Perception in Early Modern Philosophy

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The senses were subject to considerable scrutiny during the 17th and 18th centuries (traditionally called the “early modern” period). No early modern philosopher would have denied that the senses are an important source of knowledge about the world, but many worried that they are a systematically misleading source. Consider Malebranche’s ominous warning:

I shall teach you that the world you live in is not at all as you believe it to be, because actually it is not as you see it or sense it. You judge on the basis of the relation of your senses to all the objects surrounding you, and your senses beguile you infinitely more than you can imagine…there is no precision, no truth in their testimony.¹

Descartes before him was less melodramatic but similarly critical: the senses “do not, except occasionally and accidentally, show us what external bodies are like in themselves.”² It’s not all bad news for the senses, however. Hand in hand with this worry about their ability to show us what the world is really like came an extensive re-examination of almost all aspects of perception. Along the way, the early moderns made important advances in our understanding of the perceptual process, established some of the classic questions with which philosophers and perceptual psychologists wrestled for centuries, and even offered a new vision of the proper function of the senses.

Why did the senses come under a cloud of suspicion in the first place? The senses had been eyed cautiously since ancient times: ancient atomists cast colors and flavors into

¹ Malebranche 1688, Dialogue I.
² Descartes 1644, II.3.
the mind of the perceiver, Plato charged the senses with acquainting us with only shifting appearances, and ancient skeptics challenged the ability of sensory appearances to show us with any certainty what the physical world is really like, or indeed whether there really is one. But something quite dramatic and lasting happened in the early modern period. The rediscovery of ancient writings, and especially ancient skeptical writings, certainly provided one source of renewed concern about the senses. An even more pervasive challenge, however, came from developments in natural philosophy or physics, which advanced what I will call the mechanical hypothesis. Details varied from thinker to thinker, but the basic shared idea was that the physical world is made up of a single kind of stuff, matter, that is (a) fully characterized by a handful of privileged properties including size, shape, position, and local motion, and (b) divisible into insensibly small parts that are characterized by those same properties. Any change in the physical world was to be explained by the motion and impact of variously sized and shaped bodies. This conception of the physical world forced a re-thinking of almost every aspect of sense perception: the objects of perception; the causal process that gives rise to perceptual experience; the structure of perceptual experience itself; the reliability of the senses for showing us what the world is like; and even the function of the senses. This chapter considers each topic in turn.

Although a great many thinkers contributed to the discussion about sense perception in this period, the chapter is limited to philosopher-scientists in Europe who had an especially lasting influence on the topic. It restricts its scope to philosophical questions and debates, leaving aside more technical discussions in optics, anatomy, and physiology, though

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3 See Popkin 1979 for an overview of the reception of skeptical writings in the early modern period.
4 For some classic statements of the mechanical hypothesis, see Boyle 1666 and 1674; Hobbes 1655; Descartes 1644 and 1664a.
developments in these areas certainly informed the philosophical discussion. Finally, it focuses on the “external” senses (vision, audition, olfaction, gustation, and touch) to the neglect of the “internal” senses (or bodily senses, like proprioception, kinesthesia, hunger, thirst, etc.), and among the external senses, vision takes pride of place as it did in the period.

I. The Objects of Perception

Early modern philosophers continued to explore the ancient and medieval question how a substance, like a kumquat, can be the object of perception when all we immediately perceive are its sensible properties (its color, odor, flavor, shape, size, etc.), but two other issues arose that dominated discussions about the object of perception: (a) the distinction between primary and secondary qualities and (b) the question whether the immediate objects of perception are things or ideas of things. This section examines the primary-secondary quality distinction. Section IV takes up the issue whether ideas are objects of perception.

Boyle and Locke introduced the terms “primary quality” and “secondary quality” into the philosophical discussion in the latter part of the 17th century, but Galileo and Descartes made the distinction in the early part of the century.\(^5\) The distinction is roughly coextensive with the Aristotelian distinction between common and proper sensibles so far as the lists are concerned: primary qualities include many of the common sensibles (size, shape, position, and local motion and rest); secondary qualities include most of the proper sensibles (color, sound, odor, flavor, hot and cold). The nature of the distinction, however, is quite different. While both of the Aristotelian common and proper sensibles were thought to be

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\(^5\) See Peter Ross, “Primary and Secondary Qualities,” in this volume.
real properties present in bodies in just the way they appear to be, the early modern primary and secondary qualities differ from one another ontologically. Primary qualities were thought to be the fundamental intrinsic properties of body, and so they were present in bodies in just that way they appear to be. Secondary qualities were not. (What they were supposed to be we'll consider in a moment.)

The proposal that there is an ontological difference between a kumquat's shape and its color does not suggest itself to perceptual experience: both look to be out there in the kumquat. Arguments for distinguishing their ontologies therefore did not typically rely on introspecting perceptual experience. They piggybacked on arguments for the mechanical hypothesis itself, with its proposal that size, shape, position and motion are ontologically privileged properties of body that are solely responsible for the movements and interactions of bodies. Some of these arguments for the mechanical hypothesis took the form of a priori conceptual analysis which alleged that size, shape, position and motion are somehow constitutive of the very concept of body in a way that color, odor, and the like are not. Others insisted on a posteriori grounds that the mechanical hypothesis made for an especially intelligible, simple or fruitful physical theory. Thomas Reid was an interesting exception. He accepted the primary-secondary quality distinction, but thought one could argue for it simply on the basis of introspection. Reflection on our sense-based conception of size and shape, he insisted, shows it to be perspicuous and to inform us what these qualities are “in themselves” while reflection on our sense-based conception of like color, odor and the like, he further insisted, shows it to be “relative and obscure,” informing us only how these

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6 They were distinguished by whether more than one sense modality had access to them. See Chapter 2.
7 See Galileo 1623; Descartes 1644, II.4; Locke 1690, II.viii.9; Malebranche 1712, I.10.
8 See Descartes, 1644, I.69-70 and IV.200-203; and Boyle 1674.
qualities affect us. Once size, shape, position and local motion were given pride of place in the ontology of the physical world, a problem was born about the ontology of the remaining sensible qualities.

