

# Sensible Qualities: The Case of Sound

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## 1. BACKGROUND

THE ARISTOTELIAN TRADITION distinguishes the familiar five external senses from the less familiar internal senses. Aristotle himself did not in fact use this terminology of 'external' and 'internal,' but the division became common in the work of Arab and Hebrew philosophers, and in the Latin West the distinction is taken for granted.<sup>1</sup> I am going to put to one side the obscurities involved in the various internal senses of phantasia, imagination, memory, etc.; I will instead focus on the external senses. These five external senses—sight, hearing, smell, taste, touch—have their familiar counterparts in the external world: color, sound, odor, flavor, and the various tangible qualities. (The tangible qualities, unfortunately, resist being reduced to a single genus, and are typically listed as hot and cold, wet and dry, etc., where this *etc.* stands in for the complete list that one might or might not be able to give.<sup>2</sup>) These *sensibilia* (I will simply speak of *sensibles*) were known as the proper or special objects of the external senses.

In addition to these proper objects, the senses were taken to have five common objects—size, shape, number, motion, rest—and also an unlimited variety of incidental objects, the per accidens sensibles—Coriscus, one's enemy, a horse race, etc. These per accidens sensibles are in a way the most interesting and important sense objects of all. They are interesting, first, inasmuch as one of the hardest and most interesting problems about perception is the problem of *seeing as*, which seems to be precisely the phenomenon at issue

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<sup>1</sup> See H. A. Wolfson, "The Internal Senses in Latin, Arabic, and Hebrew Philosophic texts," *Harvard Theological Review* 28 (1935): 69–133.

<sup>2</sup> See, e.g., Thomas Aquinas, *Summa theologiae* (ST) I.78.1c, I.78.3 obj. 3/ad 3; *Sententia de anima* (InDA) II.13.31–33. Aristotle gives what he perhaps regards as a complete list at *De gen. et cor.* II 2, 329b19.

here. They are important, also, inasmuch as genuine perception, as we now think of it, almost always involves the perception of something sensible per accidens. Our everyday sensory experiences revolve around the experience of seeing objects of certain kinds. We can of course step back and decide that what we are *really* seeing is colors and shapes. But that is not how we ordinarily see things.

Despite their interest and importance, I want to put aside these per accidens sensibles, and focus instead on the common and proper sensibles, both of which Aristotle described as sensible per se (*kath' hauta*). In his classic statement on the objects of sensation, at *De anima* II 6, 418a7–25, Aristotle suggests that the grounds for distinguishing the per se from the per accidens are that the former sensibles are capable in their own right of making an impression on the senses. Color itself affects the external senses, and so does size. Coriscus, however, considered as Coriscus, does no such thing. He affects the senses only inasmuch as he is colored, perfumed, etc.<sup>3</sup> To focus on the per se sensibles, then, is to focus on those things in the world that are suited to make impressions on the external senses.

Why are some such sensibles proper, whereas others are common? The well-known rule of thumb here, reflected in how we refer to these sensibles, is that each proper sensible can be perceived by only one of the external senses. The common sensibles are those per se sensibles that fail this test. (Note that, of the common sensibles, only number, movement and rest are truly common to all five of the senses; shape and size are perceptible only by touch and sight.<sup>4</sup>) It is not clear, however, that this is the appropriate criterion for distinguishing the proper from the common sensibles. Albert the Great, for instance, argues that a proper sensible must meet three tests: (1) *It is sensed by only one sense*; (2) *this sense is not capable of error with respect to it*; and (3) *the organ of this sense is naturally suited to be affected by it alone*.<sup>5</sup> The last of these tests is problematic, however, for at least two reasons. First, it is problematic for touch, given that the tangible quantities resist being reduced to a single genus. Second, more seriously, it is hard to square with the fact that the external senses are affected by the common sensibles. Albert, unlike Aquinas, claims that the common

<sup>3</sup>“Hence [one’s sense] is not at all affected by the sensible considered as such” (418a23–24). See Aquinas, *InDA* II.13.127–31; Albert the Great, *Summa de homine* 34.2c (252–55).

<sup>4</sup>Cf. Aristotle, *De sensu* 442b7.

<sup>5</sup>“Ad hoc quod aliquid sit sensibile per se et proprium, tria exiguntur, scilicet quod non sentiatur alio sensu per se, et quod circa ipsum non contingit errare illum sensum, cuius est sensibile, et quod substantia organi illius sensus apta nata sit pati ab ipso et non ab alio . . .” (*Summa de homine* 34.2c [254]). Quotations from the *De homine* use the new critical edition (Cologne: Albertus Magnus Institut, 1998), but I’ve retained the convenient reference scheme of earlier editions, citing only the page number of the new edition.

sensibles are the object of the common sense (*Summa de homine* 35.4 [268–70]).<sup>6</sup> But it is hard to see how he can avoid allowing that the external senses are at least “affected” by the common sensibles, and are “naturally suited” to be so affected.

