis from the first principles of geometry or physics nor beginning from an analysis of everyday experience.

I suggest that we should understand the thought experiment as a third route to reach the same conclusion; the route one takes depends upon whether one needs to *discover*, *demonstrate*, or *receive confirmation*.<sup>33</sup> An individual who has “learned the earlier part of philosophy, namely, geometry and physics” (Hobbes would perhaps have himself in mind here) would *discover* the principles of civil philosophy by means of an analysis to and synthesis from the first principles of geometry or physics. When needing to *demonstrate*, that individual would omit the analysis and provide a thought experiment. The student (perhaps the reader of *Leviathan*) would gain an explication of the principles of civil philosophy by considering the experiment, but if needed he or she could analyze everyday experience and *receive confirmation* of the conclusion.

Furthermore, although the preceding discussion shows that Hobbes views the principles of civil philosophy as *derivable* from the “earlier part of philosophy,” i.e., geometry and physics, I suggest that he nevertheless sees the principles of civil philosophy as simples in their own right. He concludes the first part of *Elements of Law (Humane Nature)* immediately following the final article of chapter XIII with a summative claim that suggests this:

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<sup>33</sup> This notion of receiving confirmation adds to the two methods in *De Corpore* 6: the “method of invention” in *De Corpore* 6.2-10 and the “method of teaching” in *De Corpore* 6.11-19 (for discussion, see Talaska 1988, 210).

Thus we have considered the nature of Man so far as was requisite for the finding out *the first and most simple elements* wherein the compositions of Politick Rules and Laws are *lastly resolved*; which was my present purpose” (1650, 170; emphasis added).<sup>34</sup>

Thus Hobbes can understand the conceptions arising when considering human bodies in the state of nature, such as EQUALITY and HOPE, functioning as the simples for *the science of civil philosophy* and not as simples absolutely. I shall not defend this general claim here, but I take it that Hobbes does not view any particular “level,” to use an anachronism, of reality as explanatorily basic.<sup>35</sup> When we are interested in seeing how human bodies arrive at peace, we may take human bodies outside of civil relationships as our principle. Similarly, we consider other bodies in different ways depending upon purposes and explanatory needs. For example, if we are interested only in its annual path, we “consider” the earth as if it were a single point (OL I.98-99). However, if we are interested in the earth’s diurnal motion we consider it as a body moving with a “simple circular motion,” such that all its points describe the circle that the body makes (OL IV.252). Hobbes uses ‘consider’ in many different contexts to signal this flexibility, such as when he says that there is no such thing as a breadthless line but rather a body that we “consider” as having no breadth (EW VII.202) and in the context examined already where he says that SPACE is “that phantasm, in which we consider no other accident, but only that it appears without us.” Indeed, he sums up the project of the section of *De Corpore* devoted to

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<sup>34</sup> Tönnies provides this “conclusion” in a footnote (Hobbes 1928, 191 fn. 11).

<sup>35</sup> This follows from Hobbes’s commitment to the infinite divisibility of body (See *Dialogus Physicus*, OL IV.244-245; also *De Corpore* 27.1, OL I.362-364, EW I.445-448) and, as a result, his rejection of corpuscularism. Since there is no privileged “level” for explanations, we consider bodies in different ways depending upon our explanatory needs. In *Examen*, Boyle objects to Hobbes’s notion of infinite divisibility since it makes claims about what God *can* do rather than what God *has* done (Boyle 1682, 80). Gorham (2014, 84-85) highlights Hobbes’s commitment to infinite divisibility of space and time both *in rerum natura* as well with regard to our conceptions of SPACE and TIME.

geometry (Part III) by noting that “we have considered motion and magnitude in themselves and in the abstract” (OL I.314).

