Gassendi and Hobbes on Knowledge

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Thomas Hobbes was born in 1688 in Malmesbury, England. Four years later, Pierre Gassendi was born in Champtercier in France. The two men, both of whom had notable philosophical careers, met in Paris in the early 1640s, where they were part of a philosophical group centered on Marin Mersenne.[1] There is little detailed evidence of the personal relationship between Gassendi and Hobbes, largely because almost none of their correspondence survives: just two short letters, one from 1649 and one from 1654.[2] There are however clear similarities between the philosophical approaches of the two men in their published work.[3]

Both Hobbes and Gassendi are often considered materialists.[4] Both wrote a set of *Objections* to Descartes' *Meditations*. Both argued against the Cartesian doctrine of innate ideas and for the claim that all knowledge ultimately derives from the senses. Both were

[1] Noel Malcolm, *Aspects of Hobbes* (Oxford, 2002), 17.
[2] Thomas Hobbes, *The Correspondence of Thomas Hobbes* (Oxford, 1994), letters 62 and 66. Gassendi is also mentioned in Hobbes's other correspondence, largely that with Samuel Sorbière, who in 1661 recalled "delightful conversations with Mersenne, Gassendi, and yourself" (ibid, letter 142).
[3] In the Epistle Dedicatory to *De Corpore*, Hobbes praised the way that astronomy and natural philosophy had "been extraordinarily advanced by Johannes Keplerus, Petrus Gassendus, and Marinus Mersennus". Thomas Hobbes, *The English Works of Thomas Hobbes,* (London, 1839), 1.ix.
[4] In Gassendi's case, inaccurately. In the *Fifth Objections* to the *Meditations*, he argues that Descartes has not ruled out the materialist alternative. But in his *Counter-Objections* he makes clear that he does not himself accept the materialist view: "I hold by faith that the mind is incorporeal". Pierre Gassendi, *Petri Gassendi Opera Omnia in sex tomos divisa* (Lyon, 1658; reprinted Stuttgart-Bad Canstatt, 1964), 3.369a. (We cite Gassendi's *Opera Omnia* by volume, page and column.) And in the *Syntagma*, he gives arguments for the immateriality of the mind (ibid, 2.441b-2.451b).

nominalists. And both paid a great deal of attention to method in their discussions of knowledge.

The two philosophers differ, however, in their methodology. Gassendi writes in typical humanist fashion, identifying and explaining a wide variety of past views before going on to present his own alternative. Hobbes just tells the reader what he thinks. The content and orientation of their views is very different as well – in particular, the content and orientation of their epistemologies. Gassendi began his career as a skeptic, and although he soon came to reject skepticism, he also rejected the Aristotelian notion of *scientia*, arguing that there is no "certain and evident cognition of a thing, obtained through an acquaintance with its necessary cause, or by a proof".[5] In its place, Gassendi presented a probabilistic view that shows us how we can move on in the absence of certain and evident knowledge.

For Hobbes, in contrast, discussion of knowledge is by and large discussion of how to achieve *scientia,* where to have *scientia* of something is to know it through its causes. In his discussion of knowledge, if not elsewhere, Hobbes is roughly Aristotelian: he argues that we should revise our understanding of what *scientia* consists in rather than abandoning the search for *scientia* altogether.

Gassendi's attacks on the Aristotelians and on Descartes

In his first published work, the *Exercitationes paradoxicae adversus Aristoteleos* (*Exercises in the Form of Paradoxes against the Aristotelians*), Gassendi uses material drawn from ancient skepticism to attack the doctrine of *scientia.* He relies heavily on the Ten Modes – various ways to show (as he explains in the later *Syntagma*) that "one and the same thing can appear in different ways to different animals and different men, and even to one and the same man

[5] Ibid, 3.192b.

according to his various senses and his various affections".[6] In the *Exercitationes*, Gassendi uses traditional examples in which "the judgments of different men concerning the things that are perceived by the senses are very different",[7] which he understands as evidence that "men do not know the inner natures of things".[8] The same wine, for instance, tastes sweet to some people and bitter to others.[9] How can we know what the wine in itself is truly like? We cannot say that how the wine tastes to a healthy man is how it really is (as healthy men disagree), or that the way the wine tastes to the majority is the way it really is (because there is no reason to assume the majority is right), and so on. Hence, Gassendi concludes, (at least at this early, skeptical point in his career) the testimony of the senses cannot be trusted to inform us about the inner natures of things.

