Leibniz's Alleged Ambivalence about Sensible Qualities

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Abstract

Leibniz has been accused of being ambivalent about the nature of sensible qualities such as color, heat, and sound. According to the critics, he unwittingly vacillates between the view that these qualities are really just complex mechanical qualities of bodies and the competing view that they are something like the perceptions or experiences that confusedly represent these mechanical qualities. Against this, I argue that the evidence for ascribing the first approach to Leibniz is rather strong, whereas the evidence for imputing the second approach to him is rather weak. All things considered, the first, "mechanistic" approach should be regarded as his considered view.

Margaret Wilson famously accused Leibniz of being ambivalent about the nature of sensible qualities such as colors, sounds, odors, flavors, and heat (Wilson, 1977). On her view, there are many texts in which he treats these qualities as nothing more than complex microphysical or micromechanical qualities of bodies, yet many others in which he speaks of them as if they were something over and above these minute qualities, such as our confused perceptions or experiences of them. Even worse, Wilson contends, texts of both sorts sometimes appear virtually side-by-side in Leibniz's writings, as if he were unconsciously vacillating between the one approach and the other. The implication is that he gave little thought to the nature of these qualities and somehow failed to notice his tendency to alternate between incompatible perspectives. "It is amazing," Wilson reflects, "that

he was able to overlook such a conspicuous appearance of inconsistency" (1977, 330).

Nicholas Jolley agrees. He maintains that "even a limited analysis suggests that Leibniz is ambivalent in his treatment of the possession of colour concepts" (1984, 184). He then proceeds to sketch the main points of Wilson's interpretation and concludes that her assessment of the situation is "largely convincing" (186).

After many years of going unchallenged, Wilson's criticisms have recently begun to draw fire from scholars who have undertaken to defend Leibniz against the charge of ambivalence (Bolton 2002, 2011; Duarte 2009). As it happens, I am quite sympathetic with these efforts. I have argued elsewhere that Leibniz has not only a coherent but a highly distinctive and philosophically interesting theory of color [reference suppressed], something which would be highly doubtful if Wilson were right about Leibniz's ambivalence toward the nature of sensible qualities being a "pervasive" and "unrationalized" feature of his thinking (1977, 330).[1] Nevertheless, it seems to me that Bolton and Duarte have not really succeeded in acquitting Leibniz of Wilson's charge. For one thing, their replies are themselves based on questionable interpretive hypotheses. For another, they fail to accurately diagnose the missteps in Wilson's reasoning, and consequently fail

[1] In criticizing Wilson, Duarte suggests that it makes more sense to suppose that Leibniz simply equivocates in his use of terms such as "heat" and "color" than that he is alternating between incompatible theories of these qualities (2009, 728–29). From my point of view, however, this "equivocation thesis" is hardly an improvement over Wilson's ambivalence thesis. It would require us to say that Leibniz equivocates in this way not only frequently but unconsciously. But that would imply that he did not attend carefully to questions about the nature of sensible qualities, whereas I want to maintain that he did give careful thought to such questions. If the points I make in Section 2 below are correct, then we have no reason to suppose that Leibniz is guilty of either ambivalence or equivocation.

to correct those missteps.

My aim in what follows is to offer a better defense of Leibniz against the charge of ambivalence. In the first part of the essay, I present the evidence for ascribing to Leibniz the view that sensible qualities are reducible to the mechanical qualities of bodies, and I argue that this evidence is rather strong. In the second, I consider the three lines of evidence Wilson gives to show that Leibniz sometimes thinks of sensible qualities as reducible instead to something like experiences, and I argue that this evidence is rather weak. In light of these facts I conclude that the first, "mechanistic" approach represents his considered view.

1 Sensible Qualities as Shapes and Motions

Texts in which Leibniz suggests that sensible qualities are reducible to the minute mechanical qualities of bodies are not hard to find. The most explicit of these texts appear in relatively early writings. For instance, in a 1669 letter to his teacher Jacob Thomasius, he writes: "[I]t is clear that the explanation of all qualities and changes must be found in magnitude, figure, motion, etc., and that heat, color, etc., are merely subtle motions and figures." (GP 1:26/L 102).[2] Nearly a decade later, in a 1678 letter to Her-

[2]The following abbreviations will be used for citations of Leibniz's works. A: *Sämtliche Schriften und Briefe*, edited by Deutsche Akademie der Wissenschaften (Darmstadt und Berlin: Akademie-Verlag, 1923–), cited by series, volume, and page number; AG: *G.W. Leibniz: Philosophical Essays*, edited by R. Ariew and D. Garber (Indianapolis: Hackett, 1989); C: *Opuscules et fragments inédits de Leibniz*, edited by L. Couturat (Paris: Félix Alcan, 1903); DM: *Discourse on Metaphysics*, cited by section number; GM: *Leibnizens Mathematische Schriften*, edited by C. I. Gerhardt (Berlin: A. Asher, 1849–63), cited by volume and page number; GP: *Die philosophischen Schriften von Gottfried Wilhelm Leibniz*, edited by C. I. Gerhardt (Berlin: Weidmannsche Buchhandlung, 1875–90), cited by volume and page number; L: *Gottfried*

man Conring, he makes essentially the same point: "What is more probable than that all sensible qualities are merely tactual qualities varying according to the variety of sense organs? But touch recognizes only magnitude, motion, situation, or figure and various degrees of resistance in bodies" (GP 1:197/L 189). Similarly, in other texts probably written around this same time (i.e., the late 1670s), Leibniz emphasizes that on his view the "confused" attributes of the senses, that is, sensible qualities, can always be reduced to (or resolved into) "distinct" attributes such as size, shape, and motion (A 6.4:1961–62; A 6.4:2002–09/L 285–89). Remarks this explicit are hard to find in later writings, but as we will see, those writings do contain indications that Leibniz continues to think of sensible qualities in this way.

