

Thomas Aquinas

**Commentary on Aristotle's
De Sensu et Sensato**

tr. Kevin White

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PROLOGUE 436A1–B8

436a1 Since it was determined about soul in itself and each virtue from the point of view of it, the next thing is to make a consideration about animals, and everything that has life, as to what are their proper and what their common operations. Accordingly let the things that were said about soul be underlying, and let us speak about the rest, and first about what is first.

436a6 The greatest both of the common and of the proper features of animals are seen to be common to both body and soul.

436a8 For instance, sense and memory, and anger and desire, and appetite as a whole, and with these pleasure and pain. For almost all of these are present in all animals. And with these, some things that are common to everything that participates in life, and some to some of the animals. Of these, the greatest are four pairs in number, namely wakefulness and sleep, and youth and old age, and inhalation and exhalation, and life and death. About these it must be considered what each of them is and for what causes it occurs. But it also belongs to the

student of nature to discover first principles concerning health and sickness.

436a18 For it is impossible for either health or sickness to occur in what lacks life. Therefore, in general, in the case of most students of nature, and of the physicians who pursue the art more philosophically, the former finish with what belongs to medicine, but the latter begin medicine with what belongs to nature.

436b1 That all the abovementioned are common to soul and body is not unclear. For with respect to all, some take place together with the sense-power, some through the sense-power. And with respect to certain ones, some exist as affections of it, some as conditions, some as protections and benefits, and some as destructions and privations. And that sense is present in the soul by means of the body is clear both through discussion and apart from discussion.

Commentary

As The Philosopher says in *On the Soul* III, "just as things are separable from matter, so also is what pertains to intellect": 

for everything is intelligible inasmuch as it is separable from matter. Hence what is by nature separate from matter is of its very self intelligible in actuality; but what is abstracted by us from conditions of matter is made intelligible in actuality by the light of our agent intellect. And because the habits of a power are specifically distinguished according to differentiation of that which is the *per se* object of the power, the habits of the sciences, by which intellect is perfected, are necessarily distinguished according to differentiation of "the separable from matter," and so the Philosopher in

Metaphysics VI distinguishes genera of science according to different manners of separation from matter: what is separate from matter according to being and nature pertains to the metaphysician; what is separate from matter according to nature and not according to being pertains to the mathematician; and what includes sensible matter in its nature pertains to the natural philosopher. 

And just as different genera of science are distinguished according as things are in different ways separable from matter, so also in individual sciences, and especially in natural science, the parts of a science are distinguished according to different manners of separation and concretion. And because universals are more separate from matter, in natural science one proceeds from universals to what is less universal, as the Philosopher teaches in *Physics* I 

And so he began the teaching of natural science with what is most common to all natural things, namely movement and principles of movement, and from there proceeded by way of concretion or application of common principles, to determinate mobile things, some of which are living bodies.

Concerning these he also proceeded in a similar way, dividing this consideration into three parts. First he considered soul in itself, in an abstraction, as it were;

second he has a consideration of what belongs to soul according to a concretion or application to body, but in general; third he has a consideration that applies all this to individual species of animals and plants, determining what is proper to each species. Thus, the first consideration is contained in the book *On the Soul* ; the third consideration is contained in books that he wrote on animals and plants; the intermediate consideration is contained in books that he wrote on some things that pertain in common either to all animals, or to several kinds of them, or even to all living things, and the present intention involves these books.

Hence it must be considered that in *On the Soul* II Aristotle determined four levels of living things. The first consists of those that have only the nutritive part of soul, by which they are alive, namely plants. But there are some living things that, together with this, also have a sense-power but without progressive movement, namely imperfect animals, for instance shellfish. And there are some that have in addition forward local movement, namely perfect animals such as the horse and the cow. And some in addition have intellect, namely human beings. For although the appetitive part is held to be a fifth genus of powers of soul, it does not constitute a fifth level of living things, because it always accompanies the sensitive part. Now among these powers, intellect is the actuality of no part of a body, as is proved in *On the Soul* III, 

and so it cannot be considered by a concretion or application to a body or to any bodily organ, for its greatest concretion is in soul and its highest abstraction is in separate substances. This is why Aristotle did not write, in addition to the book on the Soul, a book On Intellect and the Intelligible, but if he had done so, it would not pertain to natural science, but rather metaphysics, to which consideration of separate substances belongs. But all other parts of soul are actualities of parts of a body, and so there can be a special consideration of them by application to a body or bodily organs beyond the consideration made of them in the book "On the Soul."