This forms the basis for a critique of Aristotelian *scientia.* Gassendi shares the consensus view that "all of our knowledge either is sensation or proceeds from the senses", and notes that it follows from this "that we cannot make a judgment about anything unless the senses have first given testimony of it".[10] Hence there is no "knowledge as Aristotle conceived it",[11] that is, no "certain and evident cognition of a thing, obtained through an acquaintance with its necessary cause, or by a proof".[12]

We tend to think of demonstration via causes as the hallmark of Aristotelian *scientia*, but this is not Gassendi's main focus. He is chiefly concerned with another element of the Aristotelian conception of knowledge: that knowledge involves both certainty and evidentness. This was also part of Descartes's conception of knowledge – clear and distinct

[6] Ibid, 1.84a.
[7] Ibid, 3.197b.
[8] Ibid, 3.203a.
[9] Ibid, 3.198ff.
[10] Ibid, 3.192b.
[11] Ibid, 3.192a.
[12] Ibid, 3.192b.

perception is certain and evident – and Gassendi expressed similar concerns about Descartes's view. A central theme of Gassendi's *Fifth Objections* to Descartes's *Meditations* and his long *Counter-Objections* is that clear and distinct perception cannot do what Descartes wants it to do, namely serve as a criterion of truth that is immune to skeptical doubt.[13]

Gassendi has two main lines of objection to the Cartesian doctrine of clear and distinct perception. The first is familiar: he claims that Descartes' argument for the veracity of clear and distinct perception relies on a premise concerning the existence of God, while his argument for the existence of God relies on a premise concerning the veracity of clear and distinct perception. But Gassendi also has another, less familiar concern about clear and distinct perception. Is there, he asks, a distinction between perceptions that are *genuinely* clear and distinct and those that merely *seem* to be clear and distinct? Are we supposed to determine which of our perceptions are genuinely clear and distinct on the basis of the phenomenology alone, or is there something else we can appeal to?

Whichever way Descartes responds, he faces an insuperable difficulty. Suppose he says that clarity and distinctness involves something more than mere phenomenology – that there's a distinction between genuinely clear and distinct perception, and perception that just seems clear and distinct. If so, Gassendi argues, then we need a criterion to distinguish genuine clarity and distinctness from merely apparent clarity and distinctness. But, he continues, Descartes has no such criterion to offer. Hence clarity and distinctness cannot be the criterion of truth.

[13] Gassendi was so upset by the condescending tone of Descartes' *Replies* that he answered them with a book-length set of *Counter-Objections*; the whole exchange was published as the *Disquisitio Metaphysica* (now in volume 3 of the *Opera*).

Suppose, on the other hand, that Descartes denies that perceptions can seem clear and distinct without being genuinely clear and distinct. In other words, suppose that we can determine whether a perception is genuinely clear and distinct just by introspecting. If so, Gassendi argues, we will be faced with the existence of inconsistent clear and distinct perceptions. Disagreement is rampant, and different people – all of whom are honest, and all of whom have thought carefully about the matter at hand – perceive different and incompatible things with apparent clarity and distinctness.[14] Worse, an individual may clearly and distinctly perceive that *p* at one time and that *not-p* at another. For instance, Gassendi says, as a youth he clearly and distinctly perceived that two lines that continually approached each other more closely must eventually meet. Later he learned about asymptotes and came to perceive, with equal clarity and distinctness, that they might not intersect.[15]

Descartes in fact holds the second view. Anything that seems clear and distinct *is* clear and distinct, at least if you have properly cleared your mind of preconceived notions.[16] He responds to Gassendi's objection with impatience, insisting that these inconsistent perceptions are not all genuinely clear and distinct.[17] It is typical of Gassendi that he finds this response impossible to take seriously. Our evidence that different people can perceive inconsistent things with apparent clarity and distinctness is extremely strong: "the fact that men go to meet death for the sake of some opinion seems to be a perspicuous argument that they perceive it clearly and distinctly".[18] Descartes cannot escape the existence of inconsistent clear and distinct perception unless he allows a distinction between genuine

[14] Gassendi, *Opera*, 3.315a.
[15] Ibid, 3.314b.
[16] See René Descartes, *Oeuvres de Descartes* (Paris, 1996), 7.739; *The Philosophical Writings of Descartes* (Cambridge, 1984), 2.26.
[17] Descartes, *Oeuvres,* 7.361; *Philosophical Writings* 2.249-50.
[18] Gassendi, *Opera*, 3.317a.

clarity and distinctness and merely apparent clarity and distinctness. And if he allows such a distinction, his alleged criterion becomes useless.