As to which particular distinct qualities the confused qualities of the senses are to be reduced, Leibniz is typically non-committal. He mentions a number of proposals, including that red is "the rotation of certain small globes," heat "a vortex of very fine dust," and sound something "produced in air as circles are in water when we toss a stone into it" (GP 6:499/AG 186; cf. A 6.4:2002/L 285). Yet he usually stops short of endorsing such proposals. Still, his reluctance appears to spring solely from doubts about the details of these accounts, and not about their general form: he clearly

Wilhelm Leibniz: Philosophical Papers and Letters, 2nd edition, edited by L. Loemker (Boston: Kluwer, 1989); LC: *The Labyrinth of the Continuum*, edited by R. A. T. Arthur (New Haven: Yale, 2001); LDB: The Leibniz-Des Bosses Correspondence, edited by B. Look and D. Rutherford (New Haven: Yale, 2007); LP: *Logical Papers*, edited by G. H. R. Parkinson (Oxford: Clarendon Press, 1966); LW: *Briefwechsel zwischen Leibniz und Christian Wolff*, edited by C. I. Gerhardt (Halle: H. W. Schmidt, 1860); NE: *New Essays on Human Understanding*, cited by page number from A 6.6; T: *Essays on Theodicy*, cited by section number; WF: *Leibniz's "New System" and Associated Contemporary Texts*, edited by R. S. Woolhouse and R. Francks (New York: Oxford, 1997).

thinks these are the right *sorts* of accounts to give of sensible qualities. Two cases in which he does endorse a specific proposal are that of white and black. He believes that "white is what reflects the most light and black what reflects the least" (GP 1:19/L 96; cf. C 485–90). Some years later, he refines his proposal for white: "[W]hite bears no resemblance to a spherical convex mirror, even though it is nothing but the assemblage of a number of small spherical mirrors, such as we see in froth upon close inspection." (GP 4:575–76/WF 141). Clearly the thought is that white reduces to certain tiny shapes in bodies that reflect light.[3]

Other remarks provide less explicit evidence for reading Leibniz this way. In his *Meditations on Knowledge, Truth, and Ideas*, he explains that

> when we perceive colors or smells, we certainly have no perception other than that of shapes and motions, though so very numerous and so very small that our mind cannot distinctly consider each individual one in this, its present state, and thus does not notice that its perception is composed of perceptions of minute shapes and motions alone, just as when we perceive the color green in a mixture of yellow and blue powder, we sense only yellow and blue finely mixed, even though we do not notice this, but rather fashion some new thing for ourselves. (A 6.4:592/AG 27)

When Leibniz claims that in perceiving colors or smells "we certainly have

[3]At least one text suggests that Leibniz wants to reduce (reflective) colors not just to the mechanical qualities of reflective bodies, but also to those involved in the light itself, the medium, and so forth (see GP 4:550/WF 105). This does not, however, appear to have been his considered view.

no perception other than that of shapes and motions," the clear implication is that colors and smells really just are shapes and motions; for otherwise in perceiving a color or smell we would be perceiving more than just those mechanical qualities. Furthermore, Leibniz indicates in this text that our perceptions of sensible qualities are composed of *petites perceptions* of minute shapes and motions (cf. NE 56). This point is significant because he also believes that if a perception P is composed of perceptions $p_1, p_2, \ldots, p_n$, then that which P represents is composed of those things which $p_1, p_2, \ldots, p_n$ represent. As he explains in a letter to Samuel Masson, "when there is a perception of the whole, there are at the same time perceptions of the actual parts," and "that which is composition of parts outside is represented only by the composition of modifications in the monad" (GP 6:628/AG 229; cf. NE 54). In claiming that our perceptions of color and smell are composed of perceptions of shapes and motions, therefore, Leibniz appears to be suggesting that these sensible qualities themselves are composed of shapes and motions—that, in other words, sensible qualities are really just complexes of shapes and motions.[4]

In other passages Leibniz claims that our ideas and perceptions of sen-

[4]Duarte takes the last part of this passage to show that Leibniz thinks of green as something over and above the mixture of yellow and blue, since Leibniz says that in perceiving this mixture confusedly we "fashion some new thing for ourselves" (2009, 719, 726). However, this threatens to saddle Leibniz with the view that when we perceive green we have not only a conscious perception of that color but also an unconscious perception of the mixture of yellow and blue, contrary to his claim just a few lines above that "when we perceive colors or smells, we certainly have no perception other than that of shapes and motions." Fortunately, this is not the only plausible way to read this text. When Leibniz says that we do not notice the yellow and blue but rather fashion some new thing for ourselves, his thought may be simply that we fashion a new *appearance* in addition to the more complex appearance underlying it (i.e., the appearance of a mixture of yellow and blue). Since a single reality can give rise to multiple appearances, this would still allow him to identify green with that mixture.

sible qualities represent tiny shapes and motions in bodies. For instance, in the *New Essays* Theophilus argues that our ideas of sensible qualities "depend on the detail of shapes and motions and express [i.e., represent] them exactly, though we cannot disentangle this detail in the confusion of the surpassing multitude and smallness of the mechanical actions which strike our senses" (NE 403).[5] But to say that an idea or perception represents a certain thing is just to say that it is an idea or perception of that thing. Hence, if ideas of sensible qualities represent shapes and motions, then the implication is that these qualities just are shapes and motions.