Just how positively to characterize the ontology of color, sound, odor, and the like differed from philosopher to philosopher (and sometimes from sentence to sentence within a philosopher). The options included: (a) they are reducible to the (microscopic arrangement of) primary qualities in bodies, (b) they are to be identified with the powers of those (microscopic arrangement of) primary qualities in bodies to produce sensations in the mind of the perceiver, and (c) they are merely sensations in the mind of the perceiver that are produced by the (microscopic arrangements of) primary qualities in bodies. Few thinkers firmly opted for (a), though Descartes and Locke occasionally say things that suggest this reductive view. More common were versions of (b) and (c). Locke famously cast secondary qualities as “nothing in the objects themselves, but powers to produce various sensations in us by their primary qualities, i.e., by the bulk, figure, texture, and motion of their insensible parts.” Boyle and Reid followed Locke in portraying colors, odors, and the like as powers or dispositions of bodies to produce distinctive sensations in human perceivers (and Reid, as I suggested, seemed to think this is what the senses themselves suggest to us). Galileo and Hobbes, by contrast, opted for the view that colors, sounds and the like are simply sensations in the mind of the perceiver. Here is Galileo: “[color, odor, flavors, and sound] which are supposed to be qualities residing in external objects have no real existence save in

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9 Reid 1785, II.17.
10 See Descartes 1637, Discourse 1; Descartes 1644, IV.199; and Locke 1690, II.viii.15 and II.viii.17.
11 Locke 1690, II.viii.10.
12 See Boyle 1666; Reid 1764, VI.4; and Reid 1785, II.17.
us, and outside ourselves are mere names.” However unsettled the ontology of secondary qualities was in the period, two commitments were clear and common: (a) secondary qualities like color and sound are not in physical objects in the way they sensorily appear to be, and (b) according to most parties, they depend as much on the perceiver as on the body to which they are attributed. To put the point in somewhat different language: primary qualities are objective features of the physical world, while secondary qualities in some sense subjective.

Berkeley was a rare opponent to the primary-secondary quality distinction, which he considered both philosophically indefensible and an affront to common sense. His most memorable (if unconvincing) argument against the distinction came in the form of a simple challenge: try to conceive a body that has size and shape without conceiving it to have any color or tactile qualities. He trusted we will find that we cannot, that the distinction is therefore inconceivable, and that it rests on a false abstraction of the mind. Both colors and shapes, he insisted, are ontologically on par. Curiously, and much to the consternation of later philosophers, he defended this common sense view not by returning colors and the like to a mind-independent world of bodies, but rather by drawing shapes and sizes into the mind alongside colors: all the sensible qualities (and bodies themselves, for that matter),

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13 Galileo 1623. See also Descartes 1641, 6th Replies; Descartes 1644, I.71; Hobbes 1655, XXV.3 and 10; Hobbes 1658, II.9; and Locke 1690, II.viii.19.
14 If there are genuine adherents to the reductionist position (a), they may say that the orange color of the kumquat does not depend on the perceiver (the orange color is nothing but, say, the having of a certain surface texture that can be cashed out in terms of size, shape, position and motion), but even the reductionist will say that the appearance of the color that we associate with the word “orange” is dependent on the distinctive sensations that the kumquat produces in the perceiver.
15 Berkeley 1710, §10.
Berkeley argued, exist as mind-dependent ideas (or, in the case of bodies, collections of ideas).\textsuperscript{16} Few followed him in this thesis.

II. The Origins of Perception: Sensory Processing

Just as the early moderns replaced the Aristotelian conception of the physical world and so objects of perception, so they replaced their account of how it is that we come to perceive it. The task for both was to explain how sensible properties out in the world are causally responsible for sense perceptual experiences in perceivers, a process that often occurs over a considerable distance. On the Aristotelian view, sensible species that in some way resemble the sensible properties of bodies are propagated through the medium and received by the sense organs of a sentient perceiver thereby “informing” her experience of the world.\textsuperscript{17} Descartes explicitly rejected the species theory: the process, he wrote, cannot involve “images transmitted by objects to the brain.”\textsuperscript{18} Hobbes is downright hostile: “the introduction of species…passing to and fro from the object, is worse than any paradox, as being a plain impossibility.”\textsuperscript{19} The problem stemmed from the mechanical hypothesis: if bodies operate only by local motion and impact, then the production of, say, an orange species in the medium or eye is unintelligible; no amount of pushing or turning or jiggling of variously sized and shaped particles of matter is going to result in the production of something orange. Species had to go.

The early moderns replaced the species theory with a thoroughly mechanical theory. Instead of species of color and sound propagated through the medium, they proposed the

\textsuperscript{16} See Wilson 1982 for a discussion of the mind-dependence of sensible qualities in Berkeley.
\textsuperscript{17} See Chapter 2. For a more detailed discussion of this process see Simmons 1994.
\textsuperscript{18} Descartes 1637, Discourse 4 and 1; Descartes 1641, 6th Replies; and Descartes 1644, IV.198.
\textsuperscript{19} Hobbes 1658, II.4. See also Malebranche 1712, III.ii.2 and Reid 1784, II.8.
impact of (insensibly small) bodies in motion. Hobbes offered a nice schematic account of auditory processing of a ringing bell:

…the clapper hath no sound in [the bell], but motion, and maketh motion in the internal parts of the bell; so the bell hath motion, and not sound, that imparteth motion to the air; and the air hath motion, but not sound; the air imparteth motion by the ear and nerve unto the brain; and the brain hath motion but not sound…²⁰

The explanatory rules here are clear: from object to brain there is nothing but the local motions of bodies.²¹

A critical moment in early modern theorizing about the sensory process was Kepler’s discovery in 1604 that the function of the lens (or “crystalline humor” as it was called) is not to sense, but rather to refract the light coming into the eye in such a way that all the rays of light coming from one point on a focal object are reassembled at a single point on the retina, resulting in two-dimensional (upside-down and backward) image of the object on the retina.²² The role of the retinal image, and the puzzle about how the proper orientation and the three-dimensional properties of the object are recovered in perceptual experience, became central questions in the study of vision.²³ Descartes accepted Kepler’s account of the