Gassendi's middle way

In his *magnum opus*, the enormous *Syntagma philosophicum*, Gassendi outlines his own epistemology:

> [A] certain middle way between the skeptics … and the dogmatists should be followed. For the dogmatists do not really know all the things they suppose they know, and they do not have an appropriate criterion for judging those things. However, it does not seem that all the things that are thrown into dispute by the skeptics are so unknown that we cannot have some criterion for judging them. And because the majority of the things that the dogmatists suppose they know are really unknown, too often in physics the occasion arises for declaring that we are fortunate when we arrive not at what is true but at what is probable.[19]

This middle way between dogmatism and skepticism has been called mitigated or constructive skepticism.[20] Its central claim is that although we cannot know the essences of things in the way the Aristotelians and Cartesians hoped, or achieve the sort of certainty they wanted, we can still have some genuine knowledge. This knowledge is sufficient for everyday life and for meaningful scientific enquiry, although it does not rise to the level of *scientia.* Popkin, introducing this view, connects it in particular with Mersenne and Gassendi.[21] Later, he also associates Hobbes with it.[22] There are some reasons to be cautious

[19] Ibid, 1.79b.
[20] Richard Popkin, *The History of Scepticism. From Savonarola to Bayle* (Oxford, 2003), 112-127.
[21] Ibid, 112. On Mersenne and mitigated skepticism see ibid, 113-20, and Peter Robert Dear, "Marin Mersenne and the Probabilistic Roots of 'Mitigated Scepticism'", *Journal of the History of Philosophy* 22 (1984), 173-205.

about the term 'mitigated skepticism' – the position involved is often not what today's epistemologists would label 'skepticism'. Nevertheless, Gassendi did attempt to find a position between the extremes of skepticism and dogmatism.

Gassendi's middle way offers a new kind of criterion:

> [W]henever someone objects that there … is no criterion … because anyone who says that there is does so either without a demonstration or with one, but that either way, etc, it can be said, first, that we have some demonstration. Although it is not an Aristotelian demonstration or a demonstration which requires a precise investigation of some previous sign or criterion or the like, it is the sort of demonstration that men who are prudent, intelligent, and furnished with good sense will generally accept as a proper reason and which cannot be contradicted except out of sheer contrariness.[23]

Gassendi is referring to the Two Modes of ancient skepticism:

> [W]hen Pyrrhonism was revived, some other Modes were added … The first is what can be called *regressus in infinitum*, where what has been put forward to confirm something, is said to require confirmation by another thing, and that again by another, so that no way out can be found. The second is *diallelus* … where it is shown that someone who is giving a proof asserts one thing in order to establish a second, and asserts the second in order to establish the first … The last is *hypothetical*, or *from supposition*, where, after something has been supposed, someone asserts that he is permitted to make the contrary supposition.[24]

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[22] "Both Hobbes' and Gassendi's answers to Descartes are part of their efforts to present new views for the new science in terms of a 'mitigated' or 'post-' sceptical attitude" (Popkin, *History,* 192).
[23] Gassendi, *Opera,* 1.85b.
[24] Ibid, 1.75b.

Say that the skeptic's interlocutor asserts that *p*. The skeptic then asks whether she has a demonstration that *p*. If she says no, then we have no reason to believe that *p*. If she says yes – that *p* is demonstrated by *q* – then the skeptic asks whether she has a demonstration that *q*. If the interlocutor replies that *q* is demonstrated by *p*, we have a circle and again no reason to believe that *p*. If she replies that *q* is demonstrated by *r*, then the same question is raised about *r*; and so on, and again we have no reason to believe that *p*.

Gassendi does not think that we can escape the Two Modes once we are entangled in them, but he does think we can avoid entanglement in the first place. We can offer a demonstration without having to then show that this demonstration is itself valid, so long as the demonstration is generally accepted by reasonable people and we are not presented with a reason to reject it. For, Gassendi claims, the mere fact that someone can pretend to doubt a demonstration does not call it into question. Only genuine, sincere disagreement does that:

> [A]lthough it is countered that someone who simply makes a declaration and does not prove it should not be believed, and that that the opposite can be asserted hypothetically and claimed as true by anyone … who wishes to maintain the other side, it is clear that this can indeed be done in doubtful matters, where neither experience nor some convincing and reasonable argument comes to our support, but it cannot be done without folly in other cases.[25]

Thus Gassendi treats the Ten Modes and the Two Modes very differently. He takes the Ten Modes seriously because they involve actual disagreement and actual conflicting evidence. Since the Two Modes do not, he sees no reason to entangle ourselves in them. They could be used to achieve universal suspension of judgment, but this would be folly.

[25] Ibid, 1.86a.

Gassendi's two criteria

Gassendi offers two criteria of truth, reason and the senses. They apply to different domains. The senses are the criterion of truth for the appearances. My sense of taste, for instance, is the criterion by which I know that honey appears sweet. Gassendi does not spend much time defending this criterion, because he thinks that even the ancient skeptics accepted it. Indeed he thinks that even *Descartes* accepts it, since Descartes concedes that the skeptical hypotheses of the First Meditation are supposed to affect us only within a limited context and only for a short time.

