

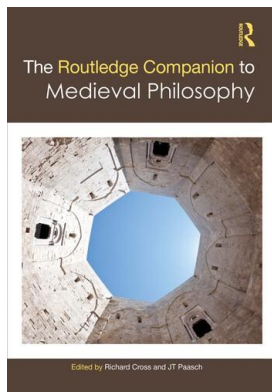
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23

INTERNAL SENSES

Deborah Black

Despite their privileging of the intellect as the only uniquely human cognitive faculty, medieval philosophers accorded a cluster of faculties located in the brain, known as the “internal senses,” with a wide variety of cognitive tasks. These internal sense faculties were united by their common concern with sensory images, in virtue of which they account for most of our everyday cognitive operations, such as our ability to remember, our capacity to integrate the diverse perceptions of our individual senses, and the creative operations of our imaginations. Moreover, since most of the capacities assigned to the internal senses are those that humans share in some form with non-human animals, discussions of the internal senses also represent medieval philosophers’ attempts to explain animal cognition and to explore the extent to which animals possess perceptual abilities akin to those of human beings.

Origins and Background

The internal senses represent an attempt to unify and systematize the various operations which Aristotle attributed to imagination (*phantasia*).¹ The Aristotelian roots of the internal senses are complicated, however, by the transmission history of Aristotle’s short physical treatises, the *Parva naturalia*, which contain more detailed expositions of Aristotle’s views on sensation and imagination. The Arabic version of these treatises was not a straightforward translation of Aristotle, but an adaptation that mixed translations from Aristotle with non-Aristotelian elements. Recent scholarship has begun to show that some aspects of the internal sense tradition, in particular as espoused by Averroes (Ibn Rushd, 1126–1198), have their origins in this unusual text.² In addition to these purely philosophical sources, the Greek medical tradition also played an important role. In particular, advances in the knowledge of the physiology of perception by Galen came to displace Aristotle’s tentative speculations concerning the corporeal organs of the sensory powers. Where Aristotle had opted for the heart as the likely center of perception, by Galen’s time, the brain was recognized as the seat of perception, and even the Arabic *Parva naturalia* presented the ventricles of the brain as the physical locus of the various internal senses. But it is only with the Arabic philosopher Avicenna (Ibn Sīnā, 980–1037) that a well-defined and systematic doctrine of internal senses becomes crystallized and assumes a central role in cognitive psychology. Finally, while Avicenna and Averroes were by far the most important sources for the Latin West, the views of patristic authors colored the Western interpretation of Aristotle and his Arabic followers. In particular, Western medieval accounts of the internal senses are often filtered through an Augustinian lens,

and Augustine's discussions of the powers of the sensory soul were often seen as supplementary or corrective perspectives on the internal sense traditions rooted in Arabic peripateticism.

Aristotle on the Senses and Their Objects

Many aspects of the internal sense tradition represent attempts to interpret Aristotle's theories of sense perception and imagination. Central to those theories is Aristotle's claim that in addition to the proper sensibles that are exclusive to one of the five external senses, such as color, sound, and so on, there is also a set of objects which are perceptible to two or more senses—the so-called "common sensibles" of motion, size, shape, and so on. Beyond the proper and common sensibles, both of which Aristotle considers essentially sensible in their own right, Aristotle also discusses a class of objects that on his principles is difficult to categorize as either purely sensible or purely intelligible. When a dog recognizes the soft gray shape as a cat to be chased, none of the proper or common sensibles account for its perception of "cat" or "something to chase." Nor does the dog have the abstract concept of "cat" or "felinity" to explain this act of recognition. Aristotle refers to sensible objects of this sort as "incidental" (or "accidental") perceptibles. His example is "seeing" the white thing as Diaries's son.³ The question of how the senses can convey what seems to be non-sensory information in incidental perception is one of the main issues that the internal senses attempt to address.

The existence of the common and incidental sensibles also points to the fact that both animals and humans are able to collate information coming from the various senses into a single, unified picture of the sensory object. The basic capacity to collect the information coming from the five senses was assigned to a faculty that Aristotle and his medieval followers called the "common sense."⁴ Augustine too used the term "inner sense" for a similar capacity. Both Aristotle and Augustine also argued that the common or inner sense is required to explain sensory apperception, our awareness that we are perceiving.⁵ But, confusing as it may be, Aristotle did not view the common sense as an additional special sense with the common sensibles as its proper object. "Common" in the two cases denotes different things: in the case of the common sensibles, it signifies an object shared by multiple senses and exclusive to none; in the case of the common sense, it implies a faculty which is common to all the senses insofar as they all convey their information to it.

Avicenna and Averroes

Avicenna is the first philosopher to develop a systematic account of the internal senses and the roles they play in human and animal cognition. Avicenna offers detailed arguments derived from a set of general principles to justify the positing of each of the internal sense faculties.⁶ Among the most important of these are that different sorts of cognitive objects require distinct faculties to perceive them, and that perception and retention pertain to different faculties. The core innovation underlying the tradition of internal senses—the positing of the so-called "estimative faculty"—derives from the first of these principles. Avicenna contends that the objects of sense perception extend beyond the external sensible form's qualities that comprise the proper and common sensibles. The senses also convey information about what Avicenna calls *ma'ānī* or "intentions," as they are known from their medieval Latin translation.⁷ Avicenna initially explains what an intention is with an example: the sheep perceives the wolf as hostile or dangerous, even when she has never encountered a wolf before. The intention "hostility" is not a sensible quality: it is not the wolf's scent or shape, but some other non-sensible property which accompanies and is conveyed by its physical appearance. Since non-rational animals like sheep perceive these non-sensible intentions, they do not rise to the level of intelligibles. So they must be some third type of perceptual object and thus require a dedicated faculty of their own to perceive them. Avicenna calls this faculty

wahm or “estimation,” once again after its common Latin translation. Avicenna also evokes the estimative faculty’s grasp of intentions to explain the ability of animals to learn from experience as when dogs learn to fear objects not naturally harmful to them, like sticks that have been used to beat them.⁸