Returning to the experiment, *Leviathan* XIII concludes by claiming three additional things about human bodies. First, by determining the definition of ‘injustice’ we learn that in humans’ natural state “nothing can be Unjust.” This follows from consideration of the privational scenario because “Where there is no common Power, there is no Law; where no Law, no Injustice” (Hobbes 2012, 196). Second, we learn that the way for human bodies to “come out of” this “ill condition” consists “partly in the Passions, partly in his Reason” (Ibid.). Furthermore, the “Passions that encline men to Peace, are Feare of Death; Desire of such things as are necessary to commodious living; and a Hope by their Industry to obtain them” (Ibid.). Considered as part of humanity’s “natural condition,” we have already understood the passions as the basic motions that move human bodies. When humans move from war to peace, then, we have learned that they do so by being moved by these three passions. A final property of human bodies in their natural state is that “every man has a Right to every thing; even to on anothers body” (Hobbes 2012, 198). The right of nature is understood as “the Liberty each man hath, to use his own power ... for the preservation of his own Nature” (Hobbes 2012, 198).

In sum, in the state of nature thought experiment the reader considers human bodies apart from civil relations (step 1) and discovers that such bodies possess EQUALITY in the faculties mind and body and are moved by PASSIONS, including the passion of HOPE (step 2). Next, the reader learns that in such a state the addition of competing desires (step 3), including competing HOPE, leads WAR, and that in this state each human body has LIBERTY. When such bodies are moved toward peace, they do so by being moved by the three passions mentioned above and by reason discovering the path to this end.

### III. Making with Generative Definitions in Geometry and Civil Philosophy

In this section, I aim to show that the simple conceptions explicated in the annihilation experiment and in the state of nature thought experiment are used to construct generative definitions in these two causal sciences. I shall suggest that in each of these *scientiae* an end is proposed and then the simples for that science are used to cause the end by means of generative definitions. Merely apprehending the simples and giving their explications would be insufficient; we must use them to make the ends we seek.<sup>36</sup>

#### III.A “We ourselves draw the lines”

As mentioned already, Hobbes criticizes Euclid's definitions because they are not generative. In *Six Lessons* (1656), he argues that generation must be included in geometrical definitions:

And where there is place for demonstration if the first principles, that is to say, the definitions, contain not the generation of the subject, there can be nothing demonstrated as it ought to be. And this in the three first definitions of Euclid sufficiently appeareth. For seeing he maketh not nor could make any use of them in his demonstrations they ought not to be numbered among the principles of geometry (EW VII.184).

Hobbes's criticism is that without providing a definition that specifies the mechanical procedure for constructing a figure one cannot have causal knowledge about that kind of figure.<sup>37</sup> Without causal knowledge, geometers fail to gain *scientia*. Hobbes's critique is not entirely fair, since as

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<sup>36</sup> Immediately before Hobbes introduces the example of the square in *De Corpore* 6.4 (discussed below), he contrasts apprehending the simples (using *cognoscere*) and knowing the causes of things (using *scire*) by “putting together.” The Molesworth edition (EW I.68) and most recent English translation (Hobbes 1981, 292-293) blur this distinction between *cognoscere* and *scire* by translating both with ‘know’.

<sup>37</sup> Jesseph (1993) discusses Hobbes's criticisms of Euclid, noting Hobbes's reliance upon Clavius's edition of and commentary on Euclid.

we have seen not all definitions for Hobbes include causes; some Hobbesian definitions are explications. As a result, the first definition in Hobbes's geometry is of 'point', understood as a body considered without magnitude. Generation enters into Hobbes's geometrical definitions with "line" which he defines as follows: "a line is made by the motion of a point" (Hobbes 1981, 297; OL I.63). Here Hobbes must make use of MOTION and BODY, which were explicated in the annihilation thought experiment.<sup>38</sup> Further definitions build upon 'line': "a surface is made from the motion of a line," using MOTION again.

As already discussed, Hobbes views geometry as *scientia* because the geometer knows actual causes through the construction of figures. However, the justification for requiring causes even in definitions such as "line" comes from Hobbes's view of demonstration as proceeding syllogistically, and understanding syllogisms as expressing containment relationships holding between names (and the conceptions they signify). He argues in *De Corpore* 6.13: "The goal of demonstration is the knowledge of causes and the generation of things; and if this knowledge is not in the definitions it cannot be in the conclusions of the syllogism..." (OL I.73). Thus, Hobbes's view that definitions must be causal follows from two claims: first, that conclusions of demonstrations leading to *scientia* must themselves include causes; and second, the only way for a conclusion to contain something is if it was already contained in the premises.