The second criterion, reason,[26] has a different domain: it informs us about the "hidden" truths that are "lurking under the appearances".[27] This is a form of inference to the best explanation. Appearances are signs of the hidden because they can only exist if there is some appropriate hidden cause. Motion is a sign of the void, for instance, because we observe motion and infer that there must be some empty space for moving bodies to move into.[28] Various cognitive capacities are signs of the existence of a soul.[29] The fact that iron is attracted by a magnet is a sign that there is some power in the magnet.[30] The order apparent in the universe is a sign that that God exists and created the universe.[31] And so on.

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[26] Calling reason the criterion may surprise some readers, who are used to thinking of Gassendi as an empiricist. But notice that what reason is doing here is making an inference from what is observed: the source of knowledge here is reason plus the senses.
[27] Gassendi, *Opera,* 1.80b. These hidden truths are contrasted both with things that are only circumstantially hidden (e.g., a fire that is too far in the distance for us to see) and with things that are entirely hidden, in the sense that humans cannot possibly come to know them (ibid, 1.68b-69a).
[28] Ibid, 1.81a.
[29] Ibid, 1.82b.
[30] Ibid, 1.82b.
[31] Ibid, 1.82b.

In general, Gassendi treats appearances as signs of the internal corpuscular structure of the things that appear to us. When I taste the sweetness of honey, I can thereby know that honey has an internal corpuscular structure that is fitted to produce the sensation of sweetness in me, under current circumstances. This move enables him to show that much of the conflict gestured at in the Ten Modes is illusory. Honey is not by nature sweet or bitter – by nature it has the power to produce the sensation of sweetness in sense organs disposed one way, and bitterness in sense organs disposed another way:

> It seems that one and the same thing can appear in different ways to different animals and different men, and even to one and the same man according to his various senses and his various affections … But although so many various *Phantasiae* or appearances are created, nevertheless it's clear that there is in the thing or object some general cause that suffices for all the things which are manifest. And so, to whatever extent the effects are not like each other, nevertheless there are two things that are certain and can be proven … One is that there is a cause in the thing itself, or the object, and the other is that there is a different disposition in the faculties that encounter it.[32]

Consider the action of the sun, which melts wax but hardens clay. We know that there is something in the sun that enables it to cause both the melting of the wax and the hardening of the clay. And we know that there is some difference between the wax and the clay that explains why the sun melts the first but hardens the second. We know this by the use of reason, just as we know by the use of reason that there must be pores in the skin else sweat could not occur.[33]

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[32] Ibid, 1.84a.
[33] Ibid, 1.68b.

This last example is particularly significant for Gassendi. He points out that although we used to have only inferential knowledge of the pores in the skin, we now know their existence by the senses, using the microscope. Similarly, we used to infer that mites have feet from the way they move, and now we see their feet; we used to infer that the Milky Way is made up of stars and can now see the individual stars that compose it through telescopes.[34] Gassendi imagines that "many of the things … which we until now perceive only by understanding will one day, by some instrument thought up by our descendants, will become … perceived by the senses".[35] This provides sensory evidence that inference to the best explanation is a legitimate source of knowledge. In other words, it shows – using the one criterion that is not, Gassendi thinks, in dispute – that reason too can serve as a criterion.

Certainty and probability

The examples of knowledge that Gassendi provides typically do not involve absolute certainty or evidentness. I could be wrong that I am tasting something with an internal corpuscular structure that gives it the power to produce the sensation of sweetness in me. Perhaps I am dreaming, and not actually tasting anything at all. Gassendi accepts this possibility, and grants that if I am in fact dreaming and there is no honey, then the belief I arrive at using reason will be false. The same goes for beliefs arrived at using the senses alone. However, he denies that the possibility of error undermines the epistemic credentials of the beliefs I have when I'm *not* dreaming or otherwise in error. Consider another example:

> [T]he sense of pain which still appears to be in a foot or hand after the limbs have been amputated can sometimes deceive … but those who are whole are so certain

[34] Ibid, 1.82a.
[35] Ibid, 1.82a.

> that they feel pain in the foot or hand which they see pricked that they cannot doubt it. In the same way, because while we live we are alternately awake and asleep, we may be deceived by a dream … but nevertheless we are not always asleep, and when we are really awake we cannot doubt whether we are awake or asleep.[36]

Let us reconstruct Gassendi's view in somewhat anachronistic terms. My belief that my foot is injured is justified by my experience of pain in my foot. Now, there may be cases where I have the same experience even though the belief in question is false: cases of phantom limb pain. But this does not show that my experience of pain in my foot cannot justify the belief that my foot is injured. It simply shows that justification does not entail truth.