It's worth noting that this sort of "mechanist" approach to sensible qualities is important to Leibniz for two closely-related reasons. The first concerns his conviction that God has created a maximally intelligible world, a world in which nothing is in principle inexplicable. This conviction is relevant to the nature of sensible qualities because on Leibniz's view such qualities are in themselves merely confused, "occult" qualities. Accordingly, if these qualities were fundamental features of the universe, then the universe would be fundamentally inexplicable to the extent that these qualities are present within it. Leibniz, however, denies that the world has any fundamentally inexplicable features. Hence, given that there are sensible qualities, it follows that they are not fundamental features of this universe. Rather, they must be reducible to, and explicable in terms of, more distinct and intelligible qualities of bodies. But according to Leibniz the only such qualities are mechanical qualities, and so sensible qualities must be

[5]Leibniz uses "expression" and "representation" interchangeably, so the claim being made here is that our ideas of sensible qualities *represent* the shapes and motions in bodies. Cf. NE 131–33, 165–66; GP 4:575/WF 141–42.

reducible to such qualities.[6]

A second reason for reducing sensible qualities to mechanical ones stems from Leibniz's celebrated principle of sufficient reason, according to which there is always a sufficient reason why things are one way rather than another. As Leibniz has it, one corollary of this principle is that causes must always be connected in some non-arbitrary fashion with their effects. Thus, there must be some non-arbitrary connection between my ideas (and perceptions) of sensible qualities and their causes.[7] According to Leibniz, however, such a connection could obtain only if my ideas of sensible qualities resembled their causes, which are mechanical qualities. Hence, in order to satisfy the principle of sufficient reason, Leibniz thinks, my ideas of sensible qualities must be similarly complex.[8] More exactly, they must be composed of simpler ideas which are themselves ideas of the mechanical qualities that enter into their cause. As I pointed out above, however, to say that our ideas of sensible qualities are composed of ideas of mechanical qualities is just to say that the former qualities are reducible to the latter ones. So according to Leibniz, the principle of sufficient reason requires that sensible qualities be reducible to the causes of our ideas of them, that is, to certain mechanical qualities in bodies.

In this section, we have encountered a wide range of texts that point to the conclusion that Leibniz wants to reduce sensible qualities to the tiny shapes and motions in bodies. We have also seen that Leibniz's reasons for

[6]See A 6.4:1961–62; A 6.4:2002–09/L 285–89.

[7]The causation in view here is "ideal" rather than "real" or "physical." For a full account of the difference, see [reference suppressed].

[8]See GP 4:575–76/WF 141–42; NE 56, 131–32, 165–66, 381–82; LDB 51; T 340, 356.

favoring this sort of approach are deeply rooted in his philosophy. I think it's safe to say that none of this would be denied by Wilson. But she would be quick to caution us not to regard this approach as Leibniz's considered view of sensible qualities. On her view, there are many other texts in his writings that point to another, competing approach to sensible qualities, some of which even appear alongside those which suggest the mechanist approach. At best, she would say, Leibniz is ambivalent about the nature of these qualities and does not have a settled view of the matter. Let us now turn to Wilson's case for this conclusion.

2 Sensible Qualities as Experiences?

According to this second approach, sensible qualities are reducible not to the micromechanical qualities of bodies but to the sensible-quality experiences they cause within us. This approach represents sensible qualities as "completely bound up with the nature of sensory experience" (330), or even as "somehow identified with the experiences" (328).

Whereas the evidence for the approach discussed above was largely direct, the evidence Wilson offers for this second approach is only indirect. There are virtually no texts in which Leibniz actually characterizes sensible qualities as experiences, sensations, or perceptions, and no such texts are offered by Wilson.[9] Instead, her evidence boils down to three claims that Leibniz repeatedly makes and that allegedly imply that he is thinking of

[9]The only exception of which I am aware occurs at NE 201, where Leibniz claims that tastes are confused perceptions. Note, however, that there are other texts in which Leibniz explicitly denies that sensible qualities are modifications of the soul. See GP 4:576/WF 142 and NE 132, as well as the discussion of these texts in [reference suppressed].

sensible qualities as in some way identified with or at least bound up with sensory experience. The first claim is that we cannot define such qualities, the second that we can have no idea of such qualities apart from sensations of them, and the third that the micromechanical qualities in bodies are the *causes* of sensible qualities. I will consider each of these in turn.[10]

2.1 Definitions and Distinct Notions

Leibniz frequently claims that that we cannot have distinct notions of sensible qualities on the ground that it is beyond our ability to define these qualities. Although we recognize them when we see them, and easily distinguish them from one another, thus making our notions of them *clear*, "we can neither distinguish nor unfold what they contain" (GP 6:500/AG 187). Consequently, we cannot give an account or definition of these qualities: "all we can do is make them known through examples" (NE 255). Though our notions of sensible qualities may be clear, then, they are not distinct but *confused*.