Once he has distinguished between forms and intentions, Avicenna then applies the remaining principles to yield a system of five internal senses, consisting of two perceptive and retentive pairs plus a combinatory faculty. The common sense is the perceiver of the proper and common sensibles, which are then stored in the imagery or “formative” faculty, the most basic type of sense memory. The estimative faculty, in turn, perceives non-sensible intentions, and the memorative or retentive power stores them. The fifth and final internal sense faculty is “imagination” (*al-mutakhayyilah*), and its role is to explain the soul’s ability to form new images, as occurs in dreaming and fictional creativity. When the intellect harnesses this faculty to aid in its operations of deliberation and inferential reasoning, the compositive imagination is called the “cogitative” or thinking faculty (*fikr*). For Avicenna, then, the cogitative faculty is not a distinct internal sense in its own right, but rather, a particular rational manifestation of imagination. Moreover, Avicenna holds that humans have estimative faculties in addition to the cogitative power, and he uses the presence of estimation alongside the intellect to explain the human propensity for making erroneous judgments even in the face of rational opposition.

While Averroes’s system of the internal senses may seem at first blush to be simply a streamlined version of Avicenna’s, his departures from his predecessor entail sharp differences in their understanding of how both animal and human perceptions work. And while a modern reader might see both Averroes and Avicenna as introducing multiple non-Aristotelian elements into their accounts, Averroes had good reason to see himself as restoring a more authentic Aristotelian psychology, since the four internal senses he retains all appear in the Arabic *Parva naturalia*, where they are localized in the brain following later medical tradition.⁹ These faculties are the common sense, which collects and collates information from the external senses; a single imaginative or formative faculty, which preserves this information; the cogitative or discriminative faculty; and the faculty of memory. Averroes rejects Avicenna’s estimative faculty as a superfluous innovation, arguing that imagination is a perceptive faculty, not merely a retentive one.¹⁰ Averroes nonetheless retains “intentions” as distinct cognitive objects from ordinary sensible forms. On his account, which reflects the use of the term in the Arabic *Parva naturalia*, to perceive an intention is to recognize the concrete individual or “core” underlying the physical qualities or “rinds” perceived by the senses.¹¹ The grasp of the intention requires a prior act of analysis on the part of the cogitative faculty to separate it from its rinds and make it available to memory. To illustrate the difference between the intention and sensible forms, Averroes identifies the forms as what a painter would depict of Zayd in a portrait of him—his size, shape, hair color, etc., whereas the intention is what we grasp in recognizing those features as belonging to the individual man, Zayd.¹² Moreover, since Averroes holds that the cogitative faculty is a distinctively human internal sense, it follows on his account that non-human animals do not have the ability to separate intentions from forms or images, and by the same token they lack a separate faculty of memory.

Augustine

Augustine discusses the soul’s sensory operations in several passages throughout his works. In an interlude woven into his proof for the existence of God in *On the Free Choice of the Will*, Augustine posits the existence of an “inner sense” in non-human animals. He argues that animal motion would be impossible if animals were aware only of their occurrent perceptions. Otherwise, animals would never pursue objects outside of their immediate perceptual range, since this depends on noticing that something they had perceived is now absent. There must, then, be an “inner

sense to which everything is conveyed” by the five senses. Since this form of awareness belongs to non-rational animals, Augustine concludes that the internal faculty in question cannot be reason, but must instead be some higher sensory power.¹³

Augustine also discusses sense perception in two later works, *On the Trinity* and the *Literal Commentary on Genesis*. In Book 11 of *On the Trinity*, Augustine seeks images of the Trinity in the cognitive capacities of the “outer human,” that is, the soul’s sensory powers, including imagination. Using vision as the paradigmatic case of sense perception, Augustine argues that images must be formed in every act of perception, although we are usually unaware of this except in deviant cases such as double vision. Once the soul actively fixes its attention on some object so as to see it, it immediately produces an image of that thing. The same account can, in turn, be invoked to explain memory, which for Augustine covers any act of retaining a likeness of an absent object. Since the production of an image is intrinsic to the act of sensation, once the sensible object is removed, its likeness remains in the percipient. It then becomes possible for the soul’s attention to be fixed on the preserved image itself as it once was on the external object, and thus to recall that object to mind. Augustine’s emphasis on the need for the percipient to fix her attention on the object shows him to be an adherent to an active theory of sensation, according to which sensation is not a matter of mere passive affection by an extramental sensible thing, but rather, it also requires the active input of the percipient in the production of the object.¹⁴ Augustine also endorses the active theory of perception in the *Literal Commentary on Genesis*, appealing to the platonic principle that lower faculties never act upon higher ones.¹⁵

The Internal Senses in the Later Middle Ages

Despite the considerable interest that the internal senses held for authors in the Latin tradition, they were seldom the focus of any dedicated discussions in their own right. Authors from the late twelfth to mid-thirteenth centuries often limited their considerations to cataloguing the different schemata of the internal senses within the psychological theories of Aristotle, the Arabic peripatetics, and patristic sources, without adjudicating among competing accounts. For later authors, the context and nature of the works in which the internal senses are discussed have a bearing on the issues that are taken up. Arts Masters teaching in the universities would sometimes introduce aspects of the internal senses into their commentaries on Aristotle’s *De Anima*, whereas theologians tended to appeal to the internal senses in a more fragmented way, the discussion being dictated by the broader theological topics under consideration.