Gassendi thinks that Descartes' first big mistake is his failure to recognize this. Descartes insists that it is impossible for something I perceive clearly and distinctly to be false. Gassendi objects that if we insist on a justification that entails truth for there to be knowledge, then we will have no knowledge. And he also objects that no such justification is necessary. We can have good reason to believe something even if it could turn out to be false.

This view is part of what has been called Gassendi's mitigated skepticism. It's important to see that Gassendi is skeptical about *scientia* and Cartesian absolute certainty, but not about knowledge in general. In this respect he's in agreement with most contemporary epistemologists who do not consider themselves skeptics of any kind.

Hobbes and skepticism

[36] Ibid, 3.388a-b.

Unlike Gassendi, Hobbes did not engage with skepticism at length in his writing.[37] Indeed, he barely mentioned it.[38] He did, however, respond to possibly the most famous use of skeptical arguments in seventeenth-century European philosophy, Descartes's First Meditation. Hobbes's comment on the First Meditation in his Objections is as follows:

> From what is said in this Meditation it is clear enough that there is no criterion enabling us to distinguish our dreams from the waking state and from veridical sensations. And hence the images we have when we are awake and having sensations are not accidents that inhere in external objects, and are no proof that any such external object exists at all. So if we follow our senses, without exercising our reason in any way, we shall be justified in doubting whether anything exists. I acknowledge the correctness of this Meditation. But since Plato and other ancient philosophers discussed this uncertainty in the objects of the senses, and since the difficulty of distinguishing the waking state from dreams is commonly pointed out, I am sorry

[37] Some scholars think that skepticism forms an important context to Hobbes's work. Even if that were the case, it would still be notable that explicit engagement is largely absent. Here see Richard Popkin, *The Third Force in Seventeenth-Century Thought* (Leiden, 1992), 8-49; Popkin, *History,* 189-207; Richard Tuck, "Optics and Sceptics: The Philosophical Foundations of Hobbes's Political Thought", in Edmund Leites (ed.), *Conscience and Casuistry in Early Modern Europe* (Cambridge, 1988); Tuck, "Hobbes and Descartes", in G.A.J. Rogers and Alan Ryan (ed.), *Perspectives on Thomas Hobbes* (Oxford, 1988); Gianni Paganini, "Hobbes among Ancient and Modern Sceptics: Phenomena and Bodies", in Gianni Paganini (ed.), *The Return of Scepticism: From Hobbes and Descartes to Bayle* (Dordrecht, 2003); Paganini, "Hobbes and the Continental Tradition of Skepticism", in José R. Maia Neto and Richard H. Popkin (ed.), *Skepticism in Renaissance and Post-Renaissance Thought: New Interpretations* (Amherst, NY, 2003); and Paganini, "Hobbes and the French Skeptics", in John Christian Laursen and Gianni Paganini (ed.), *Skepticism and Political Thought in the Seventeenth and Eighteenth Centuries* (Toronto, 2015).

[38] Popkin, *Third Force* notes only one passage in *De Corpore* (Hobbes, *English Works,* 1.63) and one in the *Six Lessons* (Hobbes, *English Works,* 7.184). Popkin *(History,* 207) describes Hobbes as "almost oblivious to his contemporary epistemological sceptics, and far more cautious than his contemporary religious ones".

> that the author, who is so outstanding in the field of original speculations, should be publishing this ancient material.[39]

One might at first suspect that Hobbes, though he clearly was aware of skeptical arguments, just did not see the point of what Descartes was doing in the First Meditation. But in fact he seems, at least in outline, to agree with Descartes – at least to agree that doubts arise, "if we follow our senses, without exercising our reason in any way".

The solution, for Hobbes as for Descartes, is to make appropriate use of reason.[40] The difference between them lies in what that appropriate use of reason is. Hobbes, like Gassendi, rejected Descartes's method of discovering essences via clear and distinct intellectual perception. However, unlike Gassendi, Hobbes did not deny that there was such a thing as *scientia*, which was the best sort of knowledge.