We have seen that in many texts Leibniz represents sensible qualities as reducible to shapes and motions. According to Wilson, however, his belief that we cannot define sensible qualities suggests that he sometimes favors an alternative approach. Here's why. As Wilson correctly notes (1977, 329),

[10]A fourth line of evidence is suggested by the claim that Leibniz's ambivalence about sensible qualities "tends to muddle his discussions of confused ideas, by conflating the confusedness proper to concepts (on Leibniz's own account) with that proper to perceptions" (Wilson 1977, 330). In short, Wilson might argue that this ambivalence offers the best explanation for his tendency to get confused about confusion. As I have argued elsewhere ([reference suppressed]), however, it is Wilson who is confused on this matter, not Leibniz. He does not get confused about confusion and thus we need not posit the ambivalence in order to explain the confusion.

Leibniz appears to regard our inability to define sensible qualities not just as a contingent limitation resulting from our lack of scientific understanding but as an essential limitation on our powers.[11] If sensible qualities are reducible to shapes and motions, however, then it ought to be only a matter of time before we discover to which shapes and motions exactly they reduce. And once we know this, we ought to be able to define them in terms of these mechanical qualities. As Wilson explains,

> [I]f we are allowed to suppose that a *red* object, for example, is just one that reflects light waves of such and such frequency in such and such circumstances, there is no obvious reason why we could not ascribe to ourselves a distinct notion of red, even on the supposition that our (sense) perceptions are all confused. We would be able to say, for instance, that red objects differ from all others in that they reflect wave-lengths in range l_x – l_y. (Wilson 1977, 328; cf. Jolley 1984, 184–85)

Since Leibniz denies that we can define colors in this way, Wilson concludes, he must be thinking of them not as complexes of physical or mechanical qualities, but as something like the experiences that confusedly represent those qualities. Only under that supposition can we explain why it is impossible for us to define colors even while in possession of physical-theoretical accounts of what makes bodies appear colored.

To see what has gone wrong here, we need to look more closely at Leibniz's views on definition. Start with the fact that he distinguishes three

[11] See especially NE 194, 255–56, 296–97.

basic ways of defining a thing. According to the first, a definition specifies marks sufficient for recognizing the thing and distinguishing it from other things. According to the second, a definition explains how the thing is generated or produced. According to the third, it resolves the concept of the thing into primitive concepts. The first sort of definition Leibniz calls *nominal*, the second *causal*, and the third *perfect*.

A nominal definition specifies one or more distinguishing features of the definiendum, as for example when gold is defined as the heaviest metal or as a metal that resists cupellation and is insoluble in *aqua fortis*.[12] Such marks are only "external features" of the thing and must be distinguished from its "inner essence" (NE 346). To define gold as we just have is not to capture its essence, but only to identify certain external or superficial features of the metal that suffice for recognizing and distinguishing it. Nominal definitions do not therefore express a thing's essence. Furthermore, since on Leibniz's view essence and possibility are equivalent, it follows that nominal definitions do not establish the possibility of their definienda. To define gold as a metal that resists cupellation and is insoluble in *aqua fortis* is not to show that such a metal is even possible. In the same way, we could define parallel straight lines as lines in the same plane that would not meet even if extended to infinity, but this nominal definition would in no way guarantee that such lines are even possible (NE 295). For all we can

[12]Other examples of nominal definitions: *fire* is a hot, bright vapor and the *rainbow* a colored bow in the clouds (A 6.4:159); *man* is a rational animal (NE 313–14); *power* or *force* is the attribute of a substance from which change arises (GP 2:170/L 516; cf. GP 2:183/L 519); *parallel straight lines* are lines in the same plane that do not meet even if extended to infinity (NE 295); a *parabola* is "a figure in which all the rays parallel to a certain straight line are brought together by reflection at a particular point" (NE 346); an *endless screw* is a line in three-dimensional space the parts of which are congruent (DM 24).

tell from these definitions themselves, they may well be harboring contradictions.

In this respect, nominal definitions contrast with both causal and perfect definitions, which do establish the possibility of their definienda. This makes causal and perfect definitions instances of what Leibniz calls *real* definitions, definitions that capture the essence of a thing and thus express its possibility. An example would be the definition of a circle as "a figure described by the motion of a straight line in a plane about a fixed end" (A 6.4:541/L 230). This is a causal definition because it tells us how a circle is generated. It's also a real definition, since in specifying how to generate a circle, it establishes the possibility of such a figure. Similarly, a perfect definition establishes the possibility of a thing by analyzing its concept into the primitive concepts that enter into it, in the process ruling out the possibility that the complex concept harbors a contradiction.[13]

With these distinctions in place, we are now in a position to see where Wilson has gone wrong. She ascribes to Leibniz the view that sensible qualities cannot be defined. But this is not exactly correct. Though Leibniz does occasionally say simply that sensible qualities cannot be defined, he almost always takes care to clarify that what we cannot do is give *nominal* defini-

[13]In some passages Leibniz distinguishes between definitions that are real *in themselves* and those that are real *through experience* (see DM 24; NE 294). Definitions of the former sort establish the possibility of their definienda themselves. Causal and perfect definitions would be examples, for the reasons just given. In contrast, a definition that is real through experience does not itself express the possibility of the thing, but nevertheless is a definition of a thing that is known to be possible because it has actually been experienced. Though no nominal definition is real in itself, Leibniz says that nominal definitions are often real through experience. In a sense they are both nominal and real. In general, however, when Leibniz speaks of real definitions he appears to have in mind ones that are real in themselves.