Accordingly this intermediate consideration must be divided into three parts. One includes what pertains to a living thing inasmuch as it is living. This is contained in the following: the book that he wrote *On Life and Death* , in which he determines about "Inhalation and Exhalation," by which life is preserved in some living things, and about "Youth and Old Age," by which the stages of life are differentiated; likewise the book entitled *On Causes of Length and Shortness of Life* , and the book that he wrote *On Health and Disease* , which also pertain to the disposition of life; and also the book he is said to have written *On Nutrition and the Nourishing* . We do not yet have these last two books.

Another part of the consideration pertains to the moving part of soul This is contained in two books: the book *On the Cause of Movement of Animals* ; and the book *On the Progression of Animals* , in which there is a determination about the parts of animals adapted for movement.

The third part of the consideration pertains to the sensitive part of soul, concerning which consideration can be made, first, of what pertains to the act of the internal or of the external sense-power, and to this extent consideration of the sensitive part is contained in the present book, which is entitled *On Sense and What Is Sensed* , that is, "On the Sensitive Part and the Sensible Object," in which is also contained the treatise "On Memory and Recollection." Again, what causes the difference between sensing and not-sensing that is brought about by sleep and wakefulness also pertains to consideration of the sensitive part, and this is determined in the book entitled *On Sleep and Wakefulness* .

But because one should pass through the more similar to the dissimilar, the order of these books seems reasonably to be such that after the book *On the Soul* , in which it is determined about soul in itself, there immediately follows the present book *On Sense and What Is Sensed* , because sensing itself pertains more to soul than to body. Next in order should be the book *On Sleep and Wakefulness* , which imply binding and freeing of the sense-power. Then follow the books that pertain to the moving part, which is next closest to the sensitive part. And last in order are the books that pertain to the general consideration of a living thing, because this consideration to the greatest extent involves bodily disposition.

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436a1 Accordingly the present book, which is entitled *On Sense and What Is Sensed* , is first divided into two parts: a prologue, and the treatise, which begins where he says *About sense and sensing* (Chapter 1, 436b8).

On the first point he does two things. First he makes clear his intention, showing what is to be treated. Second he gives the reason why it is necessary to treat of such things, where he says *The greatest* (436a6).

Accordingly he first says that *it was already determined about soul*

in its very self in the book *On the Soul* , that is, where he defined soul. Again, it was subsequently determined about

*each virtue
from the point of view
of it* . 

—that is, power—of it, I mean

For since powers of soul, apart from intellect, are actualities of parts of a body, there can be consideration of them in two ways: in one way according as they pertain to soul as certain powers or “virtues” of it, and in another way from the point of view of body. Accordingly it was determined about powers of soul themselves from the point of view of soul itself in the book *On the Soul*, but now

*the next thing is to
make a consideration
about animals, and
everything that has*

life —which he adds because of plants—namely, by determining

*what are their proper
operations*

—that is, proper to particular species of

animals and plants—*and what are
common*

—that is, common to either all living things, or all animals, or many kinds of animals. *Accordingly let*

*the things that were
said about soul be*

underlying , or supposed—that is, let us use them in what follows as suppositions that have already been explained. *And*

*let us speak about the
rest, and first about*

what is first —that is, first about what is common

and after about what is proper: for that is the order required in natural science, as was determined at the beginning of the book *The Physics* . 

436a6 Then, when he says *The greatest* , he shows the necessity of this subsequent consideration.

If the proper as well as common operations of animals and plants were proper to soul itself, the consideration of soul would suffice for this purpose; but because they are common to soul and body, it is necessary, after the consideration of soul, to determine about them so that it may be known what kinds of bodily dispositions are required for these operations or affections. And so the Philosopher here shows that all of them are common to soul and body.

On this point he does three things. First he presents what he intends. Second he enumerates the features with which the intention is concerned, where he says

For instance, sense and

memory (436a8). Third he proves the proposal, where he says

That all the

abovementioned

(436b 1).