Perhaps he should simply drop this third test. Aren’t the first two sufficient? Indeed, isn’t the first alone sufficient? Thomas Aquinas didn’t think so; he must have regarded Albert’s whole approach to this question as wrong-headed, as getting the *explanans* reversed with the *explanandum*. For Aquinas, the proper sensibles are not special because they are perceived by only one sense. It is the other way around: the proper sensibles are perceived by only one sense because there is something special about them. The proper sensibles have a special status, and because of this it is appropriate to define and distinguish the senses on the basis of these proper objects. It is a familiar Aristotelian principle that faculties are distinguished through acts, and acts through objects.<sup>7</sup> Aquinas wants to apply this principle to his account of the external, proper senses: “Proper sense . . . is necessarily distinguished into different capacities in terms of the variety of impressions made by the sensibles.”<sup>8</sup> Not all sensibles are relevant, of course: we do not have a separate sense faculty for recognizing Coriscus, or even for recognizing tall things, or groups of three. There is something special about the proper sensibles. Aquinas draws inspiration from Aristotle:

Of things that are sensible per se, those are proper that are properly sensible, and the essence of each sense is naturally suited to these (*De anima* II 6, 418a24–25).

Here is Aquinas’s commentary (with Aristotle’s words italicized):

But although both common and proper sensibles *are sensible per se*, still *proper sensibles are properly sensible per se*. For *the essence of each sense* and its definition lies in its being *naturally suited* to be affected by such a sensible. For the defining account of any capacity consists in its relationship to its proper object.<sup>9</sup>

<sup>6</sup> Albert seems to have abandoned this view by *De anima* 2.3.5, written in the late 1250s, and to have come around to a view like Aquinas’s. Accordingly, *De anima* 2.3.5 mentions only the first two of the above criteria for being a proper sensible. My remarks here about Albert, then, apply only to the *De homine*, written in the early 1240s.

<sup>7</sup> See *De anima* II 4, 415a18–20; Aquinas, *ST I*.77.3.

<sup>8</sup> “Quia vero sensus proprius, qui est primum in ordine sensitivarum potentiarum, immediate a sensibilibus immutatur, necesse fuit quod secundum diversitatem immutationum sensibilium in diversas potentias distingueretur” (*Quaestiones de anima* 13c). Note, unless otherwise indicated all translations are my own.

<sup>9</sup> “Quamvis autem sensibilia communia et sensibilia propria sint per se sensibilia, tamen *propria sensibilia sunt proprie per se sensibilia*, quia *substantia uniuscuiusque sensus* et eius definitio est in hoc quod *est aptum natum* pati a tali sensibili; ratio enim uniuscuiusque potentiae consistit in habitudine *ad proprium obiectum*” (*InDa* II.13.64–70).

The point is implicit in Aristotle, but Aquinas drives it home: the proper sensibles are special because of how they make an impression on our senses. Our senses are designed so as to be well suited to detect such objects, and so it is appropriate to define and distinguish those senses in terms of the different objects they are suited to detect.

On this reading of Aristotle (the correct one, I believe<sup>10</sup>), the proper sensibles are special not because each one has its unique sense. Rather, that one-to-one correspondence<sup>11</sup> is insured by the fact that these sensibles are special, and that hence the senses are individuated in terms of them. But what makes the proper sensibles special? According to Aquinas (*ST* I.78.3 ad 2), they are special because they are the things that make an impression on the senses *primarily*. The common sensibles, in contrast, although they do themselves make an impression on the senses, do so secondarily, in virtue of the proper sensibles. To illustrate this point, Aquinas uses the example of a wall. The various common sensibles that might characterize a wall—its size, shape, etc.—are perceived only in virtue of its proper sensibles. If the wall has no color—i.e., if it is transparent—then its common sensibles will not be *seen*. If it makes no noise, we will not be able to *hear* whether it is in motion or stationary.

The reason why the proper sensibles have this primary status, on Aquinas's analysis, is that only they are sensible *qualities*. The common sensibles, in contrast, "are all reduced to quantity" (*ibid.*). This doesn't mean that these common sensibles are all quantities: shape, for instance, is a quality that consists in the limitation to quantity. Aquinas seems to mean that our perception of such sensibles is reducible to perceiving quantity. But quantity cannot make the kinds of impressions on the senses that constitute perception. So the reason for the special status of the proper sensibles, on Aquinas's analysis, is that "the proper sensibles make an impression on the senses primarily and per se," whereas "the common sensibles do not move the senses primarily and per se, but on account of a sensible quality."<sup>12</sup> The difference is that between quality

<sup>10</sup>For a similar, more expert appraisal, see Richard Sorabji, "Aristotle on Demarcating the Five Senses," *Philosophical Review* 80 (1971): 55–57.