Were we to grant Hobbes's requirement that, as *scientia*, mathematics requires knowledge of the causes, we may still wonder why constructing a geometrical figure after

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<sup>38</sup> The relationship between the simple conception BODY and geometrical figures, such as 'line', may seem strange since it would seem that the conception BODY could be constructed from more basic geometrical notions. Thus it would seem that BODY could be analyzed further into lines, surfaces, and motion. However, Hobbes's desire to understand geometry as founded upon ways of considering bodies would prevent this inversion. This is why Hobbes denies that there is anywhere a breadthless line (EW VII.202) but only bodies that we consider as breadthless. I thank an anonymous referee for emphasizing this point.

learning how to do so from a generative definition provides causal knowledge. Why could we not gain this knowledge from carefully examining the features of a figure we encounter?

Hobbes's example of a circle from *De Corpore* 1.5 illuminates something of what he has in mind, but after considering this particular case I will look to his account of *causa simpliciter* in *De Corpore* 9.3 to show how *making* more generally is related to gaining causal knowledge. Hobbes claims that if one were to examine a circle one could not, having just encountered that circle, know by "sense" whether it is a circle (OL I.5). One could, perhaps, know that the figure looked circular insofar as it appeared to be a circle, but one could not know whether it had the properties of a circle because one did not know how that figure was generated.<sup>39</sup>

However, for the person who has constructed this circle, determining its properties "from the known generation of the displayed figure, [is] most easy" (OL I.5). Knowing the generation of this circle involves the following:

"...for if a figure is made by the drawing around of a certain body, of which one end remains stationary, we can argue in the following way: if a body is draw around always with the same length, it attaches itself first to one radius, then to another, then to a third, fourth, and so on to all of them successively. Therefore, the same length on all sides touches the circumference from the same point; that is, all the radii are equal" (Hobbes 1981, 181; OL I.5).

From knowing the generation of that body, we derive that all its radii are equal and thus know that the body before us is a circle. This connection between the properties of bodies and the causes of those properties is relevant to the passage already mentioned from *De Homine* 10.5:

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<sup>39</sup> In *Six Lessons*, Hobbes claims that if someone had never seen a circle made then it would be difficult to convince him that "such a figure [is] possible" (EW VII.205).

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“...the causes of the properties, that individual figures have, belong to them because we ourselves draw the lines” (OL II.93; Hobbes 1994, 41).

What emerges from this example is that in geometry we are the cause of the properties that figures possess. However, it still remains unclear how doing this – making a figure – gives us something epistemically unique, at least unique when compared to what knowledge we could gain of geometrical figures by sense. Perhaps examining Hobbes's understanding of cause will illuminate the difference that Hobbes desires.

In *De Corpore* 9.3, Hobbes describes *causa simpliciter*, which he says is synonymous with *causa integra*, as the “aggregate of all the accidents both of the agents however many they be, and of the patient, which when they are all supposed, it cannot be understood except that the effect be produced at the same instant, and if any of them be wanting, it cannot be understood but that the effect is not produced” (OL I.107-108).<sup>40</sup> With this idea that an effect is produced in the same instant as the aggregation of the accidents of an agent or agents and a patient, Hobbes claims that “causation and the production of effects consists in a certain continual progression” (OL I.109). His example of a progression is the increase of the heat of a fire and how the alterations in that fire cause corresponding increases in the heat of bodies around it. Hobbes's view of *causa simpliciter* as the aggregate of the accidents of the agents and patient implies that when we make figures in geometry we ourselves are part of the total cause since we are the agent; it is our participation in the total cause when making figures that makes geometry unique.

Nevertheless, this is an unsatisfactory answer. We might still ask how moving around certain bodies, such as points or lines, is any different from manipulating natural bodies, say, in

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<sup>40</sup> Leijenhorst (1996, 429) connects Hobbes's discussion of *causa simpliciter* in *De Corpore* to the *Short Tract*, seeing in *De Corpore* a departure from the Aristotelian themes in the *Short Tract*. Raylor (2001) has argued that the *Short Tract* was likely authored by Robert Payne and not Hobbes (cf. Leijenhorst 2002, 12-16 for further discussion of the authorship of the *Short Tract*).