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²⁰ Hobbes 1658, II.9.
²¹ See Descartes 1644, IV.198; Locke 1690, II.viii.11-13; Malebranche 1712, I.11; and Reid 1785, II.2-3.
²² Kepler 1604, 5.3.
²³ Berkeley, for instance, noted: “the solution of this knot about inverted images seems the principal point in the whole optic theory, the most difficult perhaps to comprehend, but the most deserving of our attention, and, when rightly understood the surest way to lead the mind into a thorough knowledge of the true nature of vision” (1733, §52).
lens and retinal image. Indeed he enthusiastically gives instructions on us how to demonstrate it to ourselves with “the eye of a freshly dead human being—or failing that, the eye of an ox or some other large animal.” Descartes put the retinal image to work in his mechanical account of sensory physiology, speculating that the retinal image is reproduced in the brain by the motion of filaments in the optic nerve that connect the retina to the brain: when filaments jiggles on the retina they simultaneously jiggle at the other end on the “inner surface” of the brain; in so doing they open pores in a pattern matching the retinal image. The open pores that constitute that brain image in turn draw animal spirits—tiny fast moving bits of matter that perpetually flow from the pineal gland at the center of the brain—so that the spirits trace yet another replica of the retinal image on the surface of the pineal gland. An image of the object is thus transmitted mechanically from retina to brain to pineal gland.

Although Descartes occasionally spoke as if the mind sees objects by inspecting these retinal and pineal images, he quite emphatically insisted in his *Dioptrics* that the mind in no way sees objects by inspecting images on the retina or in the brain “as if there were yet other eyes within our brain with which we could perceive” them. It is rather that the motions of the filaments in the brain, and the flow of animal spirits from the pineal gland, cause our perceptual experience of the object. Writing more than a century later, Reid

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24 He further noted that the lens “accommodates” to distance by changes in its shape as one focuses on nearer or further objects, thereby serving as an important cue to the object’s distance.
25 Descartes 1637, Discourse 5. Malebranche repeats the instructions at 1712, I.12.
26 Descartes 1664b, §67.
27 For an excellent introduction to Descartes’ sensory physiology see Hatfield 1992.
28 Descartes 1664b, §70 and Descartes 1641, Meditation 6.
29 Descartes 1637, Discourse 6.
30 See Wilson 1991 for a discussion of these two ways of reading of the relationship between pineal image and mind.
rejected Descartes’ idea that the retinal image is reproduced in further back in the brain (he was dubious that anyone had any idea what was going on in the brain), but he continued to insist, with Descartes, that the mind in no way sees objects by inspecting images of them on the retina: “No man ever saw the pictures in his own eye, nor indeed the pictures in the eye of another, until it was taken out of the head and duly prepared.” The retinal image, and any images further back in the brain, were thought to be links in the mechanical causal chain.

The million-dollar question, of course, is: what happens next? How do we get from local motions in the brain to a conscious perceptual experience of a bright orange, tangy, ovoid kumquat on the table three feet away? The question is really threefold: (a) how do we get from motions to conscious experiences in general (from something physical to something mental), (b) how do we get from local motions to colors and sounds in the case of secondary quality perception in particular, and (c) how do we get from local motions that constitute a two-dimensional image of the object in the head to a perception of three-dimensional objects outside the head and at a distance from us? The first two questions land us squarely in the mind-body problem. The third is a topic for perceptual psychology, and so will be considered in the next section.

The problem how motions in the brain give rise to conscious perceptual experiences in the mind is clearest for Descartes. According to his dualism, mind and body are distinct and utterly heterogeneous substances: the mind is an immaterial, consciously thinking and perceiving thing while the body is a material and unconscious thing devoid of thought and perception. They mystery is how two things that are so different could have any causal commerce with each other. Materialists didn’t have it any easier: it’s no more obvious how motions in the brain constitute conscious perceptual experiences than it is how they cause them.

31 Reid 1764, VI.12; see also Reid 1784, II.4.
in an immaterial mind. Unfortunately, the early moderns did not do much to illuminate this crucial step. Descartes’ treatment was typical: “we know that the nature of our soul is such that different local motions are quite sufficient to procure all the sensations in the soul.”

He added that God established a psycho-physiological law (he called it an “institution of nature”) joining types of brain motions with types of sensations in the mind, but that still doesn’t tell us how the causal exchange occurs. The early modern period was not without creative metaphysical ways around the problem of mind-body interaction: Malebranche’s occasionalism (which was prevalent among the Cartesians) limited all causal efficacy to God, so that the causal exchange between mind and body, like all causality in the created world, was understood to be powered by God; Spinoza’s parallelism asserted that mind and body were not separate substances after all, but two expressions a single substance (God or Nature) and that their relation is not causal but representational; and according to Leibniz’s pre-established harmony, God set things up so that the internal (and internally caused) events in the mind would be cosmically coordinated with the internal (and internally caused) events in the body. Berkeley took Malebranche a step further and held that God directly

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32 Hobbes suggested that conscious perceptual experiences are constituted by a kind of outward directed resistance to motions coming into the brain from the external world: “from the brain, [the motion] reboundeth back into the nerves outward, and thence it becometh an apparition without, which we call sound” (Hobbes 1658, II.9; see also Hobbes 1655, XXV.2). It’s not at all clear that this is an improvement on the dualist’s response.

33 Descartes 1644, IV.198.

34 Descartes 1641, Meditation 6 and Descartes 1637, Discourse 6.

35 Reid had a similar view but acknowledges the explanatory gap: “we must often be satisfied with knowing that certain things are connected, and invariably follow one another, without being able to discover the chain that goes between them. It is to such connections that we give the name of laws of nature” (1764, VI.12).

36 See Malebranche 1688, Dialogue IV.10.

37 See Spinoza 1677.

38 See Leibniz 1695.
causes ideas of bodies in us without the need for any extra-mental bodies existing at all. Most philosophers, in other words, backed away from saying there is a straightforward causal interaction between mind and body.

In response to the second question how motions in the brain result in sensations of color, flavor, and the like that bear no resemblance to anything in objects or the brain, the early moderns tended to deny that this creates any special problem by pointing out that physical causes produce mental effects that bear no resemblance to them all the time: the written word “aardvark” results in our imagining a critter with a long nose; a blow to eye results in seeing stars; and a knife slicing flesh results in pain. These things don’t give us pause, so why should we be puzzled at local motions giving rise to bright orange visual sensations and tangy flavor sensations? We are, once again, offered no real insight into how this transformation from motions to colors and flavors is supposed to work, and we are left with an explanatory gap.