<sup>11</sup>It is one-to-one, at any rate, if one ignores the problematic irreducibility of the tangible qualities.

<sup>12</sup>"Nam sensibilia propria primo et per se immutant sensum, cum sint qualitates alterantes. Sensibilia vero communia omnia reducuntur ad quantitatem. . . . Et ideo sensibilia communia non movent sensum primo et per se, sed ratione sensibilis qualitatis, ut superficies ratione coloris" (*ST* I.78.3 ad 2).

The Aristotelian tradition tends simply to identify perception with the impression of a sensible quality on the sense organ, hence treating perception as entirely passive. On this point see my *Theories of Cognition in the Later Middle Ages* (New York: Cambridge University Press, 1997), ch.4.

For further discussion of the inability of other sensibles to produce such alteration, see Aquinas's *Physics* Commentary, VII.5.914, where he remarks that qualities in the fourth species,

and quantity. (In this connection it is interesting to note that whereas the moderns distinguished between primary and secondary qualities, Aquinas would say that only the latter, the so-called secondary qualities, are entirely qualities. The so-called primary qualities turn out, on Aquinas's analysis, either not to be qualities at all, or to be reducible to quantity. Hence the moderns sometimes speak of eliminating Aristotelian qualities altogether.<sup>13</sup>)

2. WHAT IS SOUND?

Following Aquinas's lead, let us distinguish between sensible qualities (the proper sensibles) and sensible quantities (the common sensibles). Of the various sensible qualities, the most theoretically interesting, in the medieval context, is sound. The case of sound raised several problems, and these problems threatened not just their accounts of hearing, but their accounts of sensation in general.

First, it was obvious to the medievals that sound is closely connected with motion, perhaps identical to a certain kind of motion. If so, then sound is not a sensible quality at all, but instead a sensible quantity, a motion. This is, of course, an instance of what would later be called the problem of secondary qualities. The medievals were familiar with such problems, associating them with Democritus, who famously remarked "by convention color, by convention sweet, by convention bitter, in reality atoms and void."<sup>14</sup> One finds little concern, in the medieval period, over Democritus's eliminativist proposal. The worry was not that sound might not exist at all. The worry, instead, was that sound might be capable of being reduced to motion. This would have been bad enough, since it would have threatened the entire Aristotelian distinction between the proper and common sensibles, and therefore (on Aquinas's reading) threatened the very distinctness of the senses themselves.

Why should this reductivist claim look plausible for sound, but not for color or heat? The answer isn't hard to see. Whereas it took sophisticated scientific techniques to discover that color and heat might be reduced to kinds of motion, the same can be seen in the case of sound through intelligent observation. Consider, for instance, that many objects that emit sounds plainly do so in virtue of vibrating. Also, water and other objects can be seen to vibrate as the result of loud noises. Moreover, very loud noises were known to produce

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such as shape, don't produce alteration "first and principally, but secondarily, because such qualities are a consequence of certain alterations of the primary qualities."

<sup>13</sup>See Keith Hutchison, "Dormitive Virtues, Scholastic Qualities, and the New Philosophies," *History of Science* 29 (1991): 245-78.

<sup>14</sup>*Early Greek Philosophy*, tr. J. Barnes (London: Penguin, 1987) 254 [= Diels-Kranz B 125]. I do not know whether this particular phrase was known during the medieval period, but Democritus's views were explicitly described by Aristotle, at *De sensu* 442a29-b23.

results much like direct blows: thunder can shatter rocks—at least according to Aristotle.<sup>15</sup> It was plain, then, that sound and motion are tightly linked. Why not simply identify them?

There was little in earlier philosophers to discourage such a conclusion. In Plato one finds the idea that hearing is the vibration of a blow that passes through the ears (*Timaeus* 67a-c). Aristotle remarks that “sound is a certain motion of air” and that the air inside the ears is immovable “in order for it accurately to sense all the varieties of *motion*.”<sup>16</sup> Boethius, whose views on this topic were influential in the Latin West, writes that “sound is defined as a percussion of air that remains intact up to the point of hearing,” and that “every sound consists in a pulsation, and every pulsation comes from motion.”<sup>17</sup> None of these authors takes up the issue at length, and neither do they explicitly argue that sound can be reduced to a kind of motion. But it is natural to suppose that this is their meaning.

Later medieval thinkers typically resisted the reduction of sound to motion. Albert the Great defined sound as “a sensible quality, coming from a cleavage in the motion of air and existing with it.” Because sound is so closely related to the motion of air, both coming from and existing concurrently with that motion, Albert says it is not easy to say precisely what sound is. Consequently, “earlier authorities are not found to have given explicit accounts of what sound is.”<sup>18</sup> He himself gives a series of arguments against identifying sound

<sup>15</sup> *De caelo* II 9, 290b35; *De anima* II 12, 424b11–12. Aquinas stresses in light of this example that the sound and the motion are nonidentical (*InDA* II 24.151–52). See also Avicenna, *Liber de anima seu Sextus de naturalibus*, S. Van Riet, ed. (Leiden: E. J. Brill, 1968, 1972), Part II, ch.5 (157).