natural-philosophical experiments. If we engage in an experiment, say, the heating of some body, are not we also *part* of the total cause? This worry would blur the distinction (discussed already) that Hobbes makes between geometry, where we have actual causal knowledge, and Hobbesian natural philosophy, where we posit only possible causes. The answer to this worry relies upon the status of mathematical objects: Hobbesian mathematical objects do not exist qua mathematical objects in the world. Hobbes is explicit that there is, for example, no such thing as a line without breadth. As a result, when we consider a body as if it had no breadth we have the ability to be the “causes of the properties” that body comes to possess since we are solely responsible for the motion that the line has qua artificial body. Thus, although I would be part of the total cause of a body burning upon coming into contact with a flame, perhaps by my moving the flame, there are other parts of that total cause for which I am not responsible (and of which I may have no knowledge).<sup>41</sup>

So far we have seen how when we make figures in geometry we gain causal knowledge, and we have seen definitions for ‘line’ and ‘surface’. Now I will show how in a more complex definition we similarly use the simple conceptions explicated in the thought experiment. Let’s say that we have an end in mind: we aim to know the cause of a particular square so that we can make it. To discuss this sort of activity, I will treat an example that Hobbes provides at *De Corpore* 6.4 (OL I.61-62; Hobbes 1981, 292-295). If we want to know the cause of the square, then the “universal causes” will need to be known first (OL I.61; Hobbes 1981, 293), and these are the very simples gained from the experiment.

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<sup>41</sup> Locke’s distinction between real and nominal essences would have helped Hobbes here, since then Hobbes could have said that in geometry the real and the nominal essence will coincide but we do not know this in cases such as fire.

Hobbes asks the reader to consider a conception such as a square and, starting from this, engage in analysis and synthesis:

...let any conception or idea of a singular thing be proposed, say a square. The square is resolved into: *plane, bounded by a certain number of lines equal to one another, and right angles*. Therefore we have these universals or components of every material thing: *line, plane* (in which a surface is contained), *being bounded, angle, rectitude, and equality*. If anyone finds the causes of these, he will put them together as the cause of the square (Hobbes 1981, 293; OL I.61).

A shortcoming of this example for my purposes is that it suggests first undergoing an analysis from the effects.<sup>42</sup> Were Hobbes providing a demonstration, only the synthesis would be given and the analysis would be omitted (OL I.71). Hobbes also claims that this method of analysis/synthesis will work for “any conception or idea of a singular thing”; indeed, following the example of the square he considers gold. Discussion of the example of gold is beyond the bounds of this paper, but he seems to mean that we gain knowledge of the causes of any singular thing, even gold, insofar as we understand these to be *geometrical* causes of that thing.<sup>43</sup>

The two moves, then, that Hobbes suggests in discovering the “cause of the square” are resolution (analysis) and composition (synthesis). The example in the quotation above, however, stops before terminating in the simplest conceptions explicated in the annihilation thought experiment, and Hobbes notes that “if anyone finds the causes of these” then he will put them

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<sup>42</sup> As a result, it is something like the analysis discussed already wherein one might ask “whether such and such an act is just or unjust” (Hobbes 1981, 303; OL I.66).

<sup>43</sup> Hobbes makes a similar claim in *Anti-White* IV.2 regarding our knowledge of universals gained from particular conceptions. He argues that a conception caused by an experience of running water provides us with the “image of the water, not as water, but as body” and that that image “represents not that particular water but *any water, or air, or body of the same size and shape*” (Hobbes 1973, 126; Hobbes 1976, 53; emphasis added). For discussion, see Adams (2014b, 417-420). See also the way that Hobbes adapts the distinction between what is better known to us and better known to nature (part of which is quoted above at the beginning of Section II; cf. *De Corpore* 6.2; Hobbes 1981, 291; OL I.60).

together and make the square. What are the “causes of these”? From what has been said already, the causes of ‘line’ should be obvious; we understand it as made from the motion of a point (a body considered as a point), and MOTION and BODY were explicated in the experiment. Likewise, we would resolve “being bounded” as composed of PLACE, since PLACE is the part of imaginary SPACE that is coincident with the magnitude of some body.