A number of recurrent issues began to emerge as the process of assimilating the theories of the internal senses unfolded. The function of the common sense, the most basic of the internal senses, was often a focus of discussion, especially since it represented a point of contact between the Augustinian and Aristotelian traditions. As might be expected, medieval authors were especially fascinated by the Arabic accounts of intentions as a distinct category of sensory objects. Some authors embraced the concept of intentions and offered their own theories of what intentions are and how they fit into Aristotle’s classification of sensibles as proper or common, essential or incidental. Other authors dismissed the very idea that animals could perceive these allegedly “non-sensible” features of the physical world. They worried that the positing of an estimative faculty in animals seemed to blur the carefully drawn lines between sensory and intellectual cognitions, granting animals cognitive capacities beyond what was actually needed to account for their behavior. Finally, many later medieval authors came to be skeptical of the entire edifice of the internal senses. They questioned the multiplication of faculties proposed by the Arabic peripatetics, opting instead to return to the more parsimonious accounts of sense perception they found in Aristotle and Augustine.

The Common Sense and the Common Sensibles

Despite the similarities in their names, as we noted earlier, Aristotle does not link the common sensibles to the common sense in any direct way. Indeed, Aristotle spends some time arguing that there can be only five senses, and he explicitly denies that there is any sixth sense for the common sensibles. After all, the whole point about the common sensibles is that they are common to multiple senses. Aristotle also insists that the common sensibles are essentially sensible, that is, they are actually perceived by two or more of the external senses, unlike incidental sensibles. We literally see both color and shape, whereas we “see” Cleon’s son only metaphorically. Is the common sense part of the explanation of this distinction between essential and incidental sensibles?¹⁶ This was a question that many medieval authors raised in their discussions of the function of the common sense.

Aristotle’s allusions to a common sense serve to account for two phenomena: (1) the ability to discriminate between the objects of different external senses, for example, color and flavor, while nonetheless recognizing that the very same thing is both yellow and bitter; and (2) apperception or the awareness that we are sensing. Averroes, however, suggested that we could also appeal to the common sense to explain how the common sensibles are not incidental sensibles. In his *Long Commentary on De Anima*, Averroes offers two arguments for this point. The first anticipates the early modern distinction between primary and secondary qualities. Averroes asserts that the perception of the common sensibles is a necessary condition for the perception of the proper sensibles: in order to sense the proper sensibles of color and heat, for example, I must perceive them as determinate quantities of color and heat, quantity being a common sensible. By contrast, it is not necessary for me to perceive the white thing as Socrates or a snowball, or any other determinate individual. Averroes’s second argument is that the common sensibles are “proper to the common sense to the extent that they are proper to any sense.” The common sense, as the faculty to which all sensory information is channeled, has a certain proprietary claim over all the sensibles, since it is the only faculty that is affected by all of them essentially. Yet by using the term “proper” to make his point, the Commentator (as Averroes was known in the West) seems to have contradicted Aristotle’s explicit denial that the common sense has any proper objects of its own.¹⁷

These comments of Averroes became a standard point for a critical discussion among medieval authors in the thirteenth century. But before Averroes’s works became widely available, some medieval authors defended positions similar to his. John Blund (c. 1175–1248), who identifies Aristotle’s common sense with Augustine’s inner sense, goes so far as to assert that the common sensibles “are not sensed by any external sense, but rather by the inner sense which is the common sense.”¹⁸ Not only does Blund thereby make the common sensibles *proper* to the common sense, his view seems to entail that vision, touch, and so on do not themselves perceive motion and size at all, except perhaps incidentally. Blund also offers a creative blend of Augustinian and peripatetic views to construct new arguments for positing the common sense. A good example is his adaptation of the peripatetic theme that the senses themselves are unable to perceive their own activities, which Blund elaborates by drawing on the framework of Augustine’s active theory of sensation in *On the Trinity*. On this account, Blund argues, the external senses perceive only the images (*imagines*) that they construct when presented with their objects, and not the things themselves. But since vision, for example, contains no image of itself, a higher power, the common sense, must be posited to explain how we can sense that we are seeing.

Thomas Aquinas offers one of the earliest accounts of the common sense directed against the “inept” (*incompetens*) account of Averroes.¹⁹ Aquinas easily dispenses with Averroes’s claim that the common sensibles are proper to the common sense on the grounds that it flatly contradicts Aristotle’s own view. He also rejects as confused the argument that the proper sensibles depend

upon common sensibles, such as quantity. The fact that the proper sensibles can only subsist in a thing in virtue of its possession of quantity does not entail that we must *perceive* quantity in order to perceive color. If this were the case, Aquinas argues, fire, as the subject of heat, would be a common sensible perceptible by touch, whereas fire is not essentially sensible at all. It is instead an abstract, intelligible nature that is perceptible only incidentally.