Accordingly he says first that *of the features* that pertain to *animals* and plants, those that are *greatest* —that is, the outstanding ones—whether they are *common* to all animals or several, or *proper* to individual species, *are seen*, even at very first sight, *to be common to soul and body*. Hence they require another consideration beyond the one about soul taken absolutely.

436a8 Then, when he says *For instance, sense and memory*, he enumerates the features with which the intention is concerned.

First he presents what pertains to the sensitive part, namely *sense and memory*. He makes no mention of the other sense-powers, namely imagination and the estimative power, because these are not distinguished from sense from the point of view of the thing known, since they are of present things, or of things taken as present. But memory is so distinguished by the fact that it is of past things inasmuch as they are past. 🗨️

Second he presents what pertains to the locomotive part. Now the proximate principle of movement in animals is sensitive appetite, which is divided into two powers, namely “irascible” and “concupiscible,” as was said in On the Soul III. 🗨️

Accordingly he mentions *anger*, which pertains to the irascible power, and *desire*, which pertains to the concupiscible. It is from these two passions, as from what is more evident, that the two powers are named: for the concupiscible power is named from “desire” and the irascible power from “anger” (*ira*). 🗨️

But because there are other passions of the soul pertaining to the appetitive power, he adds *and appetite as a whole*, to include everything that pertains to the appetitive power. But all passions of the soul, whether they are in the irascible or the concupiscible power, are followed by pleasure and pain, as is said in Ethics II. 🗨️

And so he adds, *and with these, pleasure and pain*, the final and ultimate passions, as it were.

He adds that *these* features that have been enumerated are *almost all* found in *all* kinds of *animals*. He says “almost all” because most of them, namely sense, desire, appetite, and pleasure and pain, are found in all animals, perfect as well as imperfect. For imperfect animals have, of the senses, only touch; they also have imagination, desire, and pleasure and pain, although these are indeterminate in them; and they are moved in an indeterminate way, as was said

in *On the Soul*

III. 

But memory and anger are not found in them at all, but only in perfect animals.

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The reason for this is that not everything belonging to a lower genus, but only what is highest or more perfect, achieves a participation of likeness in what is proper to a higher genus. 

Now the sense-power differs from intellect and reason because intellect or reason is of universals, which are everywhere and always, but the sense-power is of individuals, which are here and now. And so sense, according to its proper nature (*ratio*) is apprehensive only of what is present. But if there is a power of the sensitive part that extends to something not present, this is according to participation by likeness in reason or intellect. Hence memory, which is able to know things past, belongs only to perfect animals, being something supreme in sensitive knowledge.

Likewise, the sensitive appetite that follows from sense is, according to its proper nature (*ratio*) appetite for what is pleasant according to sense, and this appetite pertains to the concupiscible power that is common to all animals. But if an animal tends by appetite to something laborious, such as fighting or something similar, this contains a likeness to rational appetite, to which it is proper to desire some things for the sake of an end that are not in themselves desirable. And so anger, which is appetite for retribution, belongs only to perfect animals, because of an approach to the genus of what is rational.

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436a11 Then he presents what pertains in any way to the nature of life.

He says that *with* the foregoing, other features are found in animals, *some* of which *are common to everything that participates in life* , that is, not only animals but also plants; but some pertain only *to some kinds of animals* . And the outstanding *of these* are listed in four pairs. The first pair he presents is *wakefulness and sleep* , which are found in all animals, but not in plants. The second is *youth and old age* , which are found in animals as well as plants, for the life of anything subject to death and birth is divided into different ages. The third is *inhalation and exhalation* , which are found in certain kinds of animals, namely all that have lungs. The fourth is *life and death* , which are found in all living things in this lower world. And he says that *about* all of *these it*

*must be considered
what each of them is
its cause.*

, and what is

436a17 Because he said that the abovementioned features are the .greatest," he adds something about some that are not so outstanding namely health and disease, which are not both found in all individual of the genera in which they exist by nature, as does happen with th(abovementioned, but which are by nature found in all living things, animals as well as plants.

He says that *it also* pertains to the natural philosopher
to discover first and universal
principles of health and

sickness . Consideration of particular principles pertains to the physician, the artisan who makes health, as it pertains to any operative art to consider particulars about its own business, because operations take place in particulars.

436a18 He proves in two ways that the former consideration does pertain to the natural philosopher, where he says *For it is impossible* (436a18).