How would “equality” and “rectitude” be resolved into explicated simples? Both of these relate to the sort of lines we will construct when making the square. The definition of ‘line’ specifies how to make a line, but it does not distinguish between straight and crooked lines or between lines we might draw of different lengths. So we draw the correct lines for a square by drawing each of them straight, understood as the shortest line drawn between two points “whose extreme points cannot be drawn farther asunder without altering the quantity, that is, without altering the proportion of that line to any other line given” (*De Corpore* 14.1; EW I.176; OL I.153-154). Similarly, we draw the correct lines to make a square when we make four lines of equal length. Lastly, we correctly put together these four lines when we link them one to another with right angles, understood as an angle “whose quantity is the fourth part of the perimeter” of a circle (*De Corpore* 14.9; EW I.186-187; OL I.161-162). Thus, to place four straight lines of equal length in the correct angles, we would first make a circle, which is defined with a generative definition in *De Corpore* 1.5 (OL I.5; discussed above), determine the “quantity” of the angle made by one-fourth of the perimeter, and then compare this quantity to the angles we use for the square.

In sum, we understand the causes of some particular like a square by resolving down to the simples of BODY, MOTION, and PLACE. Simply putting a point in motion is insufficient to generate a square, so we must move those points to make lines in a certain way (straight lines)

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and in a certain proportion to one another (equality understood as equal magnitude). Then we must place these four lines together so that they make four right angles, which we do by making a circle and marking one-fourth of the perimeter. In what sense is what we “put together” the *cause* of the square? The definition for line already includes a cause in it (MOTION), but the other components of the cause of the square are required to make the figure a square rather than some other figure. If we left out one component part, such as “right angle”, we would have caused a different figure, in this case a rhombus. Were we *demonstrating* how to construct a square, we would omit the analysis (resolution) and begin with the annihilation of the world thought experiment to explicate BODY, MOTION, and PLACE. Then we would put together in synthesis the square by using those explicated simples.

*III.B “We ourselves make the principles—that is, the causes of justice (namely laws and covenants)”*

At the close of *Leviathan XIII*, Hobbes asserts that both reason and the passions cause human bodies to move from their natural state to peace. The three passions responsible for this motion are “Feare of Death; Desire of such things as are necessary to commodious living; and a Hope by their Industry to obtain them” (Hobbes 2012, 196). However, these passions, as endeavors, say nothing about *how* to reach the end toward which their motion is directed. If just these passions were provided in the synthetic demonstration, we would be left in a situation similar to being instructed to make a square by moving a point to make some number of lines. Like the causes of a square in addition to ‘line’ – four straight lines of equal length linked by right angles – the laws of nature *direct* the motion of the three passions. Thus reason “suggesteth convenient Articles of Peace...which otherwise are called the Lawes of Nature” (Ibid.). The laws of nature, in other

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words, direct the motion so that we can satisfy the end given by these three passions. In this section, I will suggest that the laws of nature, considered jointly, play the same role as the components of square that we “put together” to cause it.

I shall assume that the three aforementioned passions provide the end toward which human bodies in their natural state are moved – peace. This is analogous to having an end in mind when working in geometry. As a demonstration, we should expect the presentation of the laws of nature to lack an analysis. Thus, we should anticipate that Hobbes would provide only a synthesis from explicated simples and, like in geometry, we should understand this “putting together” in synthesis as showing the cause of peace. What are the laws of nature on this view? In short, they “specify an optimum set of actions designed to bring about peace” (Malcolm 2002, 32). Given that you desire peace, do what the laws of nature specify.<sup>44</sup> Likewise, given that you desire to construct a square (and not, say, a rhombus), follow the instructions provided by the “cause” of square.

To provide evidence for my suggestion that the laws of nature play the same role as the component parts out of which we cause a square, I shall consider several of the laws of nature. To recall the earlier discussion from section II.C, the basic properties of human bodies in their natural state are that they possess EQUALITY, they are moved by PASSIONS, and that EQUALITY gives rise to the passion of HOPE. We learn in *Leviathan* XIV that all human bodies in their natural state have LIBERTY. Finally, WAR arises because of conflicting PASSIONS, including HOPE.

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<sup>44</sup> Hoekstra (2003, 116) similarly sees the laws of nature as conditional but argues that even so it should be unsurprising they are provided as straightforward imperatives since, given the nature of human bodies, Hobbes would view the necessary conditions as satisfied for all humans.