tions of these qualities.[14] His point is not that we cannot develop physical-theoretical accounts of these qualities, but rather that we cannot articulate marks sufficient for recognizing and distinguishing these qualities. Further, he consistently maintains that a confused notion is one for which we lack not any definition whatsoever, but a nominal definition in particular. So when he claims that our notions of sensible qualities are confused, even ineluctably so, this is not at all incompatible with the claim that we can give *real* definitions of such qualities. Indeed, Leibniz explicitly acknowledges that though we cannot nominally define sensible qualities, we can or at least will eventually be able to give real definitions for them:

> [S]imple terms do not admit of nominal definition, but ... terms that are simple only from our point of view because we have no way of analyzing them into the elementary perceptions of which they are composed—e.g., terms like hot, cold, yellow, green—do admit of real definitions which would explain what causes them. Thus the real definition of *green* is to be composed of a thorough mixture of blue and yellow, though green can no more be given a nominal definition, through which it could be recognized, than can blue or yellow. (NE 296–97; see also GP 5:18; LW 18)

As we can see here, the discovery that green is really a mixture of yellow and blue does indeed give us a real, and more specifically a causal, definition of green. But it does not give us a nominal definition and therefore our

[14] See A 6.4:160; A 6.4:540/L 230; GP 5:18; GP 6:500/AG 187; NE 194, 255–56, 296–97.

notion of green remains confused even after this discovery has been made. In the same way, even if we were to discover that some color is really just a certain configuration of tiny shapes and motions, this would only give us a real definition of that color; our perceptions of the color would still appear simple and thus we would not be able to articulate a nominal definition of the quality.

Wilson's mistake, then, is that she fails to appreciate an important nuance in Leibniz's account. While it is true that we cannot give definitions of sensible qualities in the sense of nominal definitions, and for this reason our notions of such qualities are ineluctably confused, we can give *real* definitions of those qualities once we have acquired a sufficiently advanced understanding of the mechanical basis of the corresponding perceptions.

One objection we might imagine a critic raising at this juncture is that a real definition of the sort that Leibniz admits we can have for sensible qualities ought to qualify as a nominal definition too. For example, if green is defined as a mixture of yellow and blue, then this would seem to provide us with a way of explaining green to someone who had never experienced it in such a way as to allow that person to recognize green and distinguish it from other colors. All the person would have to do is view an object under a microscope to determine whether or not it exhibits a mixture of yellow and blue. If the object does indeed look like a mixture of yellow and blue under magnification, then this would confirm that the object is green. And if it didn't, this would confirm, at least provisionally, that it isn't green. In the same way, if we were to define a color in terms of the way an object reflects light, as Wilson suggests in her example, then it would seem that the use

of a spectrometer would allow even a blind person to identify whether an object does or doesn't have that color. In short, if we succeed in developing a theoretical account of some color, then we ought to have not only a real but a nominal definition of that quality.

The flaw in this objection is that it misrepresents the nature of the marks that constitute a nominal definition. In order to count as having a nominal definition, Leibniz evidently thinks, it is not enough that we know marks whose presence indirectly indicates the presence of the thing defined. Rather, we must have marks that can be *directly* perceived in the thing:

> [I]f we had arrived at the inner constitutions of certain bodies, these [sensible] qualities would be traced back to their intelligible causes and we should see under what circumstances they were bound to be present; even though it would never be in our power to recognize their causes sensorily, in our sensory ideas which are the confused effects of bodies acting on us. For instance, we now have a complete analysis of green into blue and yellow, and almost all our remaining questions about it concern these ingredients; yet we are totally incapable of disentangling the ideas of blue and yellow within our sensory idea of green, simply because it is a confused idea. (NE 403)

As Leibniz explains in this text, it is not enough for a distinct idea or nominal definition that we be able to infer on empirical grounds that green consists of yellow and blue. Rather, we must be able to *see* green as a mixture

of yellow and blue; as Leibniz puts it, we must be able to disentangle the ideas of yellow and blue within our sensory idea of green.[15] Yet this is something we just can't do, no matter how much theoretical knowledge we might have of that quality. In the same way, even if I know that red is a certain complex mechanical quality in virtue of which the red object reflects light within a certain range of wavelengths, this brings me no closer to a nominal definition of red, since I cannot perceive any such mechanical quality in the quality red. Though I may have experimental evidence for thinking that red reduces to that mechanical quality, and though that theoretical knowledge may supply me with a kind of indirect mark of red, it will never supply me with a mark that red can directly be seen to exhibit. Hence, I cannot give a nominal definition of this color.[16]