A handful of philosophers, like Locke and Reid, who were especially modest in their estimation of the range of human knowledge, conceded the explanatory gap between mind and body. Reid, for example, wrote:

how are the sensations of the mind produced by impressions upon the body?

Of this we are absolutely ignorant…there is a deep and a dark gulf between [mind and body] which our understanding cannot pass; and the manner of their correspondence and intercourse is absolutely unknown.

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39 See Berkeley 1710, §26.
40 See, e.g., Descartes 1644, IV.197 and Locke Essay II.viii.13. Of course, the natural response is that these phenomena should give us pause!
41 Reid 1764, VI.21. See also Reid 1785, II.4 and Locke Essay IV.iii.13.
Since intelligibility and explanatory success were meant to be precisely the advantages that the mechanical philosophy had over Aristotelian physics, this concession made at the body-mind junction was significant. Berkeley did not miss the opportunity to point out exactly that.42

III. The Structure of Perceptual Experience

Once in the mind, there is still work to be done to get us to perceptual experience. Descartes famously distinguished three “grades of sensory response”: (a) motions in the sense organs and brain, (b) sensations, which are the immediate result in the mind of those motions, and (c) a host of judgments that embellish those sensations in a variety of ways.43 Why suppose that judgments are involved in perception? After all, it doesn’t feel like I am making any judgments when I look at the trees out my window. I just open my eyes, turn my head, and I see them. The trouble stems from the fact that everyone in the period granted that the sensations we receive from the world are impoverished by comparison with the perceptual experience we actually have of it. Visual sensations, for example, were thought to amount to a series of kaleidoscopic images of two-dimensional color patches. What we see, however, are three-dimensional objects of constant size, shape, distance, and color. Visual experience must therefore have a more complex structure than meets the eye: it is, the early moderns proposed, determined by a combination of sensations received from without the mind and judgments produced from within it.

Descartes’ account of the judgmental component of perceptual experience was a bit of a hodge-podge: it included judgments that attribute colors and flavors and the like to

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42 For discussion see Wilson 1982.
43 Descartes 1641, 6th Replies. For a similar breakdown of the process, see Malebranche 1712, I.9.
bodies, judgments that flesh out the three-dimensionality of visual objects, judgments that provide size and shape constancy, judgments by which objects appear to be “outside” us, and also the epistemologically precarious judgments that things in the world are as they sensorily appear. He also rather implausibly suggested that while in adulthood we make all these judgments so habitually that we don’t notice them, we originally made them deliberately.44 Malebranche cleaned up the Cartesian picture by separating what we he called “natural” judgments that affect the way the world perceptually appears to us from “free” judgments that result in beliefs about how things are in the world, e.g., that they are as they appear.45 Only the latter free judgments, he thought, involve an act of will and result in beliefs for which we are epistemologically responsible, since they are the only ones we have any control over. Natural judgments that result in perceptual experience itself, he proposed, are hard-wired into our nature: that colors appear to be on the surfaces of objects and that bodies appear to have three dimensions not two are the result of judgments that occur in us “independently of us and even in spite of us.”46

That judgments contribute to perceptual experience was generally accepted. The nature of those judgments, however, was hotly debated. The debate centered largely on spatial perception in vision, for the problem to solve in this case was both clear and pressing: how is it that from two-dimensional retinal and sensory images we come to see three-dimensional objects? Berkeley opened his hugely influential work, An Essay Toward a New Theory of Vision (1709), with a puzzle about distance perception in particular:

2. It is, I think, agreed by all that Distance, of itself and immediately, cannot be seen. For, distance being a line directed endwise to the eye, it

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44 See Descartes 1641, 6th Replies and Descartes 1644, I.71.
45 See Malebranche 1712, I.10 and I.14.
projects only one point in the fund of the eye [the retina], which point remains invariably the same, whether the distance be longer or shorter.

3. I find it also acknowledged that the estimate we make of the distance of objects considerably remote is rather an act of judgment...than of sense.\textsuperscript{47}

Everyone agreed that if the retinal image did not contain information about distance then any sensation produced in the mind as a result of it cannot either.\textsuperscript{48} Judgments must fill in the distance. The Cartesians are routinely thought to cast these judgments as \textit{innate} to the mind (witness Malebranche’s description of them as “natural”) and as \textit{intellectual} in nature: we calculate the distance of an object “as if by a natural geometry” Descartes famously wrote; thus, for example, from the knowledge we have of the distance between our eyes and their angular convergence on an object, we calculate by a process of reasoning the distance of the object by angle-side-angle.\textsuperscript{49} Berkeley, by contrast, argued that the judgments in question are \textit{learned} not innate, and \textit{associative} not intellectual: we immediately perceive distance only through touch (by reaching for or walking toward the object), and thus we must learn to “see” distance by associating our visual sensations of an object with tactile perceptions of its distance; distance perception is an intermodal phenomenon and geometry has nothing to do with it.\textsuperscript{50} This classic portrayal of the debate does an injustice to the Cartesians, who in fact proposed many means by which we perceive distance, some purely psycho-physiological (and so involving no judgments at all), some involving learned associative judgments, and only occasionally ones that smack of innate geometrical

\textsuperscript{47} Berkeley 1709, §§2-3. \hfill \textsuperscript{48} But see blow, fn. 51, and Hatfield and Simmons 2003b for a possible exception in Descartes. \hfill \textsuperscript{49} See Descartes 1637, Discourse 6; Descartes 1641, 6th Replies; and Descartes 1666, §48. See also Malebranche 1712, I.9. \hfill \textsuperscript{50} Berkeley 1709, §45.
reasoning. There is nevertheless a real disagreement between them over whether vision needs to be supplemented by touch in order for visual objects to be represented at a distance, and this debate had repercussions into the 20th century.