The first law of nature is introduced by appealing to LIBERTY, and it uses the simples of HOPE and WAR – motions of human bodies (HOPE) and the conflict arising from those motions frustrating each other (WAR) – that were explicated in the thought experiment:

...as long as this naturall Right of every man to every thing endureth, there can be no security to any man, (how strong or wise soever he be), of living out the time, which Nature hath ordinarily alloweth men to live. And consequently it is a precept, or generall rule of Reason, *That every man, ought to endeavour Peace, as farre as he has hope of obtaining it; and when he cannot obtain it, that he may seek, and use, all helps, and advantages of Warre*" (Hobbes 2012, 198-200).

The second law, which is "derived" from the first law also uses LIBERTY; it instructs that insofar as human bodies seek peace they must relinquish the LIBERTY found in the state of nature and "lay down this right to all things" (Hobbes 2012, 200).

Following this presentation of the first two laws, Hobbes clarifies what laying down a right entails, the nature of injustice, and the distinction between contracts and covenants. All of these distinctions occur to show how the machinery required for the first and second law are present in human bodies' natural state, and this is the reason that Hobbes places them in Part I of *Leviathan* ("Of Man"). This concords with the "Table" in *Leviathan IX*, where, for example, "contracting", which delivers "The *Science of the Just and Unjust*," is a consequence of speech, which itself is a one of the "Consequences of from the Qualities of *Men in speciall*" (Hobbes 2012, 130-131). Instances of contracting are consequences that follow from humans *considered* as bodies.

The simples explicated in the state of nature thought experiment are used in various other laws of nature. In the discussion of the third law of nature, "*That men perform their covenants*

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*made*” (Hobbes 2012, 220), we find that without this instruction human bodies will return to the condition of WAR. In the ninth and tenth laws, Hobbes directly appeals to the simple of EQUALITY. He articulates the ninth law as against pride: “*That every man acknowledge other for his Equall by Nature. The breach of this Precept is Pride*” (Hobbes 2012, 234). Hobbes asserts a relationship between the ninth and tenth laws, saying that upon the ninth “*dependeth another.*” The ninth law is “*That at the entrance into conditions of Peace, no man require to reserve to himselfe any Right, which he is not content should be reserved to every one of the rest*” (Hobbes 2012, 234). Here again he appeals to the simple of EQUALITY: “...the acknowledgement of naturall equalitie” (Hobbes 2012, 234-236). EQUALITY recurs in the eleventh law, where judges are instructed to “*deale Equally*”, in the twelfth law, where things that cannot be divided must be “*enjoyed in Common*”, and in the thirteenth law, where for the sake of “*equall distribution*” lot is the means by which things which cannot be divided or enjoyed in common are to be distributed (Hobbes 2012, 236).

Importantly, the laws of nature are generative definitions insofar as they tell human bodies what to do to cause peace. As we have seen earlier in *De Homine* 10.5: “*We ourselves make the principles—that is, the causes of justice (namely laws and covenants)...*” (OL II.94; Hobbes 1994, 42). In this way, they are analogous to the causes of the square. If one wants to make peace one should do what is specified by the laws of nature, considered jointly.

Thus, as in the case of the square, once we “*put together*” all of the laws of nature we know the cause of peace. Indeed, Hobbes indicates that he considers this as adding together (compounding/synthesis) when he gives the single rule that will enable all humans to “*examine*” the laws of nature. Hobbes holds that all of the laws can be “*contracted into one easie sum... Do not do to another, which thou wouldest not have done to thy selfe*” (Hobbes 2012, 240). In

addition to this language of “sum”, which suggests that we are to put together by reckoning all of the laws to gain peace, Hobbes uses the metaphor of the “ballance”:

...he has nothing more to do in learning the Lawes of Nature, but, when weighing the actions of other men with his own, they seem too heavy, to put them into the other part of the ballance, and his own into their place, that his own passions, and selfe-love, may adde nothing to the weight; and then there is none of these Lawes of Nature that will not appear to him very reasonable (Hobbes 2012, 240).

This reference to the balance, and the simple of EQUALITY implicit in it, might have seemed figurative had not EQUALITY played such a central role in Hobbes's preceding discussion of the laws.