After refuting Averroes, Aquinas offers an alternative account of the relation between the common sense and the common sensibles. Since the common sense is the point of convergence for all the perceptions of the external senses, its proper object is neither the common nor proper sensibles, but the modifications that these sensibles produce in the five senses. In this way, the common sense's role in sensible discrimination is reducible to its status as the locus of sensory apperception. The same mechanism also explains how the common sensibles are perceived. When sensible objects of different sizes, shapes, and locations affect the percipient's external senses, the common sense will be aware of these different sensory modifications, and thereby perceive the common sensibles. Despite his disagreement with the details of Averroes's account, for Aquinas too, the common sensibles are not directly perceived by the external senses, but rather, their perception is reducible to the common sense's higher-order awareness of the activities of the external senses.

Arguments similar to those of Aquinas appear in several anonymous *De Anima* commentaries from the Arts Faculty at the University of Paris.²⁰ While the authors of these commentaries are generally sympathetic with Averroes on his controversial views regarding the intellect, they take a surprisingly critical stance on his account of the common sense. Perhaps the most astonishing case is that of Anonymous Giele (c. 1270–1275), perhaps the most radical Latin Averroist of the thirteenth century. He rejects both of Averroes's arguments for the essential sensibility of the common sensibles on grounds similar to Aquinas. This author also accepts with Aquinas the modal interpretation of the common sensibles, according to which the common sensibles are reducible to the different ways in which the senses are impressed by their proper objects.²¹ Not all Arts Masters adopted the Thomistic modal account, however. Anonymous Bazán (c. 1272–1277) treats the common sensibles as concomitant properties that are conveyed alongside the proper sensibles: when I see a color, for example, I also sense magnitude and motion with it. This author also offers an interesting variation, evocative of the argument of John Blund, on the need to posit the common sense to account for apperception. He argues that the external senses are unable to sense their own actions because they are passive powers whose entire nature is to be “led by their external objects.”²² But since the operations of the senses are not external, but rather, internal, objects, a higher-order sense must be posited to explain apperception.

Averroes's arguments linking the common sensibles to the common sense were not universally panned by later authors. In the fourteenth century, Walter Burley (1275–1344) offered a sympathetic reading defending Averroes against his detractors.²³ Burley argues that common sensibles serve as the subject of the proper sensibles, and thus constitute their matter. But form and matter are the principles of action jointly, not in isolation. So what affects the senses essentially is not the proper sensibles alone, but the composite of the proper and common sensibles. Vision, for example, is affected not simply by color, but by a color of a specific shape and size, either moving or at rest, and so on. Burley also rejects Aquinas's charge that such an account confuses the ontological makeup of material objects with the conditions under which they are perceived, making the analogy between quantity and fire beside the point. Fire is a subject of heat insofar as this heat is something “out there” in the world, but magnitude is a subject of heat insofar as it is a sensory object that affects the organ of touch. If a proper sensible did not have magnitude, shape, and so on, it could not be sensed at all. But heat would have the same sensible effect on a percipient regardless of whether it was found in a fire or in a pot of boiling water. That is why fire is an incidental sensible, but quantity is not.

Estimation, Intentions, and Animal Minds

Most Western authors who accepted the need to posit multiple internal senses upheld a hybrid view in which elements of Avicenna's system were adopted alongside features of Averroes's account, often without explicit recognition of their incompatibility. By far, the most common departure from the original Arabic accounts of the internal senses is the restriction of estimation to non-human animals. The examples of sheep fleeing wolves and nursing their lambs seemed to capture the imagination of Western readers at the expense of the explanatory functions that estimation was meant to serve in the realm of human cognition. To make up for the missing internal sense in the human case, many Latin authors adopted Averroes's account of the cogitative faculty as a distinctively human internal sense, rather than Avicenna's view that it is simply the imagination under rational control. But since both Avicenna and Averroes accept intentions as cognitive objects in addition to the proper and common sensibles, Latin authors who construct these hybrid views also uphold the existence of intentions. Yet, these Latin authors diverge widely in their understanding of what intentions are and how they are grasped by the estimative and cogitative faculties.

John Blund views an estimative intention, such as the hostility of the wolf, as something existing in physical objects, that is, it is a real feature of the external world.²⁴ This raises a problem for Blund, however, since he assumes that every sensory object must also be a likeness (*similitudo*) of some property of the external object formed in the common sense by the proper senses. But since there is no likeness of the intention impressed on the common sense, as seems to follow from its inability to grasp the intention, from where will the estimative faculty of the sheep acquire it if not through her sensory encounter with the wolf? Blund resolves this puzzle by building perception or awareness into the very notion of a likeness. To say the intention is not present as a likeness in sensation and imagination is simply to say that they are unable to perceive the intention, because it is incompatible with their natural abilities (*non sunt nature concordantis*), that is, with the physiological makeup of their organs. This does not, however, entail that the intention appears out of nothing in the estimative faculty. The senses and the imagination are able to transmit the intention, but when it is present in them, it does not have the status of a likeness, since they cannot perceive it.