Reid was another important figure in the debate about the structure of perceptual experience. He rejected an important assumption shared by the Cartesians and Berkeley alike: that judgments effectively finish the representational job begun by sensations to provide us with a full-blooded perceptual experience of the world. First, Reid drew a sharp distinction between sensation and perception. Sensation, he proposed, is wholly non-representational mental state that has no object but only distinctive qualitative character. Perception, by contrast, is mental state that always has an object and that involves both a conception of the object and an irresistible belief in its present existence. The two mental states are not two stages in the building of a sensory representation of the world, but two fundamentally different kinds of mental state that are confused together in our ordinary perceptual experience of the world. Second, Reid thought that the transition from having a sensation to perceiving an object occurred not by any kind of innate reasoning (contra the Cartesian account of distance perception) and not by learned associations (contra Berkeley’s

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51 Even the “natural geometry” in Descartes was sometimes simply a metaphor to describe a purely psycho-physiological process that operates “as if” our brains were calculating by a kind of natural geometry. For his part, Malebranche was crystal clear that the “natural geometry” is part of the system of “natural judgments” hard-wired into the mind so that it involves no actual reasoning (Malebranche 1712, I.9). For a helpful discussion of the many Cartesian cues to distance, including the natural geometry, see Hall’s commentary in the translation of Descartes 1664b, Hatfield 1992, Simmons 2003b, and Wolf-Devine 1993.

52 For a helpful review of the early modern debate, and a detailed discussion of Berkeley’s side of it, see Atherton 1990. For a discussion of the debate over the course of 300 years see Degenaar 1996.

53 See Reid 1785, I.1 and II.16; and Reid 1764, VI.20-21.

54 See Reid 1785, I.1, II.5, and I.16; Reid 1764, VI.20. Malebranche is often thought to have anticipated Reid’s distinction between sensation and perception (see Nadler 1994, Jolley 1995, and even Reid 1785 II.7; but cf. Simmons).
account of the same), but simply, if mysteriously, “by the constitution of our nature.”

Sensations, he proposed, are nothing but “natural signs” of the properties of bodies that never bear any resemblance to their objects, but that trigger perceptions of those properties “by a kind of natural magic.” The resulting perceptions are “original perceptions”, which Reid distinguished from “acquired perceptions” which depend on learned associations between one original perception and another, as when I “see” that the bag of groceries is heavy. On the topic of spatial perception in particular, he granted Berkeley that it is an acquired perception: we must learn to see spatial properties through associations between original perceptions of visual figure (which are always only two-dimensional) and original perceptions of tangible figure (which is three-dimensional).

The lively debate about spatial perception touched on another famous debate that surfaced in this period: the “Molyneux problem”. William Molyneux, an Irish philosopher, posed the following problem to Locke: suppose a man born blind is acquainted by touch with a globe and a cube of similar size and made of the same metal; take the globe and cube away; restore the man’s sight; can he on the basis of sight alone determine which object is the globe and which the cube? Although there are differences in the details, Locke and Berkeley both answered no: it takes experience to associate the look of the objects with the

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55 Reid 1764, VI.12.
56 Reid 1764, 5.3, VI.21 and 6.24; Reid 1785, II.16.
57 Reid 1764, VI.20.
58 Reid 1764, VI.3 and VI.21-22; Reid 1785, II.19 and 21. His account is complicated by the fact that he thought our original perceptions of visible figure themselves skip skipped the sensational stage, proceeding directly from impressions in the eye to original perceptions of (two-dimensional) shapes. Moreover, contrary to Berkeley, who took visual and tactile figure to be heterogeneous properties, Reid insists that our original visual perceptions of figure are homogeneous but incomplete or “partial” perceptions of the same properties perceived completely by touch (see Reid 1785, II.19).
feel of their shapes. Leibniz, in a “Cartesian” sounding moment, answered yes: both vision and touch give us access to an innate intellectual geometry, and once that is in place the patient can (at least in principle) visually discern the sphere and cube “by applying rational principles”, viz., geometry, to his new visual sensations; there is no need to associate the visual and the tactile here. Reid took on the problem too, but gave different answers in different places depending on slightly different construals of the Molyneux question: for a newly sighted blind boy not steeped in the principles of mathematics, he agreed with Berkeley that the boy would not be able to distinguish the sphere from the cube and that discerning three dimensional shapes through vision typically depends on cross-modal associational learning; for a sophisticated mathematician, however, he sided with Leibniz, arguing that she could figure out the shapes by applying the principles of mathematics to what is presented in visual sensation.

IV. A Veil of Ideas?

So far we have focused on the question how perceptual experience comes about. Let’s turn to perceptual epistemology: what is perception like as a source of knowledge about the world? There are two main questions to tackle here: (a) did the early moderns think that things or ideas of things are the proper objects of perception and (b) do the senses yield any useful knowledge about the world? This section treats the first question; the next and final section treats the second.

59 Locke 1690, II.ix; Berkeley 1709, §§41 & 110; and Berkeley 1710, §43.
60 Leibniz [1704], II.ix.
61 Reid 1764, VI.3.
62 Reid 1764, VI.7 and VI.11. Reid thought that visual and tangible figure were inter-derivable, since they are not, contra Berkeley, heterogeneous properties. For a helpful discussion of Reid’s complex answers to the problem, see Nichols 2007, chapter 9.
It used to be taken for granted that the early moderns were committed to a “veil of ideas” theory of perception according to which all we immediately see, hear and smell are ideas that represent objects and their properties, and from which we can only infer the existence of objects and properties that lie on the other side of the ideational veil. Ideas, on this view, are both ontological and epistemological intermediaries standing between perceiver and world. The trouble with such a theory of perception is that it invites external world skepticism: if all I immediately perceive are ideas, then how can I be sure there is anything on the other side? It is also an affront to common sense: when I say that I see a vase of lilacs on the table, what I take myself to be in perceptual contact with is a physical vase of lilacs and not a mental representation of it.