Though Hobbes shows little explicit concern with skepticism, it does make sense to think of him as a skeptic about various specific topics. For instance, we might well describe Hobbes as a sort of religious skeptic. In several texts he argues that our knowledge of God, indeed the very manner in which we can conceive of him, is severely limited. Hobbes argues that our thoughts about God are like the thoughts that a man born blind can have of fire.[41] That man can conceive of fire only as the cause of the warmth he feels, and we can conceive of God only as the cause of everything around us. Though such restricted views about what

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[39] Descartes, *Oeuvres,* 7.171; *Philosophical Writings* 2.121.
[40] Cf. John Laird, *Hobbes* (New York, 1968), 160: "In the main, therefore, Hobbes was a joyful rationalist, relying confidently upon individual insight".
[41] See the fifth of Hobbes's *Objections* to Descartes's *Meditations* (Descartes, *Oeuvres,* 7.179-80; *Philosophical Writings* 2.126-7) and Hobbes, *Leviathan* 11.25. We cite passages in *Leviathan*, *De Corpore,* and the *Elements of Law* by chapter and paragraph.

we can think and know about God are hardly unknown, they are in a sense skeptical, for they deny that we have, or can have, knowledge which many people take us to have.[42]

Hobbes, perception, and 'the modern philosophy'

Perhaps the most prominent part of Hobbes's theory of knowledge is his theory of perception. This appears in chapter 1 of *Leviathan*, and chapter 2 of the *Elements of Law*. In these works, Hobbes begins with views about individual human beings, before moving on to views about groups of humans (i.e., political philosophy). The first part of his theory he presents is his theory of sense. This theory is also presented in chapter 25 of *De Corpore*. Though the three presentations differ slightly, the central views are the same in each case – the differences seem to arise from differences in which Hobbes wanted to emphasize in each context, rather than from any change in his view on these issues between the early 1640s and the mid 1650s.

We might relate Hobbes here to a general view about what was distinctive about modern philosophy. Hume states it as follows:

> The fundamental principle of that philosophy is the opinion concerning colours, sounds, tastes, smells, heat and cold; which it asserts to be nothing but impressions in the mind, deriv'd from the operation of external objects, and without any resemblance to the qualities of the objects.[43]

Looking at Hobbes's accounts of sense, we find him arguing, as he puts it in the *Elements of Law*,

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[42] Popkin, *Third Force* discusses the 'religious skepticism' of denying that Moses was the author of all of the Pentateuch. On this issue, see also Malcolm, *Aspects,* 383-431.

[43] David Hume, *A Treatise of Human Nature* (Oxford, 2000), I.iv.4. See also the description of what the "new philosophy" holds in the speech of the second *abbé*, "a good philosopher", in note B to the article "Pyrrho" in Bayle's *Dictionary*. Pierre Bayle, *Historical and Critical Dictionary: Selections* (Indianapolis, 1991), 196-7.

(1) That the subject wherein colour and image are inherent, is not the object or thing seen.

(2) That that is nothing without us really which we call an image or colour.

(3) That the said image or colour is but an apparition unto us of that motion, agitation, or alteration which the object worketh in the brain or spirits, or some internal substance of the head.

(4) That as in conception by vision, so also in the conceptions that arise from other senses, the subject of their inherence is not the object, but the sentient.[44]

Thus Hobbes argues that color is an appearance, or a feature of appearances, not a feature of any external object.[45] The perceived color is (merely) causally related to the perceived object. Hobbes is, in this sense, modern. Gassendi, with his views about appearances as signs of corpuscular structure, is similarly modern.[46]

How far did Hobbes take this view? Certainly he held it about the qualities commonly called secondary, such as color. Indeed, color is his main example in chapter 2 of the *Elements of Law*. Did Hobbes also hold this view about other perceived qualities? Though it is not entirely clear, in the above passage, what "image" refers to, earlier in *Elements* 2.4 it seems clear that Hobbes wants to treat shape as well as color. And later in the chapter he says more:

> And from thence also it followeth, that whatsoever accidents or qualities our senses make us think there be in the world, they are not there, but are seemings and apparitions only. The things that really are in the world without us, are those motions

[44] Thomas Hobbes, *The Elements of Law* (Oxford, 1994), 2.4.
[45] On discussions of such Galilean ideas by Hobbes, Gassendi, and other members of the Mersenne circle, see Tuck,"Optics and Sceptics".
[46] See section 2.3 above.

by which these seemings are caused. And this is the great deception of sense, which also is by sense to be corrected.[47]

All of our perceptions of qualities are apparently on a par here. The accidents and qualities we seem to perceive are "not there" in "the world", but only in us. Motion is a special case. But even then we cannot perceive all of the relevant motions (such as the ones that give rise to the perceptions of particular colors). There is indeed a great "deception". Some might want to apply the word 'skepticism' here, but Hobbes does not.

Indeed, Hobbes does not suggest that we lack of knowledge of the object, even if our perceptions do not present it as having the same features it really has. Rather he thinks we can, using a combination of sense and reason, learn that we should not identify the features of appearances and the features of objects, and learn that the appearances are caused by motions, not by qualities that resemble the appearances.