<sup>16</sup> *De anima* II 8, 420b11, 420a8–11; cf. *De sensu* 447a1–2. Alan Towey describes Aristotle as identifying sounds with “different shaped packets of air.” If so, then sound might still be reducible to a sensible quantity—namely, to shape. See Towey’s “Aristotle and Alexander on Hearing and Instantaneous Change: A Dilemma in Aristotle’s Account of Hearing,” in *The Second Sense: Studies in Hearing and Musical Judgement from Antiquity to the Seventeenth Century*, C. Burnett, M. Fend, P. Gouk, eds. (London: Warburg Institute, 1991), 14.

<sup>17</sup> *De institutione musica*, ed. G. Friedlein (Leipzig: B. G. Teubneri, 1867), I.3 (189): “idcirco definitur sonus percussio aeris indissoluta usque ad auditum”; II.20 (253): “omnis vero sonus constet in pulsu, pulsus vero omnis ex motu sit.”

<sup>18</sup> “Dicimus ergo quod sonus est qualitas sensibilis proveniens ex fractivo motu aeris et ens cum illo . . . Cum igitur sonus causetur ab esse tam debili et sit cum ipso, ipse adhuc debilius habet esse, et propter hoc ab auctoribus non invenitur expresse determinatum, quid sit sonus” (*Summa de homine* 24.1 [200–1]).

Francisco Toletí, a sixteenth-century Jesuit, remarked in this connection that when the proximate genus of a thing is unknown, one has to give one’s account in terms of the proximate sensible causes: “thus Aristotle defines sound in terms of striking and percussion, not as its genus, but as its proximate cause” (*In tres libros Aristotelis De anima Commentaria una cum quaestionibus* [Lyon: 1591], 308). (I have drawn this and several other references from Michael Wittmann, *Vox atque Sonus: Studien zur Rezeption der Aristotelischen Schrift “De anima” und ihre Bedeutung fuer die Musiktheorie* [Pfaffenweiler: Centaurus-Verlagsgesellschaft, 1987]. Wittmann’s valuable study describes and edits many more interesting texts than I can possibly do justice to in a paper of this length. See, in

with motion. The first of these claims that no proper sense object can be a common sensible, and that therefore sound, the proper object of hearing, cannot be identified with motion.<sup>19</sup> From our perspective, this begs the question. The very difficulty the case of sound presents is that it threatens the Aristotelian framework to which Albert appeals. Albert evidently thinks the plausibility of that framework is enough for us to reject the reduction of sound to motion, but his *modus tollens* might well be our *modus ponens*. Notice, further, that this line of argument presupposes the analysis of proper sensibles that we saw Albert give earlier. If, in contrast, we accept Aquinas's view that the proper sensibles should be taken as distinguishing the senses—not vice versa—then the reduction of sound to motion would not make sound a proper sensible, but would simply lead us to distinguish the external senses in a different way. That would entail the absurd result that hearing is not a distinct external sense.<sup>20</sup> But it is not at all clear how this absurdity ought to be avoided, hence not clear that the reduction should be denied.

Albert's definition of sound, and his best argument against the reduction of sound to motion, is drawn from Avicenna. We might as well, then, go directly to the source. Avicenna specifically asks whether sound is a motion in the air, noting that this view was sometimes maintained. He makes an interesting argument to the contrary:

(1) If true sound were motion itself, and not something following it or concomitant with it, then when motion is known, sound too would be known. (2) But this is not the case . . . (3) Therefore, that from which sound comes in its essence and specific nature is not that from which motion comes essentially and specifically.

(4) Therefore sound is an accident that comes from such motion, resulting from it and occurring with it.<sup>21</sup>

Sound cannot be identified with motion (or, better, with a *kind* of motion), Avicenna claims, because if two things are identical then anyone with knowl-

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particular, vol. I, 282–90, for a discussion of later medieval efforts to determine what exactly sound is, if not simply motion.)

<sup>19</sup> *Summa de homine* 24.1 (200). See also *De anima* 2.3.18. This was a standard line of argument: see, e.g., Giles of Rome, *Expositio super libros de anima* (Venedig, 1496), f. 43vb (quoted in Wittmann, *op cit.*, vol. I, 282).

<sup>20</sup> A modern echo of this result can be heard in George Berkeley's *Three Dialogues*, Dialogue I, where Philonous presses the absurdity that "real sounds may possibly be *seen* or *felt*, but never *heard*" (*Philosophical Writings*, D. M. Armstrong, ed. [Macmillan: New York, 1965], 145–46).