[15]Duarte (2009, 729–31) makes a similar point, though our views differ in an important respect. From his perspective, theoretical accounts of sensible qualities fail to qualify as nominal definitions because they do not make intelligible to us the connection between the sensible qualities being defined and the more fundamental qualities in terms of which they are defined. For example, the microscope may reveal that green is a mixture of yellow and blue, but this knowledge in no way allows us to understand the connection between green and these other qualities (GP 6:500/AG 187). Only in cases where this connection is intelligible to us, Duarte claims, can we be said to have a nominal definition. In my view, Duarte is quite right to criticize Wilson for, in effect, setting the bar too low for nominal definitions. She writes as if any definition will do, and that clearly isn't the case. However, I believe Duarte makes the opposite mistake of setting the bar too high. Consider Leibniz's favorite example of a distinct notion, the assayer's notion of gold. This notion is distinct because the assayer is in possession of various marks of gold. She knows that gold is the heaviest metal, is insoluble in *aqua fortis*, and so on. But the assayer typically has no intelligible grasp at all of the connection between gold and these marks. She has no clue why the metal we call gold resists cupellation or is insoluble in *aqua fortis*. All she knows is that gold is unique in exhibiting these marks, and that is enough for her to count as having a distinct notion and nominal definition of gold. My account, in contrast, sets the bar neither too low nor too high.

[16]This accounts for Leibniz's belief that all distinct notions must be clear, which both Wilson (1977, 330) and Jolley (1984, 184–85) find puzzling. As we have seen, having a distinct notion of a quality involves being able to specify distinguishing marks that the quality can be directly perceived to exhibit. But if we can specify such marks, then it follows that we can also recognize that quality when we sense it. Thus, every distinct notion must also be clear.

This way of viewing the matter might seem to have an odd consequence. Leibniz holds that our knowledge is of higher quality to the extent that it is more distinct. But on the account I have given, our knowledge of a sensible quality does not become more distinct, even as we develop better and better theoretical definitions of it. For all those theoretical definitions tell us, they bring us no closer to having a nominal definition of the quality and therefore no closer to having a distinct idea of the quality. This, however, is strange. It would seem that as we develop better theoretical definitions of a quality, our knowledge of its nature is improving. And if it improves enough, then we ought to count as having a distinct notion of the quality, it seems, even if we cannot define it in the special way required for a nominal definition.

This puzzle highlights the fact that on Leibniz's view we can learn a great deal about the nature of a thing without thereby acquiring a distinct notion of it. As he sees it, our knowledge of a thing is better to the extent that we can distinguish within our notion of the thing the simpler notions that enter into it. In the ideal case, we would be able to distinguish a notion's primitive ingredients within it. Leibniz calls this *adequate* knowledge, and though he is unsure whether humans ever actually attain it (A 6.4:587/AG 24; cf. NE 267), he does believe that we can approach it to the extent that we can distinguish simpler notions within our more complex ones. This is precisely what the term "distinct" is meant to signify: distinct notions are those in which we have made some progress toward attaining adequate knowledge, that is, toward distinguishing within the notion the simpler notions that enter into it. In the case where we learn through ex-

perimentation that certain notions must enter into a more complex notion, however, we do not succeed in distinguishing anything in the latter notion. If the microscope allows us to discover that the notions of yellow and blue must enter into our notion of green, that gets us no closer to distinguishing any notions within our notion of green. Despite all our advances in optics, we are no closer to being able to see yellow and blue within green, or discerning the notions of yellow and blue *within* our notion of green, than we ever were. And so our notion of green continues to be confused, despite the fact that our theoretical knowledge of that color is impressive and continues to grow.

Leibniz's insistence that we cannot nominally define sensible qualities in no way conflicts with his belief that they are reducible to the mechanical qualities of bodies. Wilson's failure to attend to the distinction between real and nominal definitions leads her to see tensions in Leibniz's thinking that could only be explained in terms of a pervasive ambivalence toward the nature of sensible qualities. But once we attend sufficiently to this distinction, it becomes clear that there is no tension here at all. He consistently and coherently maintains that we can give real but not nominal definitions of sensible qualities. That is, we can explain the circumstances under which these qualities arise, but we cannot even begin to distinguish within them any underlying nature. For all our theoretical advances, they appear as simple and primitive as ever.

2.2 Congenital Blindness

Wilson's second line of evidence consists of passages in which Leibniz claims that we cannot explain sensible qualities to those who have never sensed them. Here is a typical example of such a passage, which Wilson quotes in her critique:

> [W]e recognize colors, smells, tastes, and other particular objects of the senses clearly enough, and we distinguish them from one another, but only through the simple testimony of the senses, not by way of explicit marks. Thus we cannot explain what red is to a blind man, nor can we make such things clear to others except by leading them into the presence of the thing and making them see, smell, or taste the same thing we do .... This is so even though it is certain that the notions of these qualities are composite and can be resolved because, of course, they do have causes. (*Meditations on Knowledge, Truth, and Ideas*, A 6.4:586/AG 24)[17]

Leibniz admits that our notions of these qualities can be resolved into more primitive notions, and his evidence for this is that such qualities (or our notions of them) have causes. His thought is evidently that we can resolve our sensible quality notions into notions of mechanical qualities such as shapes and motions, which can be thought of as the causes of sensible qualities

[17]See also *On Universal Synthesis and Analysis, or the Art of Discovery and Judgment*, A 6.4:540/L 230; *General Inquiries about the Analysis of Concepts and Truths*, A 6.4:744–45/LP 50–51; *Preface to a Short Book on the Elements of Natural Science*, A 6.4:2002–3/L 285; *On What is Independent of Sense and Matter*, GP 6:500/AG 187.