The evidence that the early moderns committed themselves to a veil of ideas theory is considerable: Descartes opened his *Meditations on First Philosophy* (1641) with a battery of skeptical arguments involving illusions, dreams, and a malicious demon that question our sensory access to a mind-independent world; a systematic disparity between sensory appearance and physical reality is built into the mechanical hypothesis suggesting a distinction between what we see and what there is; talk of “ideas” was everywhere in the texts; talk of what is immediately perceived and what is only mediately perceived (or judged) was common; Berkeley went so far as to suggest that kumquats and their kin are themselves nothing but collections of ideas; and Reid charged almost every one of his predecessors with holding the veil of ideas theory that culminated in Berkeley’s idealism.\(^{64}\)

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\(^{63}\) This reading of the early moderns has been around since Reid (1764 and 1785), but it was re-introduced with vigor in the 20\(^{th}\) century by Bennett 1971 and Rorty 1979.

\(^{64}\) The only philosopher (from Plato to Hartley) that Reid hesitates to attribute the veil theory to is the Cartesian philosopher Antoine Arnauld. See Reid 1785, II.13.
There is, nevertheless, good reason to resist this reading of the early moderns. Ideas entered the theory of perception on behalf of explaining how it is that we perceive things like lilacs. Any theory of perception has to work within certain constraints. For most of the early moderns those constraints included (a) no action at a distance, so information about the lilacs has to get to the perceiver somehow; (b) immaterial minds do the perceiving, so information about the lilacs ultimately has to get into the mind in an immaterial form; and (c) the world consists of matter in motion, so something has to account for the disparity between the way the lilacs physically are in the world and the purple, fragrant way they appear. Given these constraints, ideas might be thought of as immaterial carriers of information that enable the human mind to perceive things like lilacs in the colorful and fragrant way that it does. If that’s right, then early modern ideas were doing much the same work that Aristotelian species did, serving not as the objects of perception but rather as the means of perceiving objects in the way that we do.

One way of arriving at this alternative, and increasingly popular, reading of the texts is to contextualize the term “idea”. It is clear that ideas are supposed to be mental, and so, for most early moderns, immaterial. It is also clear that we cannot think or perceive without them and that they are in some sense representations of objects. But are they mental objects? In his mature work, Descartes distinguished two ways to understand the term “idea”: (a) as

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65 Hobbes, a materialist, was an exception to (b).
66 Berkeley was an exception to (c).
68 For a helpful overview of the many meanings and uses of the term in the period, see Yolton 1996, chapter 2.
an act of thinking or perceiving and (b) as a representation of an object. What is important is that these are two aspects of one and the same mental state and not two distinct mental items that stand to each other as act to object. The Cartesian Antoine Arnauld made this point emphatically: “I…take the idea of an object and the perception of an object to be the same thing.” If that’s right, then perceptions are themselves representations of objects; they are not directed to representations of objects. Properly speaking we do not perceive ideas; we have ideas; and in having them we perceive objects. Malebranche, by contrast, explicitly took ideas to serve as objects of perception: we have to perceive ideas if we want to perceive lilacs, for there is nothing representational about our own mind to make lilacs present to it.

Malebranchean ideas, however, were purely intellectual representations residing in the mind of God, and nothing like the epistemologically private sensory images at play in the “veil of ideas” theory. When he said that sense perception involves the perception of ideas, he had in mind that there is something intellectual at the core of it, and that there is something outside our minds to which all our perception is directed when we perceive an object.

Interestingly, in the very public debate between Arnauld and Malebranche on the nature of ideas, each accused the other’s conception of ideas as falling prey to a skepticism-inducing veil between perceiver and world, and each prided himself on avoiding any such thing.

Locke initially looks committed to the veil: the mind, he wrote, “hath no other immediate object but its own ideas” and “‘Tis evident, the Mind knows not Things

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69 He gives different labels to them in different places: ideas considered “materially” and “objectively” (Descartes 1641, Preface to the Reader); ideas considered “formally” and “objectively” (Descartes 1641, Meditation 3); ideas considered “materially” and “formally” (Descartes 1641, 4th Replies); and without any explicit labels (Descartes 1644, I.17).

70 Arnauld 1683, chapter 5.

71 For discussion see Jolley 1990, chapter 4; Nadler 1994; and Wahl 2004.

72 For discussion of this aspect of the debate see Simmons 2009.

73 Locke 1690, IV.i.1.
immediately but only by the intervention of the Ideas of thing.”  But then again he also wrote, like Arnauld, that having ideas and perceiving things amount to the same thing and he vehemently rejected Malebranche’s reification of ideas as objects distinct from the perceiving mind. It is possible that in saying that ideas are the immediate objects of the mind, Locke was simply pointing out that our access to objects comes not by the objects hurtling themselves into the mind, but rather by way of ideas, i.e., by our perceiving them. As for Berkeley, he insisted that he was “not changing things into ideas, but rather ideas into things.” In saying this he was trying to distance himself precisely from the veil theory: we immediately perceive ideas, but since those ideas constitute things like lilacs there is no veil between mind and world; ideas only introduce a veil when there is something else lurking behind them (like collections of insensibly small bits of [mind-independent] matter).

Clearly the notion of an idea was not fixed in the period. But far from conceiving ideas as epistemological barriers to the world, the early moderns seem to have taken them to be an essential means of access to it (or, in Berkeley’s case, as parts of it) and seem to have been staunchly committed to avoiding the implications of any veil theory.

V. Sensory Epistemology

How, then, does perception fare as a source of knowledge in the early modern period? In the Aristotelian tradition, the senses were the starting point for our knowledge of both the

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74 Locke 1690, IV.iv.2.
75 Locke 1690, II.i.9.
76 Locke 1706.
77 For a representation of the interpretive dispute see Chappell 1994; Lennon 2001; and Bolton 2004.
78 Berkeley 1713, Dialogue 3.
79 Berkeley took collections of insensibly small bits of matter to be just more collections of ideas that are reliably correlated with collections of, in this case, lilac ideas, and not as something lurking behind the sensory appearances.
existence and the nature of the physical world. The early moderns largely agreed that the senses are the source of our knowledge that a physical world exists. They took external world skepticism seriously, but responded to it with a variety of arguments for the existence of a physical world based on one or another feature of perceptual experience. Only Reid refused to give an argument, saying instead that our sense-based belief in the physical world is at once “unaccountable” and unassailable. Most conceded to the skeptic, however, that the conclusion is not known with absolute certainty. Berkeley, as usual, was an exception in thinking that the senses give us conclusive evidence for the existence of a physical world, but no evidence whatsoever for the existence of a mind-independent physical world. He was as concerned as the others with skepticism, but found a decisive means for refuting (or undermining) it in idealism. (Of course, many thought that Berkeleyan idealism amounted to a simple acceptance the skeptic’s conclusion.)