#### **IV. Conclusion and Benefits**

The goal of this paper has been to argue that the laws of nature in civil philosophy play the same role as generative definitions of geometrical figures, such as the definition of square. The link between civil philosophy and geometry is natural given Hobbes's pronouncement that they are the only *scientiae* – the two sciences in which we possess actual causal knowledge. All other knowledge is from the effects to possible causes. However, even though Hobbes requires generation to be in the definitions, not all definitions can be causal. Some definitions are explications of simple conceptions.

The paper has furthermore argued that for Hobbes the definitions by explication for these simple conceptions are achieved in a thought experiment. The two thought experiments considered – the annihilation thought experiment and the state of nature thought experiment – both aim at providing definitions by explication and then these explicatory definitions are used

within the generative definitions. The structure in civil philosophy and geometry of a thought experiment, definition by explication, and generative definitions allows Hobbes to see himself as providing a demonstration by synthesis in both cases. The synthesis begins with first principles, the simples, and ends by putting together all the component parts to make the thing in question, whether a square or peace.

In the remainder of the conclusion, I shall briefly mention three advantages of the understanding of the laws of nature for which I have argued. First, the maker's knowledge view of civil philosophy attends to Hobbes's geometrical practice rather than assuming his geometry, and as a result his civil philosophy, is axiomatic in nature.<sup>45</sup> Rather than presenting the reader with axioms, Hobbes offers thought experiments to provide definitions by explication that will serve as the first principles of a synthetic demonstration. Hobbes's supposed affection for Euclid is as old as Aubrey's description of Hobbes's accidental encounter with an open copy of the *Elements* in a library that "made him in love with geometry" (Aubrey 1898, 332). However, seeing Aubrey's report as providing evidence of Hobbes's fondness for Euclid is not without difficulties, which becomes evident when we examine Hobbes's views of Euclid in more detail, as well as Hobbes's own practice of geometry. Indeed, Hobbes explicitly criticizes Euclid's definitions (discussed above) since they are not generative.<sup>46</sup>

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<sup>45</sup> Hattab (2014, 477-478) agrees that Hobbes's first principles are definitions of simplest conceptions and not axioms. For discussion of Hobbes's relationship to Euclid and other figures, see chapter 3 of Jesseph (1999). Two recent examples seeing Hobbes's system as axiomatic are Deigh (1996) and Martinich (2010). Deigh (1996, 37) claims the following: "In keeping with his well-known admiration of geometry, his belief that it supplies the right model for organizing the knowledge gained in a branch of science, Hobbes represents this body of natural law as having an axiomatic structure." Martinich (2010, 168-169) alludes to Hobbes's "conception of science on the geometrical model of Euclid (as he interpreted it)" and to "his Euclidean model of geometry." Boonin-Vail (1994, 22-23) sees Hobbes's praise of the use of definitions in geometry as evidence for understanding Hobbes's science more generally as following an "axiomatic method."

<sup>46</sup> Nevertheless, Hobbes does use 'Elements' in the title *Elements of Law* and in his *Elementa* trilogy (Schuhmann 1998, 120 fn. 14).

At other points in the corpus Hobbes is similarly damning of the Euclidean program where axioms are assumed without demonstration: “For the axioms which we have from Euclid, which are possible to demonstrate, are not principles of demonstration...” (*De Corpore* 6.13, OL I.72). Rather than assuming axioms, perhaps on the authority of the teacher or on account of their self-evidence, Hobbes holds that even those axioms must be demonstrated: “...to the end that the reader may know that those axioms are not indemonstrable, and therefore not principles of demonstration; and from hence learn to be wary how he admits any thing for a principle, which is not at least as evident as these are” (*De Corpore* 8.25, OL I.119).<sup>47</sup> That Hobbes should depart from Euclid in various ways is unsurprising since he tells the reader of *De Corpore* that before reading any further, he or she should first read Euclid, Archimedes, and other writers since what Hobbes seeks to provide is “new” and meant to “serve the interests of physics” (*De Corpore* 15.1; OL I.175-176). Instead of beginning from axioms in the fashion of Euclid, the present paper has endeavored to show Hobbes grounding synthetic demonstrations, whether in geometry or civil philosophy, in definitions of simple conceptions explicated in a thought experiment. These explications are then used in generative definitions that give the cause of our constructions.