<sup>21</sup> "Si autem verus sonus esset ipse motus, nec esset consequens illum aut comitans illum, tunc cum sciretur motus, sciretur et sonitus. Hoc autem not est ita: unum enim et idem non potest sciri et nesciri simul nisi ex duabus partibus aut ex duabus dispositionibus; ergo id ex quo est sonus in sua essentia et specialitate, non est id ex quo est motus essentialiter et specialiter. Ergo sonus accidens est quod accidit ex hoc praedicto motu quem consequitur et est cum illo" (*Liber de anima* II.5 [157]). I am, regrettably, unable to read the Arabic. But I have made several emendations to the Latin text on the basis of Van Reit's Arabic-Latin apparatus.

edge of the one must have knowledge of the other. Yet here the consequent often does not obtain: one can perceive motion without perceiving sound; more tellingly, one can perceive sound without perceiving motion. There are obvious parallels here with the argument that Descartes would make some 600 years later for a real distinction between his mind and body. The notoriety of Descartes's argument makes it unnecessary, I think, to dwell on the difficulties that arguments of this kind face.<sup>22</sup> But, precisely because arguments of this kind are so notorious, it needs to be stressed that Avicenna has not given us an obvious non-starter. Much of the weight of the argument rests on the first premise, which Avicenna defends as follows (filling in the ellipse in the above passage):

For one and the same thing cannot be both known and not known at the same time unless with respect to two parts or two characteristics.

This defense of the first premise leaves room for dealing with obvious counterexamples. You know that aspirin is a pain reliever; you do not know that acetylsalicylic acid is a pain reliever; therefore, etc. Avicenna might reply that these claims are true only *de dicto*, and that your lack of knowledge extends only to a certain characteristic of aspirin, namely its chemical name.

There are a host of subtle and far-ranging issues here. But it appears that Avicenna is alert to the danger, judging from the way that he carefully words his first conclusion, (3). Sound, he says, is not identical to [a kind of] motion with respect to its "essence and specific nature." This is the key to the argument. For it does seem plausible to maintain that if  $A = B$ , then a knowledge of the essence of A entails (and is entailed by) a knowledge of the essence of B. And if this first premise is plausible, then we can shift our focus to the second premise, understanding it as the claim that one can have knowledge of sound, with respect to its essence and specific nature, without having an equivalent knowledge of the motion in air that is supposedly identical to sound. Here, perhaps, Avicenna is wrong. Perhaps the essence of sound just is a certain kind of motion. But it is certainly plausible—I mean plausible not just in the context of pre-modern science, but *really* plausible—to maintain that we do know the essence of sound, through our everyday experiences, regardless of what we know about the motion and the compression of air. Sound, in other words, is not essentially a kind of motion, but a sensible quality, the thing that we are

<sup>22</sup>Virtually any introduction to the philosophy of mind will carefully explain the various kinds of fallacies that plague arguments of this form. See, for example, Paul Churchland, *Matter and Consciousness*, revised edition (Cambridge: MIT Press, 1988) 32–34, from which I draw the example of aspirin used below. Descartes's best-known argument of this general form occurs in *Meditations on First Philosophy* (Med. VI, AT 78). Of course, there is unending controversy about the proper analysis of that argument.



intimately familiar with, on a daily basis. If that is the essence of sound, then sound is not motion.<sup>23</sup>

Of course I've only scratched the surface of this argument; I've said nothing, for instance, about how we might evaluate questions about what sound is *essentially*. But in order to maintain the historical focus of this paper, I will at this point merely note that Avicenna's argument does not seem to have been developed by later thinkers. Albert's version of the argument is a pale shadow of the original.<sup>24</sup> Others simply took for granted the irreducibility of sound to motion. Aquinas, for instance, never seems to have given explicit attention to the problem, but time after time he describes sound as something that results from or is caused by motion.<sup>25</sup> In his commentaries he even rewrites Aristotle, at least twice, so that where Aristotle seems to identify sound and motion, Aquinas has sound occurring as the result of motion.<sup>26</sup>

Robert Grosseteste was one medieval who seems to have accepted, at least tentatively, the reduction of sound to motion. In his commentary on the *Posterior Analytics*, he describes the vibrating motion of an object producing sound and then identifies this motion as the making of sound.<sup>27</sup> Elsewhere he is more tentative, saying that this motion "is sound—or else is the swiftness natural to sound."<sup>28</sup> There is, however, no discussion of what the implications might be

<sup>23</sup> Other recent philosophers, for different reasons, have tried to make a case for the irreducibility of sensible qualities. See, for example, James Cornman, *Perception, Common Sense and Science* (New Haven: Yale University Press, 1975), and the discussion in C. L. Hardin, *Color for Philosophers. Unweaving the Rainbow* (Indianapolis: Hackett, 1988), 60–61. More recently, Mark Johnston, "Are Manifest Qualities Response-Dependent?" *Monist* 81 (1998) 3–43, has offered a powerful argument for this view. Johnston tries to eliminate all middle ground between irreducible sensible qualities and a radical error theory of perception.