One of the most original accounts of the nature of estimative intentions is offered by Albert the Great. Albert devotes multiple chapters to the internal senses in both of his major works on philosophical psychology, the *Summa de homine* and the *Sententia de anima*. Albert's account is a notable example of the contraction of estimation to an animal power. On his view, estimation is to be understood as the analogue to the practical intellect in animals. Albert also offers a novel explanation of how intentions are perceived.²⁵ Albert holds that in abstracting the intention from the sensible form, estimation provides the animal with an awareness of the individual as such, and this, in turn, is what gives rise to the emotions of affection, fear, and so on that provoke the animal's responses. Albert remarks, "no wolf would ever have pity over its offspring unless it had knowledge both of this individual and of the fact that this individual is its offspring." But how does the intention confer this knowledge of individuals? Albert thinks that it is because the objects of estimation are "intentions" in the more general medieval sense of cognitive objects existing in the minds of their knowers. Thus, when Avicenna contrasts forms and intentions, Albert understands the form as a principle of being in the extramental thing, and the intention as the representation of that thing as a complete substance existing in the cognizer: "The intention is not a part of the thing like the form, but rather it is the representation (*species*) of the whole knowledge of the thing." Like Blund, Albert claims that the other external and internal senses are only able to perceive the aspects of the object that are compatible with their natures. But they do so in virtue of the entire perceived object affecting the percipient in some way. The unique ability of the estimative faculty, then, is to be able to recognize sensible representations as possessing intentional being in the percipient,

and this is what forms the basis of its ability to identify the object as an individual which is either beneficial or harmful to the percipient.

Albert's student Thomas Aquinas includes elements from both Avicenna and Averroes in his account of the internal senses concerned with intentions. Aquinas accepts the need to posit the estimative faculty to account for animal behavior, but unlike Avicenna, he limits estimation to non-human animals. In the *Summa Theologiae*, Aquinas argues that animals must have something like an estimative faculty in order to allow them to perceive the things necessary for their survival, citing the sheep-wolf example. Aquinas adds an interesting justification for differentiating intentions from other sensible forms. While the senses may perceive their proper objects as pleasant or painful, this is simply a reaction to the agreeableness or incompatibility of the object with the sense organ. We might think of it as an inchoate aesthetic judgment—some sounds are cacophonous, some colors are garish. By contrast, the grasp of intentions by the estimative faculty involves an awareness of their utility to the animal's overall well-being, which Aquinas attributes to a "certain natural instinct."²⁶

According to Aquinas, humans have a cogitative faculty instead of estimation, and that faculty is understood after the model of Averroes as "particular reason," that is, the ability to compare and differentiate individual as opposed to universal intentions. But exactly how are animal estimation and human cogitation analogous faculties? Aquinas elaborates on this point in the discussion of incidental sensibles in his *Commentary on De Anima*, where he considers the nature of intentions and their perception.²⁷ Aquinas argues that for any object to count as an incidental sensible, it must be cognized essentially at the time of perception by another faculty for which it is the proper object. Thus, if there are any incidental sensibles that are neither the proper sensibles of other senses (as when I "see" something sweet), nor universal intelligibles grasped by the intellect (as when I see a triangle in a proof of the Pythagorean theorem), then we will need to posit a third faculty by which these objects are essentially perceived. This is the function served by the estimative and cogitative powers. They grasp individual intentions, that is, they recognize singular things as concrete individuals. However, while both animal estimation and human cogitation perceive individual intentions, only the cogitative faculty is able to recognize the individual as "falling under some common nature," that is, as an instance of whatever sort of thing it is. Humans alone are able to perceive "this white thing" as "this human," or "this sugar cube," in virtue of the co-presence of the intellect. What does our sheep perceive when she grasps the intentions of the wolf or lamb? Taking his cue from the pragmatic nature of the standard examples, Aquinas claims that animals grasp individual intentions only to the extent that the individual in question is "the term or principle of some action or passion." A sheep knows her lamb not as "my baby," but simply as "something to be nursed," and she knows this plant not as grass, but simply as something to be eaten.²⁸ Aquinas offers a teleological justification for these limits: estimation is present in animals solely to aid in their survival. And for that there is no need to differentiate *individuals* for their own sake, but simply to recognize whether some individual thing is harmful or useful.

Despite his defense of the existence of the estimative faculty in animals, Aquinas ultimately seems to undermine the role that estimation originally played in recognizing the complexity of animal cognition. One possible factor contributing to this development may be the fusing of Averroes's and Avicenna's accounts of intentions that seems to dominate most of the accounts we have seen. Overall, Aquinas seems to agree with Averroes that the intentions grasped by the internal senses are representations of designated individuals, "thises." As such, intentions imply some sort of implicit grasp of the essences that these individuals instantiate, and that is something that Aquinas is unwilling to grant to animals even in an inchoate way.²⁹ But the explanatory power of animal estimation seems weaker on this account. To say that an animal perceives an individual as a terminus of some action or passion—as "edible" or "capable of inflicting harm"—seems to rest on at least as sophisticated an act of cognition as recognizing it as an individual of a certain kind.

It's not clear if Aquinas thinks that animals actually perceive hostility or friendliness in these cases. Moreover, it seems odd to balk at the idea that an animal could recognize an individual as *this*: experience would suggest that animals do discriminate between individuals—my cat can differentiate me both from a stranger and from a dog—but Aquinas's account seems unable to explain this insofar as it assumes that such recognition requires the grasp of a common nature that is the sole province of the intellect.