Knowledge and scientific knowledge

That account of sense is only part of Hobbes's more general account of knowledge. Another thing we need to acknowledge is that Hobbes thought there were different kinds of knowledge. Consider what he says in the first paragraph of chapter 6 of *De Corpore* (the chapter on method):

> Philosophy is knowledge [*cognitio*], acquired through correct reasoning, of the phenomena or apparent effects from the conceived production or a certain possible generation, and of the production which was or could be from the conceived apparent effect. The *method* of philosophizing *is therefore the shortest investigation of effects through known causes, or of causes through known effects.* Moreover then, we are said *to know*

[47] Hobbes, *Elements of Law,* 2.10.

> an effect *scientifically* [*scire*] *when we know* [*cognoscimus*] of *its causes that they are, and in what subject they inhere, and in what subject they introduce the effect, and in what manner they produce it.* And accordingly, scientific knowledge [*scientia*] is τοῦ διότι or of causes; all other knowledge [*cognitio*], which is called τοῦ ὅτι, is either sense, or imagination or memory remaining after sense.[48]

Hobbes here distinguishes between two things we might call knowledge – both of which, indeed, his seventeenth-century English translator called knowledge.[49] These are, in Latin, *scientia* and *cognitio*. *Scientia* – which we might call scientific knowledge, though this too has potentially misleading connotations – is the best sort of knowledge. *Cognitio*, or at least can be, a sort of knowledge, but falls short of *scientia*.

Consider here the account of the human mind that Hobbes builds up in the early chapters of *Leviathan*. As he develops this account, he discusses sense and memory and experience. He does grant that there is knowledge here, though it is not of the best sort: "sense and memory are but knowledge of fact".[50] Building on those, he gives an account of prudence, which is a sort of correct prediction, based on experience:

> Sometime a man desires to know the event of an action; and then he thinketh of some like action past, and the events thereof one after another; supposing like events will follow like actions … Which kind of thoughts is called *foresight*, and *prudence*, or *providence*; and sometimes *wisdom*; though such conjecture, through the difficulty of

[48] This translation is based upon, but modifies, that of Helen Hattab, "Hobbes's and Zabarella's Methods: A Missing Link", *Journal of the History of Philosophy* 52 (2014), 461-85: 469-70.
[49] On the translation, see Hattab, "Hobbes's and Zabarella's Methods", especially 469-70.
[50] Hobbes, *Leviathan,* 5.17.

> observing all circumstances, be very fallacious … it be called prudence, when the event answereth our expectation.[51]

Prudence, then, is a sort of correct prediction, based on experience. But for all the value of sense and memory and indeed prudence, Hobbes nevertheless contrasts them with science.

This Hobbesian science (or *scientia*) does not include everything we might call science. For one thing, Hobbes is often talking about a sort of knowledge, rather than an area of enquiry. Moreover, Hobbes thinks that *scientia* is not possible in some of the fields we might regard as sciences. Thus he excludes both natural and political history from philosophy, because they are "but experience, or authority, and not ratiocination".[52]

Hobbes develops this sort of categorization further in chapter 9 of *Leviathan*. There, after distinguishing science from history, he distinguishes different sciences by their subject matter. Hobbes here appears to be approaching the notion of a science as an area of enquiry, rather than of a kind of knowledge, though that second notion is certainly at work too. His list of sciences includes geometry, astronomy, meteorology, and optics, but also some more surprising examples, in particular astrology.[53]

That gives us an idea of areas in which we might hope to have *scientia*. But what is *scientia* (other than simply being a good sort of knowledge) and why is it so good? In chapter 6 of *De Corpore*, Hobbes discusses method, the correct way to try to achieve *scientia*. Here we focus on one important aspect of Hobbes's view: the role of causes. Scientific knowledge, Hobbes says, is of causes. And we "*know* an effect *scientifically when we know of its causes that they*

[51] Hobbes, *Leviathan,* 3.7.
[52] Hobbes, *De Corpore* 1.8, in *English Works,* 1.11. Hobbes also there excludes, for various reasons, theology, "the doctrine of angels", knowledge acquired by divine revelation, and "the doctrine of *God's worship*". Some will no doubt suspect that these exclusions are a cover for atheism. But on the face of it Hobbes is saying that there is such possible knowledge, but it is not the same sort of knowledge one seeks in philosophy.
[53] Hobbes lists astronomy as a science in this chapter in the 1651 English edition, but not in the rather different chapter in the 1668 Latin edition.

are, and in what subject they inhere, and in what subject they introduce the effect, and in what manner they produce it".[54] The best sort of knowledge, for Hobbes, is causal understanding.