<sup>24</sup> See *Summa de homine* 24.1 (200); *De anima* 2.3.18.

<sup>25</sup> Here are some typical passages: "Sound is *caused* by the air's being struck and put in motion" (*ST* I.78.3c); "sound, however, is *caused* by local motion" (*InDA* II.14.254–55); "air's being forced out is indeed the *cause* of sound's generation" (*InDA* II.16.119–20); "sound's generation in air is the *result* of the motion of air" (*InDA* II.16.170); "sound is the *result* of motion" (*InDA* II.17.135); "sound is *generated* by motion" (*InDA* II.17.137–38); sound "is caused by the striking of air" (*In De sensu* 15.173–74). See also II *SENT* 2.2.2 ad 5, where Aquinas raises the possibility that sound might be able to pass through the heavens in *esse spirituale*, without there being any motion.

<sup>26</sup> Where Aristotle says that the motion of air *is* sound, Aquinas writes instead that motion "gives off (*reddit*) sound" (*InDA* II.17.64–65). Another apparent identification at *De sensu* 446b30–47a1 is replaced with the claim that "sound results (*consequitur*) from a kind of local motion" (*In De sensu* 15.272–73). But see *InDA* II.18.69, where Aquinas simply repeats Aristotle's apparent identification.

<sup>27</sup> "hic itaque motus . . . sonatio est" (*Commentarius de Posteriorum analyticorum*, ed. P. Rossi [Florence: L. S. Olschki, 1981], II.4 [386]). For this and a number of other references in this paper I am indebted to Charles Burnett's stimulating paper, "Sound and its Perception in the Middle Ages," in *The Second Sense*, op. cit.

<sup>28</sup> "Et hacc motio sonativi secundum extensionem et contractionem in partibus minutis, quae consequitur motum localem tremoris est sonus vel velocitas naturalis ad sonum" (*De generatione*

for an Aristotelian theory of sensation. Must we break apart the distinction between the proper and the common senses? Must we deny that hearing is a distinct sense?

In retrospect, it seems that the answer to both questions is *no*. There is no reason why the Aristotelian theory of sensation described in section one could not survive the reduction of sensible qualities to quantities. One path the medievals might have pursued is to embrace what we now call *physicalism*. Color, on this view, might be described in terms of the physical properties of an object's surface; heat in terms of molecular motion; sound in terms of waves of changing air pressure. The medievals could have embraced an account of this sort by agreeing that all of the proper sensibles are in fact quantities, but still insisting that only certain kinds of quantities are in fact the primary, proper ones. Sound is a certain kind of quantity—a certain kind of compression and motion in air or water—and it is this quantity that the sense of hearing is uniquely suited to detect. This line of thought would have required abandoning much of the conventional Aristotelian distinction between quantities and qualities. But the physicalist view captures the spirit of the Aristotelian account of sensation, because it preserves the idea that the proper objects of sensation are those features of the world that animals have been specially equipped to perceive. The sensible features of the world are specified in terms of their ability to make an impression on our senses; our senses are distinguished according to how those sensible features are distinguished. Whether these features turn out to be irreducibly qualitative or quantitative can be viewed as an empirical, nonessential issue.

### 3. WHERE IS SOUND?

Medieval Latin philosophers were by and large committed to the idea that the objects of sensation are qualities in the external world: the green on the surface of the leaf, the taste in the honey. There were plenty of influential historical precedents that might have discouraged this kind of realism. Avicenna, for instance, explicitly maintained that the objects of sensation are the forms that make an immediate impression on our senses; Aristotle is at best ambivalent on these issues.<sup>29</sup> It is instructive to see how Aquinas, in commenting on one such ambivalent text in Aristotle, attempts to set the record straight. In the *De sensu*, Aristotle proposes a distinction designed to settle a controversy over whether several people can ever perceive the same object:

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*sonorum*, L. Baur, ed., *Die philosophischen Werke Grossetestes*, Beiträge zur Geschichte der Philosophie des Mittelalters IX [1912] 7).

<sup>29</sup>Some key passages in Avicenna are at *Liber de anima* II.2 (121–22, 129). For Aristotle, see *De anima* III 2, 425b26–426a28, and the discussion in Terence Irwin, *Aristotle's First Principles* (Oxford: Oxford University Press, 1988), 313–15.

They all sense that which first produces the movement (the bell, frankincense, or fire), which is numerically one and the same, whereas [each senses] something private (*idiou*), numerically different but the same in species, and so many see, hear, and smell at once (446b22–24).