(or at least of our experiences of them). But in this very same passage, he claims that we cannot explain what red is to a blind person. This, according to Wilson, is puzzling. If red is just the complex of shapes and motions into which our notion of red can be resolved, then nothing should prevent us, at least in time, from being able to explain the nature of red to a person born blind. Yet Leibniz insists that we cannot explain what red is to such a person. This tension in Leibniz's thinking is, by Wilson's lights, yet another sign of his ambivalence about sensible qualities. When he claims that color notions can be resolved, he seems to be thinking of colors as nothing more than complexes of tiny shapes and motions. But when he denies that we can explain color to someone without showing it to them, he seems to be thinking of colors as something over and above the mechanical qualities that correlate with our color experiences, something like the experiences themselves (Wilson 1977, 327–30; cf. Jolley 1984, 184–85).

One strategy for dealing with texts of this sort would be to suppose that Leibniz views our inability to explain sensible qualities in terms of other, more intelligible qualities as only a temporary limitation stemming from our limited understanding of the nature of sensible qualities. Understood in this way, his claim that we cannot explain what red is to a person born blind would be perfectly consistent with the view that red is reducible to shapes and motions and can in principle be explained in terms of these other qualities. However, though many of Leibniz's statements on this topic are admittedly compatible with this sort of reading, on the whole they weigh against it. In the first place, he admits that we have made some progress in understanding the nature of at least some sensible qualities. For

instance, he thinks we have discovered that green is really a mixture of yellow and blue. This, it would seem, ought to allow us to explain green to a person who has never seen that color, so long as they have seen yellow and blue. Yet even while acknowledging this discovery he still denies that we can carry out such explanations (GP 6:500/AG 187).

Moreover, there is one text in which he makes quite clear that our inability to explain sensible qualities has nothing to do with our ignorance of their underlying natures. In the preface to what Leibniz intended to be a short book on the elements of natural science, he imagines a group of people who live in a land with no heat. These people, he tells us,

> could not be made to understand what heat is [*quid sit calor*] merely by describing it, for even if someone were to explain to them the innermost secrets of nature and even interpret perfectly the cause of heat, they would still not recognize heat from this description if it were presented to them. (A 6.4:2002–3/L 285)

Instead, what is needed for them to understand heat is a sensation: "if someone were to kindle a fire near them, they would at length learn what heat is [*quid sit calor*]." In the same way, "a man born blind could learn the whole of optics yet not acquire any idea of light" (ibid.). As these remarks make clear, it is not because of inadequacies in our understanding of optics or of the nature of heat that we cannot explain these qualities to those who have never sensed them.

Wilson takes passages such as these as evidence that Leibniz was thinking of sensible qualities as something over and above the mechanical qualities to which, in some moods, he thought they could be reduced. But this is not the only plausible way of reading these passages.[18]

When Leibniz speaks of our inability to explain what qualities like red and heat are, it is natural for us to interpret him as claiming that we cannot explain the underlying natures of these qualities, for instance, whether red is really a certain complex of tiny shapes and motions. But this is not, I think, what he really had in mind. When he says that we cannot explain what a sensible quality is, what he means, I would suggest, is that we cannot explain it in such a way as to communicate to someone a clear notion of that quality, that is, a notion that would allow them to recognize and distinguish the quality by sensory means. There are explicit indications that this is what Leibniz had in mind. In his discussion of the people from a heatless land, he says that we could not explain to them what heat is because even

[18]In her response to Wilson, Bolton suggests that our inability to acquire a concept of a sensible quality apart from any acquaintance with that quality is actually perfectly consistent with Leibniz's mechanistic-reductive account. This is because on her reading, acquiring a concept of a quality apart from experiencing it requires being in possession of a "complete and thoroughly distinct" definition of that quality, something we could not expect to have even on the assumption that sensible qualities are reducible to mechanical qualities (Bolton 2011, 17-18??; cf. Bolton 2002, 142). This reading of Leibniz helps make sense of his claim that a man born blind could "learn the whole of optics yet not acquire any idea of light" (A 6.4:2003/L 285). However, in the *New Essays*, written some two decades later, he takes a different view. There it is said that what the man born blind lacks is not an idea of light or colors but "a conception of the *clear-confused*, that is, the image of light and colors" (NE 137). Moreover, Leibniz indicates that a man born deaf and mute can have ideas of things that do not have shape even though he cannot experience them in the way we normally do (ibid.). What are we to make of this apparent change of view? It is certainly possible that Leibniz simply changed his mind at some point between the writing of these works. However, I consider it more likely that the comments in the *New Essays* represent his considered view and that in the earlier work he misstated his view. What he should have said, I believe, is that the man born blind cannot acquire a *clear* or *distinct* idea of light.

if we apprised them of the "innermost secrets of nature" and of the cause of heat, "they would still not recognize heat from this description if it were presented to them" (A 6.4:2002–3/L 285). Clearly what is at issue in Leibniz's mind is not whether we can explain the underlying nature of heat, but whether we can explain heat in such a way as to enable someone to recognize it when they feel it. His point is that we cannot give someone this kind of recognition-enabling notion through any sort of explanation, but only by exposing them to heat. Similarly, in the *New Essays* he specifically says that what the congenitally blind person cannot achieve is "a conception of the *clear-confused*, that is, the image of light and colors" (NE 137). What this person cannot acquire is not necessarily an understanding of the underlying nature of light and colors, but rather an idea or mental image of them that would allow her to recognize them by sight.