A second benefit of the maker's knowledge view of civil philosophy is that it provides an answer to the Taylor-Warrender debate concerning the relationship of civil philosophy to human nature, and to natural philosophy more generally (Taylor 1938; Warrender 1957).<sup>48</sup> It seems that debate arose because of an apparent ambiguity in Hobbes's claims about the relationship of civil

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<sup>47</sup> On this issue of the need to demonstrate even Euclidean axioms, see Leijenhorst (2002, 144ff).

<sup>48</sup> Likewise, the maker's knowledge view of Hobbes's civil philosophy resists seeing the parts of Hobbes's philosophy as joined by deductive connections from first philosophy to geometry and from geometry to natural philosophy and civil philosophy (as many have held, such as Peters 1967; Watkins 1973; Hampton 1986; Shapin and Schaffer 1985). In this way, the maker's knowledge view is buttressed by two recent arguments against the deductive account (Adams 2016; Biener 2016).

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philosophy to the other sciences. However, if we understand Hobbes as holding that the simples for a science are determined by our explanatory needs – a materialism that does not privilege a single level for explanations – then we can understand why Hobbes grounds civil philosophy in human bodies apart from civil relations. Here we consider the properties of such human bodies as the simples for a synthetic demonstration; this level is sufficiently simple for the explanatory goal. As Hobbes says, it was as far as “was requisite for the finding out the first and most simple elements wherein the compositions of Politick Rules and Laws are lastly resolved” (1650, 170). Human bodies in their natural state are, of course, analyzable into more simple components; thus, if our goal were to explain human digestion or some lower-level phenomenon then we could appeal to some ‘lower’ level for the simples. Likewise, if we wanted to explain why human bodies fall when slipping from the edge of a cliff, we would consider them not qua human bodies but qua bodies, and other simples would ground our explanation.

Finally, the maker's knowledge view of civil philosophy can make sense of Hobbes's statements that the laws of nature are “Immutable” and “Eternal”:

The Lawes of Nature are Immutable and Eternall; For Injustice, Ingratitude, Arrogance, Pride, Iniquity, Acception of persons, and the rest, can never be made lawfull. For it can never be that Warre shall preserve life, and Peace destroy it (*Leviathan XV*; Hobbes 2012, 240).

In seeing the laws of nature as playing the same role as the cause of square, we can make sense of this and other quotations without requiring some lawgiver, such as God, to vouch for their immutability or eternity. In just the same way that “it can never be that Warre shall preserve life,” it can never be the case that a square is composed of curved lines or unequal sides. We might have imposed different names, perhaps signifying the conception SQUARE with the name

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'donkey', but insofar as the conception SQUARE is considered Hobbes can coherently hold that it could never be composed otherwise than as the definition that he provides. And indeed, Hobbes himself denies that the laws of nature are properly laws since "Law, properly, is the word of him, that by right hath command over others" (2012, 242). Instead, Hobbes holds that these "laws" are "but Conclusions or Theoremes concerning what conduceth to the conservation and defence" and as such they are "dictates of Reason" (Ibid.).<sup>49</sup> In the end, the laws of nature are like the causes of the square; they tell us how to make the peace that we desire.

### **Acknowledgements**

Previous versions of this paper were presented at the South Central Seminar in Early Modern Philosophy, the *Scientiae* conference at Victoria College of the University of Toronto, a session of the International Hobbes Association at the American Philosophical Association meeting (Eastern), the International Society for the History of Philosophy of Science (HOPOS), Mississippi State University, the State University of New York at Albany, and the University of Pittsburgh. I thank participants at these talks for their feedback, in particular Geoffrey Gorham, Helen Hattab, and Peter Machamer, as well as two anonymous referees for this journal.

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<sup>49</sup> Hobbes does note, of course, that "*if we consider* the same Theoremes, as delivered in the word of God, that by right commandeth all things; then they are properly called Lawes" (2012, 242; emphasis added). Gauthier (2001, 262) suggests that the laws of nature are first dictates of reason and then later come to be known either by being enshrined in Scripture or as part of civil laws.

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