Aristotle doesn't say which object has the better claim to be perceived, the public source or the private object. Both are perceived, he seems to be saying. Aquinas, in commenting, removes all ambiguity:

If one takes *that which first* moves the medium, then *they all sense one and the same* thing—in the way that everyone, near and far, hears the sound of one percussion, and likewise everyone smells one odorous body. . . . But that which then comes to each privately is *numerically different but the same in species*, because all such impressions are caused by the same form of the first active cause. And thus *many see, hear, and smell at once* the same sensible, coming to them through different impressions.<sup>30</sup>

The commentary differs from the text in not treating these private impressions as things that are perceived.<sup>31</sup> Instead, Aquinas supplies at the end of the passage an unambiguous conclusion. What we perceive is the same external object; our private impressions are just that, impressions; they are not objects of sensation.

Aquinas's view is characteristic for the Latin West. But such a view faces a difficulty in the case of sound. Sound, among the various sensibles, has a peculiar and amorphous location. Avicenna spoke of it as having neither fixed nor stable existence (*Liber de anima* II.5 [154]). Aquinas picked up on this phrase in contrasting sound with the other sensibles. "Color, smell, flavor, and tangible qualities have a permanent and fixed existence in their subject." In contrast, he says, "sound is caused by motion. It does not have a fixed and stable existence in its subject, but consists in a kind of impression."<sup>32</sup> The basic problem with sound is that, unlike the other sensible qualities, sound seems to exist in the medium, not in the object making the sound. As Aquinas says, "sound becomes audible in the air." More specifically, "in a body making a

<sup>30</sup> "Si vero accipiatur *id quod primo* movet medium, sic *unum et idem omnes sentiunt*, sicut unius percussio sonum audiunt omnes sive propinqui sive remoti; similiter unum corpus odoriferum, puta coctanum, vel thus in igne ardens, odorant omnes; sed *id quod iam proprie* pervenit ad unumquemque est *alterum numero, sed est idem specie*, quia ab eadem forma primi activi omnes huiusmodi immutationes causantur; unde *simul multi vident et odorant et audiunt idem* sensibile per diversas immutationes ad eos pervenientes" (*In de sensu* 15.190–200).

<sup>31</sup> The syntax of the Greek text of the *De anima* makes it clear, in a way that the Latin translation does not, that these private impressions are themselves perceived. (This is what justifies the confident addition to Aristotle's text of the words 'each senses.') The translation Aquinas has in front of him does not force such a reading and he accordingly does not embrace it.

<sup>32</sup> "Dicendum quod color et odor et sapor et qualitates tangibiles habent esse permanens et fixum in suo subiecto. . . . Sonus autem causatur ex motu et non habet esse fixum et quiescens in subiecto, sed in quadam immutatione consistit" (*InDA* II.16.21–35).

sound that sound is only potential; the sound is made actual in the medium, which is moved by the percussion of the body making the sound."<sup>33</sup>

Aquinas's position on sound seems to be the standard medieval view.<sup>34</sup> It also seems to accord with our pre-theoretical intuitions; we do tend to think of sound existing in the air, not in the object, whereas we think of color as existing in objects. It is not clear to me that this intuitive distinction could survive critical scrutiny, given a modern understanding of the mechanisms at work. Our view about sound seems to stem primarily from the fact that we see colors only when we look directly at them, whereas we hear sounds around the corner, down the hall, etc. This makes it seem as if sound fills the air, hence exists in the air, whereas color seems located in a single place. But it is hard to see why this should be a satisfactory basis for saying that the one exists in the object, the other in the air. It rather seems merely a feature of the different physical properties of light versus sound waves.<sup>35</sup>

Moreover, once sound is separated from the object that causes it, it is not clear what can block the same from occurring in other cases where sensation occurs through an external medium. This is particularly clear in the case of color. The medievals supposed that physical objects have a certain quality, color, and that this quality is capable of multiplying a likeness of itself through a luminous medium, into the eye (see *InDA* II.14). The surface color, therefore, is what makes an impression on the eye, primarily and per se, and so surface color is the primary object of sight. We, too, standardly think of color as a property of physical objects. But this property—a reflective capacity—is not in any sense that which makes an impression on the eye. It is the reflected light, on Aquinas's principles, that makes an impression on the eye—just as it is the sound in the air, not the object emitting the sound, that makes an impression on the ears. A modern understanding of color, then, makes it seem much more analogous to the case of sound.

<sup>33</sup> "Sonus autem audibilis fit in aere" (*ST* I.77.4c); "in corpore sonante non est sonus nisi in potentia, in medio autem quod movetur ex percussione corporis sonantis fit sonus in actu" (*InDA* II.16.72–74).

<sup>34</sup> See, e.g., Albert, *Summa de homine* 24.2 (201–2); Roger Bacon, *De multiplicatione specierum* in *Roger Bacon's Philosophy of Nature*, D. Lindberg, ed. (Oxford: Clarendon Press, 1983), I.2: "It is clear in the case of the proper sensibles that they produce species that make an impression on the senses, and in general a sense receives the *species* of sensibles, as Aristotle says, and in this all the authorities and masters agree—except in the case of sound." Bacon's point here is that sound does not seem to be a quality of a sensible object that gets transmitted to the percipient via species. Rather, *sound itself* seems to be transmitted through the medium. As Wittmann, *op cit.*, documents at length, it became standard in later scholastic discussions to ask whether sound has natural or intentional/spiritual existence *in medio*.