The worry that animal estimation encroaches on the intellect's territory comes to a head in a brief but well-known disagreement between two of Aquinas's successors, Henry of Ghent and John Duns Scotus. In the opening question of his *Summa of Ordinary Questions*, Henry defends the possibility of human knowers grasping the essences of created substances. One of Henry's arguments offers an analogy with the estimative faculty in animals to establish that *a fortiori* the intellect must have equivalent abilities.³⁰ Henry observes that even the senses are able to reach the non-sensible properties underlying the sensible appearances of material things, and to illustrate this he appeals to a variation on the standard Avicennian example of the sheep perceiving hostility in the wolf. Henry uses the metaphor of digging or "burrowing" (*fodiens*) to describe how the sheep perceives the wolf's hostility through its sensible appearance. Just as hostility is buried under the wolf's accidental forms of color, shape, and scent and uncovered by the digging of estimation, the wolf's substantial nature is also present under those same sensible accidents and able to be unearthed by the burrowing of the intellect. While Henry does not explicitly identify the non-sensed intentions that the sheep grasps from the wolf with its substantial form, his appeal to estimation to support the intellect's ability to grasp the substances of things suggests a strong continuity with Albert the Great's earlier attempt to explain intentions as representations of the whole perceived object, already present in the impressions on the senses but inaccessible to their limited perceptual grasp.

If the standard account of what animal estimation can do leads Henry to such a position regarding intellectual knowledge, Scotus's response is to deny that account.³¹ The embodied human intellect has no such access to substantial forms no matter how much digging it does, and animals certainly do not possess anything akin to such an ability. Scotus is openly derisive of the very idea of animal estimation, claiming that Henry is "adducing one falsehood to confirm another." Scotus then constructs an amusing thought experiment to undermine the traditional ovine examples of estimation. He asks us to imagine a sheep which is miraculously made to look like a wolf, and then consider whether the lamb would still judge the sheep to be lovable. Scotus thinks that would be absurd: a lamb will flee anything that *looks* like a wolf, whether it is harmful or not. Scotus also anticipates the obvious rejoinder to this thought experiment for those who hold the burrowing view of estimation: the intention of hostility is something distinct from the wolf's outer sensory appearance; yet, it is nonetheless always inextricably tied to *that* appearance and no other—and that is why the lamb will fear even its mother if she looks like a wolf. Scotus rejects this view since now the intention ceases to do any real explanatory work: why bother with the burrowing if one can explain animal behavior as a reaction to sizes, sounds, smells, and so on? Scotus's response to Henry implicitly seems to undermine as well accounts such as Aquinas's which differentiate between aesthetic and utilitarian perceptions of compatibility and revulsion. While the bee's attraction to the flower might involve a perception of the flower's utility for its honey-making task, on Scotus's view, one could eliminate this level of explanation simply by appealing to the bee's visual and olfactory attraction to the bright color and sweet scent of the flower.

William of Ockham expresses similar skepticism regarding the need for an estimative faculty, building on Scotus's thought experiment.³² Ockham envisages estimation as the animal version of abstractive cognition, in contrast to sensation, which provides intuitive cognition of the sensible forms of a present object. Estimation is then used as a counter-example to the claim that abstractive cognition always relies on a prior intuitive cognition of the same object. For it seems

that estimation cognizes the intention independently of any prior sensory intuition, “because the sheep knows the hostility of the wolf, not through [hostility’s] proper representation (*per speciem propriam*), but through the representation of something else (*per speciem alienam*),” that is, its external sensible appearance. Ockham rejects this view by simply eliminating intentions as distinct perceptual objects. Ockham argues that unless there is no way to explain animal behavior on the basis of reactions to the external appearances of things, positing a separate faculty with a new type of object is superfluous. If someone objects that this is not sufficient because not all animals react in the same way to the same objects (the cat fears the dog but not the mouse), Ockham responds that it is well-established that the same sensibles can cause diverse and even opposed reactions in a single subject. Ockham gives no example here, but presumably he has in mind such standard cases as the same flavor tasting bitter to a sick person and sweet to a healthy one. Ockham then repeats Scotus’s example of the sheep in wolf’s guise, agreeing with the Subtle Doctor that a lamb would flee its own mother in such a case. But then the lamb would not be fleeing because of her perception of hostility, since there is no hostility in her mother. Hence, the only cause of her flight must be the external guise her mother has been given.

Ockham provides one further counter-argument to the estimative faculty that rests on a conception of intentions different from those we have seen thus far. Where Albert, Henry, and Scotus viewed intentions as in some way bearing on the grasp of sensible objects as substances, Ockham instead observes that the standard examples of animal intentions, such as hostility and lovability, have the status of *relations*: “The hostility of the wolf does not name something absolute except the act of seeking to harm, or the power, or the nature in the power, for such an act of seeking, be it an active or a passive power.” Hostility is not some quality in the wolf like its color that is ready and waiting to affect the sheep who encounters it. And given that the capacity of the intellect to grasp relations is tenuous enough, assigning a special animal faculty to their perception is even more unwarranted: “But if hostility names a relation (*respectum*), it does not seem that a brute animal apprehends a relation, since the intellect can barely grasp one.”

If there is no such thing as animal estimation, how can we account for the obvious capacity of animals to learn from experience, without having recourse to objects like intentions? For Ockham accepts that many animals seem to have some form of practical cognition, as in dogs who appear to deliberate, and in the many cases of animals who seem to have a sense of time.³³ Ockham thinks that to account for this, all we need to posit are basic cognitive habits rooted in the animal’s ability to retain past sensibles which are no longer present to it, and consider them again at a later time. While this makes it seem as if animals have more complex cognitions, this cannot be the case, since animals lack the necessary apperceptive capacity to be aware that they have apprehended these same objects in the past.³⁴ While Ockham thus admits that animals learn from experience to the extent that they possess habitual knowledge, he says little about the mechanisms by which this comes about, and indeed he seems to suggest that even here the arguments are only persuasive (*probabiliter*). But it is hard to see how the mere retention of past perceptions could explain even the most basic forms of animal learning, unless animals had some ability to recognize the similarity between what they are now experiencing and what they have retained, or to make new connections between the information stored from a variety of different past experiences.