Where the early moderns departed sharply from their predecessors was in denying that the senses are reliable guides to the nature of physical world. It is not that they thought the senses show us nothing about the physical world, but what they show us is limited and qualified.

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80 They were also the starting point for our knowledge of immaterial things like the soul and God (see Chapter 2). The early moderns had mixed views concerning our knowledge of immaterial things: some (like Descartes) allowed for purely intellectual knowledge of them that is independent of the senses; some (like Locke) adopted the posture of modesty about our ability have genuine knowledge of immaterial things, though nonetheless offered arguments for the existence of God; some (like Berkeley) introduced a new category of cognition (cognition by “notion”) to talk about the knowledge we have of immaterial things; and some (like Hume) purported to have no idea (literally) what is meant by such terms.

81 Reid 1785, II.20.

82 For some of these discussions see Descartes 1641, Synopsis and Meditation 6; Arnauld 1683, chapter 28; Locke 1690, IV.i.14; Malebranche 1712, I.10 and Elucidation 6; and Reid 1785, II.20.
The early moderns generally agreed that our perception of primary qualities like size and shape shows us something about what the world is like, but there are qualifications: it is subject to occasional errors about particulars (square towers look round from a distance and straight sticks in water look bent); it is markedly perspectival (coins look perfectly round when viewed from above, but in some sense look elliptical when viewed obliquely); it is relational (what looks to be to your left looks to be to my right); and it is limited (we can’t see anything smaller than a mite or very far away). These caveats worried Malebranche a great deal: “the judgments we form on the testimony of our eyes concerning extension, figure, and motion are never exactly true.”\footnote{Malebranche 1712, I.10.} Even Malebranche, however, allowed that our perception of primary qualities “include some measure of truth.”\footnote{Malebranche 1712, I.10.} It represents to us the sorts of properties that really are out there in the world, even if any particular representation inevitably contains something false or misleading about it. Secondary quality perception is another matter.

Locke famously argued that while our sensory ideas of primary qualities “resemble” the qualities in the world that cause them, our sensory ideas of secondary qualities do not.\footnote{Locke 1690, II.viii.15. Descartes and Malebranche similarly spoke of a lack of resemblance between mind and world in the case of color, odor, sound, etc. (see Descartes 1641, Meditation 6; Descartes 1664a, chapter 1; and Malebranche 1712, I.12).} Berkeley retorted that nothing mental can resemble anything physical (what could they possibly have in common?), but it seems clear that what Locke had in mind was that our perceptual experience of size, shape, position, and motion shows us (at least in general) what these properties are like in bodies, whereas our perceptual experience of colors, sounds, smells, flavors, hot and cold does not show us what these qualities are like in bodies. Not even in general. Color vision may show us that the surface of a lemon is different from the surface
of a lime, but it does not reveal the true nature of that difference; that is, it does not show us what that difference consists in physically on the surface of the fruits. Descartes put it this way: “If someone says he sees color in a body…this amounts to saying that he sees…something there of which he is wholly ignorant, or in other words, that he does not know what he is seeing.”

His persistent characterization of secondary quality perception as “obscure and confused” underscored this point. Reid agreed with his predecessors on this point: our senses give us a distinct conception of primary qualities and “inform us what they are in themselves” while they give us only “a relative and obscure notion” of secondary qualities and “as to what they are in themselves, our senses leave us in the dark.” Only Berkeley thought our perception of secondary qualities quite true to the nature of reality.

It should come as no surprise, then, that so many of the early moderns treated the senses as epistemic troublemakers. Because we typically believe what we see, hear, smell, taste, and feel, we wind up with a lot of false beliefs. On instinct, we believe that pineapples are yellow in just the way they appear to be; that where we see no bodies there are no bodies; that the sun rises and sets while the earth remains still; and that the stars are small and nearby. These are all false beliefs, and it takes something other than unaided sense perception to get us to appreciate the truth of the matter: pineapples may be yellow but not independently of their effect on color vision; there are insensibly small bodies all over the place; the sun is stationary while the earth rotates; and the stars are very large and very far away. Even once we learn the truth, it is difficult to resist our habitual sense-based beliefs.

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86 Descartes 1644, I.68.
87 Reid 1785, II.17.
stars and large and distant when we actually look at them.\textsuperscript{88} It is the prevalence and
persistence of these false sense-based beliefs that prompted Descartes’ full-scale skeptical
attack on the senses at the opening of the \textit{Meditations} and Malebranche’s exhaustive and
lengthy inquisition of the senses at the start of the \textit{Search After Truth}. Their advice is to
withdraw from the senses and rely instead on the deliverances of the intellect in our search
for truth about the nature of the physical world. As an empiricist, Locke was friendlier to
the senses, taking them as an essential starting point for knowledge, but even he thought the
knowledge we can reap from them about the nature of the physical world is extremely
limited by the “dull and narrow information” we receive from our “not very acute ways of
perception.”\textsuperscript{89} His advice was not to turn to the intellect (since he didn’t think it could
do anything other than manipulate sensory ideas), but rather to “look a little into the dark side,
and take a view of our ignorance”\textsuperscript{90} and to recognize with modesty that “we are not capable
of a philosophical knowledge of the bodies that are about us.”\textsuperscript{91} Even Reid, a self-appointed
apologist for the senses, concedes that the senses get us into epistemic troubles when make
hasty judgments on their basis.\textsuperscript{92}

All of this raises a question: if the senses lead us into false beliefs about the world,
then why on earth do we have them? It can’t be an unfortunate accident. In the theological
context of the period, God created us and gave us our senses. What was he thinking? What
kind of benevolent creator would equip his creatures with such distorting lenses on the
world? The early moderns had an interesting answer: God gave us senses not to show us