<sup>35</sup> I discuss the philosophical question of sound's location at length in my "What is Sound?" *Philosophical Quarterly* 49 (1999): 309–24. I argue there that, in order to avoid inconsistency, sound should be located at its point of origin rather than in the medium.

Perhaps, then, it is a mistake to think of sound as existing in the air—unless we are prepared to say the same thing about color and even smell. (Smells, notice, seem to be an intermediary case. We are inclined to think of smells as existing in the air, but we are also strongly inclined to think of them as existing in the object.) If we want to defend the kind of realism about sensible qualities that Aquinas puts forward, it seems that we have good reasons for doing so across the board. This would suggest that we should repress our intuitions about sound, and insist that sounds, like colors and smells, exist in the object that is their source. Alternatively, we might try claiming that sensible qualities are not features possessed by the object, but are the sensible qualities issued by the object: the reflected light, the emitted sound and smell. This would be a kind of compromise position: we would be acknowledging that sensible qualities exist in the medium, but we would be locating them immediately adjacent to the object. Such an account would explain why we take sensation to give us information about the physical source of the impression, rather than about the medium. It gives us information about what sorts of sensible qualities are being released by the object.

This compromise position offers a further advantage. Aristotle, notoriously, insists on the thorough reliability of our senses when it comes to detecting their proper sensibles. We don't make mistakes in such cases—except perhaps (at least on Aquinas's account) in cases where the organ is defective or impeded.<sup>36</sup> In criticizing this view, the counterexample that commentators almost inevitably propose is one where an object is seen in nonstandard lighting conditions. Such apparent counterexamples can seem to be a further motivation for the Aristotelian to adopt a non-realist theory of sensible qualities, and to make the sensibles be the private sense objects described above in *De somno*.<sup>37</sup> But these cases can be handled just as well by identifying color as that which is emitted by the object, rather than as an unchanging quality of the object's surface. Our senses are not infallible guides to surface color, but they are—at least when working properly—infallible guides to emitted (reflected) color. By understanding color in this way, Aristotelians might more plausibly maintain the thesis of infallibility, and yet preserve an account on which the objects of sensation are features of the external world.

Yet this suggestion has its difficulties. What if a red filter is placed between percipient and object? What if the percipient has unknowingly been outfitted

<sup>36</sup> This is Aquinas's reading of *De anima* III 3, 428b19 (*InDA* III.6.58–85); see also *ST* I.85.6c. But see 428a11–12, where Aristotle makes no exception.

<sup>37</sup> The counterexample, and the proposed remedy, are offered both by Irwin, *Aristotle's First Principles*, 313–15, and by Norman Kretzmann—as a reading of Aquinas!—in “Infallibility, Error, and Ignorance,” in *Aristotle and His Medieval Interpreters* (*Canadian Journal of Philosophy*, supp. vol. 17 [1991]: 171–72).

with contact lenses that have a reddish tint? In such cases, the Aristotelian might talk about the light projected on the viewer's side of the filter or lens. But this line of reply forces one toward the view that infallibility is guaranteed only with respect to the color that makes an *immediate* impression on the sense. This, again, pushes us toward the alternative described in the *De somno*, toward treating the objects of sensation, sensible qualities, as the immediate and private impressions on one's sensory organs.

Albert the Great, in light of these kinds of examples, moves halfheartedly in this direction. Albert proposes distinguishing the sense object as it exists in the object sensed and the sense object as it is received abstractly in the sensory organ. Although the sense object can be radically transformed on its way from object to organ, still there is no sensory error—even if what is white looks to be red or yellowish—“because the proper sensible actually has such existence in abstraction, although it does not have such existence in the subject where it exists materially.”<sup>38</sup> Evidently, Albert wants it both ways. He wants to continue treating external qualities as the objects of sensation, and at the same time he wants to safeguard the infallibility of the senses. Clearly, something has to give. Either he must abandon realism with respect to sensible qualities or he must concede that infallibility applies only to our private experiences, and that, with respect to the external world, there are no guarantees.<sup>39</sup>

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<sup>38</sup> “Et haec non sunt error sensus in sensibili proprio, quoniam sensibile proprium revera tale esse habet in abstractione, licet non habeat tale esse in subiecto, in quo est secundum esse materiale, quod habet in natura” (*De anima* 2.3.5).

<sup>39</sup> I want to thank two anonymous referees for the *Journal* for their helpful comments. I've also benefitted from comments received at the 1997 International Congress of Medieval Philosophy.