Many Senses or One?

The negative reactions to the estimative faculty exemplified in Scotus and Ockham represent one of the motivations that led many later medieval authors to pare down the number of internal senses. A number of different reductionist approaches can be found in diverse authors from the later thirteenth and fourteenth centuries. Perhaps the most radical and original is that of Peter John Olivi (1248–1298), a philosopher who is a maverick on many issues in both cognitive and

affective psychologies.³⁵ Olivi argues that the proliferation of senses that emerges with the advent of Arabic Aristotelianism is unnecessary: the various operations which are parceled out to distinct faculties are all the actions of a single internal sense power, which Olivi identifies with the common sense. Olivi's discussions of the internal senses are heavily inspired by Augustine, and since Augustine's inner sense corresponds most closely to the common sense of the peripatetics, it is not surprising that Olivi would opt for the common sense as the sole survivor of his reductionist project. But in addition to his appeal to Augustine's authority, Olivi offers many arguments to support the sufficiency of a single common sense, by systematically surveying each of the internal senses and explaining how they are best understood as aspects of the common sense.

Unlike critics of the estimative faculty, Olivi's views do not seem to rest on any skepticism about animal perception, or even a general concern that the activities assigned to the internal senses are not really sensory operations.³⁶ Instead, Olivi seems to reject the traditional principles of faculty differentiation and substitute new principles of his own which favor a more unitary account of sensation. For example, Olivi holds that one doesn't need distinct faculties for reception and retention; indeed, these must be the operations of one and the same faculty, since only the original perceiver is in a position to identify the retained object as the same one that it perceived in the past. Similarly, Olivi concedes that both humans and animals perceive something like intentions, and he even differentiates habitual or learned from innate or instinctual estimations.³⁷ But he argues that estimative judgments are a function of whatever perceives the sensibles themselves, since as even Avicenna conceded, hostility and other intentions always accompany images, and they require that the percipient recognizes the image as useful, harmful, and so on. But to recognize some object as manifesting some property can only be done by the faculty that perceives the object's sensory appearance—and that faculty is none other than the common sense. Olivi also anticipates Ockham's view that intentions such as the wolf's hostility have the character of relations.³⁸ For Olivi, however, this establishes that when the sheep perceives the hostility of the wolf, it must also perceive the two terms of that relation, the wolf and itself. And this again leads us back to the common sense as the percipient of both.

As to why he opts for the common sense as the sole internal sense faculty, Olivi appeals to its two Aristotelian functions of collating sensory information and apperception.³⁹ Olivi points out that all the functions assigned to other internal senses ultimately depend upon sensory information or are ways of reacting to it, whether that information is actually being perceived or has been stored from prior experience. So all that we need is a central processor which is aware of all the information that has been gathered by the senses. Since the common sense—as understood by both Augustine and the peripatetics—is the absolutely basic and necessary condition for all the subsequent operations delegated to the other internal senses, it is the most obvious candidate to survive Olivi's psychological downsizing.

A number of other authors from the later middle ages attempted their own reductionist programs. In the *De Anima* commentary of an anonymous master originally identified as John Buridan, a more modest paring down is offered as an alternative to the fourfold Averroist scheme of common sense, imagination, cogitation, and memory. Although Ps.-Buridan does not endorse either alternative himself, his proposal raises a new concern that will also be taken up by other authors. Why, the author wonders, do we need two distinct retentive powers, imagination for proper and common sensibles, and memory for intentions? Even if we grant that intentions require a separate faculty to grasp them, it does not seem that the mere preservation of intentions requires them to be kept apart from the sensory forms when they are not being considered.⁴⁰

More restricted schemes which pare the number of internal senses down to the bare minimum are evident in the authentic *De Anima* commentary of John Buridan (d. 1358/61), and in that of Nicolas Oresme (d. 1382). Buridan, like Olivi, sees no need to proliferate the internal senses beyond the common sense.⁴¹ Buridan argues that since the common sense is a superior power to the

external senses, it is able to perceive not only the sensible forms that they perceive, but also the non-sensible intentions traditionally assigned to estimation or cogitation. Buridan rejects the view shared by Aquinas and Ps.-Buridan that time is a non-sensible intention, arguing instead that it is a common sensible just like magnitude and motion, and thus within the purview of the external and common senses. So we do not need a separate faculty of memory to explain our sensory awareness of past time. Finally, Buridan manages to dispense with imagination by arguing that it is primarily a human faculty whose role is to supply images to the intellect to aid in intellectual thought.⁴² So it too can be viewed as yet another modality of the common sense, since its contents are nothing but what was once actually perceived by that power. Buridan thus concludes that “imagination,” “estimation,” and “memory” are simply different names given to the common sense when it performs these diverse operations.