There has been considerable debate about how these views relate to Hobbes's other views about method.[55] However exactly we resolve this debate, it remains clear that Hobbes's account of *scientia* focuses on causal explanation. That itself suggests the question of when and how we can know what the causes are. Hobbes himself was aware of this, and suggests a restrictive answer. We can and do know the causes, and thus have *scientia*, in geometry and in civil science (political philosophy). Elsewhere, however – even in proper philosophical or scientific investigation – our grasp on causes is less secure, and we lack *scientia*.

Seeing Hobbes's positive evaluation of geometry here, we might associate him with a general trend among early modern philosophers to praise the successes of mathematics and look for a way, through method, to associate philosophy more closely with mathematics.[56] Hobbes's approach to that is to place civil science – which is to say, his own political philosophy – on the same footing as geometry. For there, as in geometry, we can really know the causes.

> 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.[57]

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[54] Hobbes, *De Corpore,* 6.1.
[55] For a very helpful recent discussion, see Hattab, "Hobbes's and Zabarella's Methods".
[56] Gassendi is an exception here: despite his admiration for Galileo, his physics is rarely quantitative and he expresses no desire to emulate the alleged certainty of mathematics.
[57] Hobbes, Epistle Dedicatory to the *Six Lessons*, in *English Works,* 7.184.

In the geometrical and political cases, we ourselves make the things we are investigating, so we know their causes. In other cases – say we want to investigate the workings of the tides – we can suggest what the causes might be, but cannot be so sure of what they are.

Hobbes's views about causal explanation connect to another important aspect of his view, an emphasis on definitions.[58] In the Epistle Dedicatory to *De Corpore*, Hobbes said that he was "confident … that in the three former parts of this book all that I have said is sufficiently demonstrated from definitions; and all in the fourth part from suppositions not absurd".[59] Part I is on "Computation or Logic", Part II on "The First Grounds of Philosophy", Part III on "Proportions of Motions and Magnitudes", and Part IV on "Physics, or the Phenomena of Nature". Thus Hobbes thought that all of his system, from logic through metaphysics, and through geometry to the account of refraction and reflection at the end of Part III, was grounded in definitions. Once we leave geometry for physics, and the realm in which we do not know the causes, we also lack definitions.

Explaining by citing causes, and explaining by deducing from definitions, seem however to be different enterprises. Ultimately, one wants an account of how these two aspects of Hobbes's method are related. In several cases, though not all, the connection appears to be that the definitions state causes. Consider for example the definitions of 'line', 'length', and 'point': "Though there be no body which has not some magnitude, yet if, when any body is moved, the magnitude of it be not at all considered, the way it makes is called a *line,* or one single dimension; and the space, through which it passeth, is called *length;* and the

[58] For a recent discussion of the role of definitions in Hobbes's view, see Marcus P. Adams, "Hobbes, Definitions, and Simplest Conceptions", *Hobbes Studies* 27 (2014), 35-60.
[59] Hobbes, *English Works,* 1.xi.

body itself, a *point*".[60] Each of those key geometrical notions is defined by describing what causes such a thing.

There are also non-geometrical examples. For example, at the place in chapter 17 of *Leviathan* – "Of the Causes, Generation, and Definition of a Commonwealth" – where we might expect a definition of 'commonwealth', and where Hobbes emphasizes the word in the text, as if he has defined it, what he has actually done is state how a commonwealth is caused:

> This is more than consent, or concord; it is a real unity of them all, in one and the same person, made by covenant of every man with every man, in such manner, as if every man should say to every man *I authorise and give up my right of governing myself to this man, or to this assembly of men, on this condition, that thou give up thy right to him, and authorize all his actions in like manner*. This done, the multitude so united in one person is called a COMMONWEALTH, in Latin CIVITAS.[61]

Scientia is, for Hobbes, the best sort of knowledge, and is possible for us, but seemingly only in limited realms.[62] Though there is nothing about the subject matter of physics per se that means we cannot have *scientia* there, we are in practice unable to know what the causes of many physical phenomena are, and so cannot have *scientia* of them. *Scientia* remains in Hobbes's account, unlike Gassendi's, and Hobbes thinks it is present in two important sciences. But he also finds it to be absent in all other sciences. So perhaps there is a way in which, on this issue, Hobbes and Gassendi are closer than they first appear.

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[60] Hobbes, *De Corpore* 8.12, in *English Works,* 1.111.
[61] Hobbes, *Leviathan,* 17.13. More broadly, Hobbes's political philosophy clearly aims at a sort of causal understanding of society. How exactly this can be a causal explanation is a complex issue, connected to the question of the status of the state of nature. Here our focus is just on how this causal project is connected to a search for definitions.
[62] See Douglas Jesseph, "*Scientia* in Hobbes", in Tom Sorell, G.A.J. Rogers, and Jill Kraye (ed.), *Scientia in Early Modern Philosophy* (Dordrecht, 2009).

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