\textsuperscript{88} See Descartes 1644, I.72 and Descartes 1641, 6\textsuperscript{th} Replies. See also Malebranche 1712, I.14
and Reid 1785, II.22.
\textsuperscript{89} Locke 1690, IV.iii.6.
\textsuperscript{90} Locke 1690, IV.iii.22.
\textsuperscript{91} Locke 1690, IV.iii.29.
\textsuperscript{92} Reid 1785, II.22.
the true nature of the physical world, but rather to help us to get around safely in the world. As Malebranche put it: “the senses were not given to us to know the truth about things in themselves, but only for the preservation of our body.” \(^{\text{93}}\) The early moderns thus re-conceived the very function of the senses. According to Aristotelian epistemology, the senses are something like under-laborers to the intellect, providing it with the raw materials for knowledge about the nature of the physical world. The early moderns re-conceived them as guides to survival. Whatever disagreements the early moderns had on the details of sensory processing and the structure of sense perception, they all agreed on this. Even Berkeley, who disagrees with so much of what his predecessors say about perception, agreed that function of the senses is to facilitate bodily self-preservation: through them “we are instructed how to regulate our actions in order to attain those things that are necessary to the preservation and well-being of our bodies, as also to avoid whatever may be hurtful and destructive of them.” \(^{\text{94}}\)

With this in mind, let’s think again about the senses as sources of knowledge about the physical world. They may do a messy job of showing us the fundamental nature of physical reality, but if their job is to guide us safely through the world, what they need to show us is how it pertains to our bodily well-being. When I’m thirsty, I need to know not that the glass of milk is situated at a certain latitude and longitude but whether it is within reach of my hand. I need to know not that it has a certain physical constitution but whether it is good to drink. The senses reveal precisely these sorts of things to me: the glass of milk looks to be within arm’s reach to my right and smells fresh not sour, so I can drink it. The

\(^{\text{93}}\) Malebranche 1712, I.5.

\(^{\text{94}}\) Berkeley 1709, §147. In other figures, see Descartes 1641, Meditation 6; Locke 1690, II.xxiii.12; and Reid 1785, II.16, 20 and 22.
senses, we might say, provide a self-interested or even “narcissistic” view of the world: if I’m sick, that same glass of milk may well taste terrible, as well it should since milk is not what I need at the moment. The way the Cartesians put this point was by saying that the senses represent the world not “as it is itself” but “as it is related to and can benefit or harm my body.” Note that this holds of both primary and secondary quality perception: the spatial properties of the glass of milk are represented egocentrically and perspectively, and its secondary qualities (like its taste) as “agreeable” or “disagreeable”. Both are helpful in guiding action. Locke went so far as to suppose that our senses are perfectly fitted “to the conveniences of life and the business we have to do here,” so that if we were given more acute sense organs, like “microscopical eyes,” that show us more of the detail of the physical world, it would only be to our detriment. Reid concurred, insisting that “by diminishing or increasing [the acuity of our senses] we should not mend but mar the work of Nature.” (Reid thought that our acquired sensory appreciation of fine wine and gourmet food, for instance, constituted such an increase that inevitably leads to a more miserable life.)

When viewed as guardians of the body, the epistemological criticism of the senses is replaced with accolades. Descartes wrote that in matters concerning our self-preservation

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95 See Akins 1996.
96 Descartes 1644, II.3; Malebranche 1712, I.6, I.10, I.18 and Conclusion First Three Books; and Malebranche 1688, Dialogues IV.13-14 and XII.2.
97 See Descartes 1641, Meditation 6; Malebranche 1712, I.5; and Reid 1785, II.16 and II.21. Descartes went so far as to say that even color perception represents things as agreeable or disagreeable (green, he suggested is the most agreeable color). Malebranche and Reid would have none of that, and instead added a third category of “indifferent” sensations that serve to help us readily distinguish objects. For a more detailed discussion of the self-interested nature of sensory representation in Descartes and Malebranche, see Simmons 2003 and 2008.
98 Locke 1690, II.xxiii.12.
99 Reid 1785, II.21.
the senses “report the truth much more frequently than not.” Even Malebranche wrote
that they are “faithful witnesses” concerning what’s good for the body; that they are
“accurate and precise” in informing us about the relations between our own body and other
bodies; and that they lead to “quite correct” judgments concerning the preservation of the
body. Reid insisted that they “neither require nor admit of improvement” in this area. If
the senses get us into epistemological trouble (i.e., false beliefs), it is because we use them
hastily and improperly to construct theories about the nature of the physical world when
they are designed to be guides to action. The problem is not so much with the senses as
with our misuse of them. The scrutiny to which the senses are subject in this period, then,
should be read not as an indictment against their epistemological credibility, but rather as part
of an effort recast their role in our cognitive economy.

REFERENCES

Arnauld, Antoine. (1683). Des vrayes et dees fausses idées. Cologne. Translation: On True and


Arbini, Ronald. (1983). “Did Descartes have a Philosophical Theory of Sense Perception?”

Press.

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100 Descartes 1641, Meditation 6, emphasis mine; see also 6th Replies.
101 Malebranche 1688, Dialogue 1 and Dialogue 4; see also Malebranche 1712, I.12, I.20, and
Conclusion of the First Three Books.
102 Reid 1785, II.21.
103 That is not to say that the senses are useless in constructing a theory of the physical
world. Even for a rationalist like Descartes, they have an important role to play in scientific
observation and experiment: the intellect determines the nature of the physical world in
general, and offers up possibilities for the way the world might be, but the senses are needed
to determine which among the possibilities are actual. See Hatfield 1986.


__________. (1674). *About the Excellency and Grounds of the Mechanical Hypothesis.* London.


Descartes, René. (1637). *La Dioptrique,* published with his *Discours de la méthode.* Leiden.


__________. (1644). *Principia Philosophiae.* Amsterdam. References to book and section as I.1


_________. (1658). Elementorum philosophiae section secunda De Homine. London. References are to chapter and section as I.1.


Leibniz, Gottfried. (1695). “System nouveau de la nature et de la communication des substances, aussi bien que de l’union qu’il y a entre l’ame et le corps.” Journal des savants. Published anonymously.

_________. ([1704]/1765). Nouveaux essays sur l’entendement humain. Amsterdam and Leipzig. Leibniz wrote the text in 1704, but suppressed publishing it when he heard of Locke’s death that year; it was published posthumously in 1765. References are to book, chapter, and section as I.i.1.