Nicholas Oresme echoes a number of the themes found in his predecessors.⁴³ He argues explicitly that one needs to posit some internal sensory power beyond the external senses, offering as evidence a number of the traditional phenomena associated with various internal senses, such as the ability to make sensory judgments; the capacity to have sensory experiences, such as dreams, in the absence of actual sense perception; sensible discrimination; and apperception. Oresme then rehearses the fourfold Averroist system of internal senses, which he seems at first to endorse. While he does not use the label “intentions,” Oresme acknowledges that animals perceive non-sensible properties such as hostility and love.⁴⁴ Unlike Buridan, he preserves the distinction between two conserving powers, adding that both imagination and memory not only retain information, but also compose and divide the information they have stored. Despite this initially positive stance, at the end of his overview, Oresme judges the arguments he has rehearsed to be merely probable (*verisimilia*) inasmuch as they are primarily backed by authority. In conclusion, Oresme proposes that there might be only two internal sense powers, one cognitive or perceptive (*cognoscitiva*)—which is called by different names depending on the function it serves—and the other retentive (*reservativa*).⁴⁵ Thus, Oresme declares, “There doesn’t seem to be any need to posit more.”⁴⁶

Notes

- 1 Avicenna (1978: 97); for *phantasia*, see Aristotle, *DA* 3.3.
- 2 See Pines (1974); Daiber (1997: 36–41). Hansberger studied this text in her PhD thesis (2007) and is currently preparing an edition of the text. For accounts, see Hansberger (2008, 2010, 2018).
- 3 Aristotle *DA* 2.6.
- 4 Aristotle, *DA* 3.1; Augustine 1993, *On the Free Choice of the Will*, 2.3–5.
- 5 Aristotle, *DA* 3.2.
- 6 Avicenna (1959: 43–44, 1.5).
- 7 Much ink has been spelled over the proper translation of this term, which literally means “meaning” or “idea.” Hasse (2000: 132) suggests “connotative attribute,” and some recent scholars have adopted this suggestion, but I retain the traditional Latin calque.
- 8 Avicenna (1959: 163–164, 4.1 and 184–185, 4.3).
- 9 Hansberger (2018); see Hansberger (2019) for a fuller account of the relation between Averroes’s views and those of the Arabic *Parva naturalia*.
- 10 See Averroes (1954: 333–41), a text not available in the West until the second quarter of the fourteenth century; cf. Averroes (1974: 39).
- 11 Averroes (1974: 33, A42–43).
- 12 Averroes (1974: 41).
- 13 Augustine (1993: 34–39, 2.3s–5).
- 14 Augustine (1991: 303–318).
- 15 Augustine (1982: 200–201, 12.16, §33).
- 16 At *DA* 3.1 (425a27–28), Aristotle remarks that since we “already have a common sense” for the common sensibles, they will be proper rather than incidental sensibles.
- 17 Averroes (1953, 2.65); trans. Averroes (2009: 177–179). But compare 2.134, trans. (ibid.: 254–256), which seems more in keeping with the readings of Latin authors.

- 18 Blund (2013: 126–127).
 19 Aquinas (1999: 205–207, 2.13).
 20 I will refer to these commentators by the name of their modern editor.
 21 Anonymous (1971, q. 14); trans. Pasnau (2002: 74–76); the same criticisms of Averroes are offered in (ibid.: 232–234, q. 21).
 22 Anonymous (1971: 461–464, q. 39).
 23 See Burley (1971, §§36–37).
 24 Blund (2013: 136–142, c. 19, §§254–261). For an account of Blund and other early authors' views on estimation, see (Hasse 2000: 127–153).
 25 Albertus Magnus (1968: 167–168), Bk. 3, treatise 1, c. 2.
 26 Aquinas (2002: 73–77, 1.78.4).
 27 Aquinas (1999: 207–209), Bk. 2, c. 13.
 28 Aquinas's position is echoed by Anonymous (1971: 236–238, q. 23): “But the cogitative faculty in brute animals differs from that in humans, because in brutes the individual intention is only understood in relation to some task (*opus*), such that the plant is not understood by the sheep insofar as it is a plant, but insofar as it is edible.”
 29 An interesting contrast to this reluctance is found in the terminology of an earlier Arts Master (c. 1250–1260), who refers to the object of estimation as an *intelligible* form (*forma intelligibilis*). See Anonymous (2009: 156–157), Bk. 2, q. 64.
 30 Henry of Ghent (2008: 16–17, a. 1, q. 1, ad 7m).
 31 Scotus (2009: 29–30), *Ordinatio* Bk. 1, d. 3 p. 1 q. 1.
 32 Ockham (1970: 405–406, 410–412), *Ordinatio* 1.3.2.
 33 Ockham (1984: 313–316), *Reportatio*, 4.14, resp. ad 8m dubium.
 34 Ockham, following Scotus, holds that memory has a double object, namely, the thing remembered and my past act of perceiving it. See Ockham (1984: 278–317, 4.14); for Scotus, see Wolter and Adams (1993).
 35 Olivi (1924, qq. 52–67); see Toivanen (2007) for an overview.
 36 For Olivi on animals, see Toivanen (2011).
 37 Olivi (1924: 603, q. 64).
 38 Cf. Toivanen (2011: 420–421).
 39 Olivi (1984: 609–614, q. 66). Cf. Toivanen (2007: 452–453).
 40 Ps.-Buridan (1991: 646–653, q. 27).
 41 Buridan (1984: 373–389, q. 23).
 42 This account of imagination is also shared by Ps.-Buridan (1991: 752–753).
 43 Oresme (1995: 297–305, q. 21).
 44 Oresme identifies these properties as objects that have no sensible species. The contrast between *intentiones* and *species* also occurs in Anonymous (1963: 248). What seems to be happening is that Avicenna's use of *form* (*ṣūrah* = *formas insensatas* in this text) is being read as equivalent to *species* in the technical sense of a representation.
 45 On this view, “common sense,” “imaginative,” and “cogitative” are names for the cognitive functions, whereas “fantasy” is used for imagination as retentive.
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