Understood in this way, nearly all of Leibniz's remarks about what a person born blind can and cannot know about color are consistent with the idea that sensible qualities are just complexes of shapes and motions. As we saw in section 2.1 above, one can know everything there is to know about the underlying nature of a quality and yet still lack a clear, much less a distinct, notion of that quality. A clear notion requires that we be able to recognize a thing in virtue of certain marks that it can be directly perceived to exhibit. A distinct notion requires not only that we be able to recognize the thing but that we be able to articulate the marks in virtue of which we recognize it. Clearly a person born blind can have neither sort of notion, since one who cannot see color can neither recognize it in the requisite way nor articulate the marks in virtue of which they recognize it in this way. But

this does not rule out the possibility that such a person could acquire some notion of color by learning about its underlying nature. For all its value, such a notion would evidently be neither clear nor distinct, but obscure.

In conclusion, Leibniz's remarks about what a blind person could or could not know about color do not rule out the possibility of explaining what color is in the sense of explaining its underlying nature. But they do rule out the possibility of explaining what color is in the sense of giving someone a clear conception of that quality.

2.3 Color and Its Causes

In one instance Wilson describes Leibniz's alleged ambivalence about sensible qualities in these terms:

> [H]e vacillates between saying that physics tells us what sensible qualities are or consist in, and saying that physics tells us the causes of sensible qualities. Insofar as he inclines to the former view, he thinks of sensible qualities as properties in the physical objects that happen to be discriminable by the senses. Insofar as he inclines to the latter view, he thinks of the nature of a sensible quality as completely bound up with the nature of sensory experience .... (Wilson, 1977, 329–30)

The former view, of course, is the reductive approach discussed above in section 1. It says that colors are really just complexes of certain micromechanical qualities of the bodies that appear colored to us in ordinary perception. The latter view, in contrast, says that sensible qualities either are

or are bound up with the experiences these mechanical qualities cause in us. We have already considered two lines of evidence for ascribing the latter view to Leibniz. In this passage, Wilson alludes to a third: Leibniz's propensity for saying that the qualities described in physics are not sensible qualities but rather the causes of such qualities. The texts she evidently has in mind are those in which Leibniz says that sensible qualities, as well as our concepts of such qualities, must be complex because after all they do have causes (i.e., the micromechanical qualities in bodies).[19] If the minute shapes and motions that physics reveals to be the causes of our perceptions of sensible qualities are not what these qualities are or consist in, but merely what causes them, the thought goes, then sensible qualities must be something over and above these shapes and motions. In short, a thing cannot be identified with its cause.

In assessing this evidence, let us first observe that Leibniz is quite happy to speak of the underlying nature of a quality as its cause. This is evident, in the first instance, in his account of causal definitions. As the name suggests, a causal definition specifies how a thing arises or is caused. But as a species of real definition, it also gives an account of what a thing really is. Thus, in definitions of this sort the underlying nature of a thing is being equated with its cause. It is also evident in those passages in which he reasons that sensible qualities (or our notions of them) must be complex because they have causes. To say that an apparently simple quality is complex is to acknowledge that it has an underlying nature (and a complex one at that).

[19]See *On Universal Synthesis and Analysis, or the Art of Discovery and Judgment*, A 6.4:540/L 230; *Meditations on Knowledge, Truth, and Ideas*, A 6.4:586/AG 24.

But the mere fact that a quality has causes does not in itself imply that it is complex or has a complex underlying nature: even simple qualities, it seems, could have causes. Leibniz's inference therefore makes sense only if we understand him to be thinking of a quality's causes as its underlying nature.

In speaking of a thing's underlying nature as its cause, I would suggest that Leibniz is merely speaking in accordance with appearances, as he does in a variety of contexts. A nature is said to be "underlying" precisely because it isn't the nature a thing initially appears to have. On Leibniz's view, green is really just a mixture of yellow and blue. At a deeper level of analysis, it's really just an assemblage of tiny shapes and motions. But when we perceive the color green, we do not perceive it as having either of these natures. At the level of appearances, then, it is natural to think of the mixture of yellow and blue, or the corresponding micromechanical qualities, as causes of green, rather than as its underlying nature. This is why Leibniz is willing to speak of the micromechanical qualities of bodies as the causes of sensible qualities, even though he believes that at a deeper level of analysis qualities of the latter sort just are qualities of the former sort.[20]

Even if Leibniz's willingness to speak thus in accordance with appearances were illegitimate, what matters for our purposes is that his doing so need not—indeed should not—be taken as evidence that he is thinking of sensible qualities as something over and above their causes. As he is using the term in this context, a thing's cause just is what it really is, its underly-

[20]Leibniz's willingness to speak of mechanical qualities as the distinct qualities that "accompany" confused sensible qualities can also be explained in a similar way.

ing nature.

3 Conclusion

Wilson maintains that Leibniz sometimes thinks of sensible qualities as bound up with the corresponding experiences. I hope it is now clear that the evidence she offers for this conclusion is rather weak. In contrast, we have seen that the evidence for ascribing to Leibniz the rival view that sensible qualities are reducible to the micromechanical qualities of bodies is quite strong. The right conclusion to draw is therefore that Leibniz consistently favored the latter, mechanist approach, and that he did not vacillate between the one view and the other. Contrary to the claims of Wilson, he was not ambivalent about the nature of sensible qualities.

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