First he does so by argument. *Health or sickness* can be found only *in what has life* , from which it is clear that the living body is the proper subject of health and disease. But the principles of a subject are also the principles of its proper attribute (*passio*). Hence, since it pertains to the natural philosopher to consider the living body and its principles, he must also consider the principles of health and disease.

Second he proves the same thing by a sign or example that he concludes to from an argument that he presents. *Most* natural philosophers
finish their study *with what*

belongs to medicine , and likewise

most physicians —that is, those *who*

pursue the art of medicine *more*

philosophically , not only applying

experience, but inquiring into causes—*begin* their consideration of

medicine with what is natural. From this it is clear that consideration of health and disease is common to both physicians and natural philosophers.

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The reason for this is that health is sometimes caused by nature alone, and because of this it pertains to the consideration of the natural philosopher, to whom it belongs to consider the workings of nature; but sometimes it is caused by art, and in this respect it is considered by the physician. But because the art causes health not principally, but by as it were helping nature and ministering to

it, the physician necessarily gets the principles of his science from the natural philosopher as from one who is prior, as a ship's captain gets his principles from an astronomer. This is the reason why physicians who pursue their art well start with what belongs to natural philosophy.

But anything artificial that is made by art alone, for instance a house or a boat, in no way pertains to the natural philosopher's consideration, just as what is made by nature alone in no way pertains to the consideration of art except inasmuch as art makes use of a natural thing.

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436b1 Then, when he says *That all the abovementioned*, he proves the proposal, namely *that all the abovementioned are common to soul and body*.

He uses the following argument. All the abovementioned pertain to the sense-power. But the sense-power is common to soul and body, for sensing pertains to the soul through the body. Therefore all the abovementioned are common to soul and body.

He makes the first premise clear by an induction, as it were. of the abovementioned features, *some take place together with the sense-power*, namely those that pertain to sensitive apprehension, such as sense, imagination, and memory. Some take place *through the sense-power*, for instance those that pertain to the appetitive power, which is moved by the apprehension of sense-power. Of the others, which pertain even more clearly to the body, some are *affections* of the sense-power, namely sleep, which is a binding of sense-power, and wakefulness, which is its freeing; some are *conditions* of the sense-power, namely youth and old age, which have to do with whether the sense-power is in good condition or is weak; some are *protections* of of *and benefits* to the sense-power, namely breathing, life, and health; and some are *destructions and privations* of it, namely death and sickness.

He says that the second premise, that sense is common to soul and body, *is clear* both by argument and without argument.

The argument is ready to hand. Since a sense-power is affected by something sensible, as was shown in the book *On the Soul*, ,

and sensible things are bodily and material, what is affected by the sensible is

necessarily bodily.

Even without argument this is clear from experience, because if the bodily organs are disturbed, the operation of the sense-power is impeded; and if they are removed, the sense-power is completely removed as well.

CHAPTER 1

436B8–437A19

436b8 About sense and sensing—what it is and why this affection occurs in animals—something was said before in the discussions On the soul.

436b10 Any animal as animal necessarily has sense-power, for by this we determine that something is an animal or non-animal.

436b12 Taking each of them by itself, touch and taste accompany all necessarily, touch for the cause stated in the discussions On the soul, but taste because of food: for by this it distinguishes the pleasant (good-tasting) and unpleasant (bad-tasting) with respect to food, so as to avoid the latter, but pursue the former. And in general, flavor is the affection of the nutritive part of soul.

436b18 But the senses that go through what is external—such as smell, hearing, sight—are in those of them that advance. And they are in all that have them because of health, so that, pre-sensing, they might pursue food, but avoid what is bad and harmful.

437a1 And they are in those that have prudence for the sake of the “well”: for they announce many differences, from which there arises in them discernment of what can be contemplated and what can be done.

437a3 Of these, sight is better for what is necessary and of itself, but hearing for understanding and by accident.

437a5 For the power of sight announces many and many kinds of differences, because all bodies participate in color. Hence the common objects are also better perceived by this; I call size, shape, movement, and number “common.” But hearing announces only differences of sound, but to a few also those of voice.

437a11 But by accident hearing contributes a greater share to prudence. For discussion, being audible, is a cause of learning, not in itself but by accident; for it consists of words, and each of the words is a symbol. Hence of those deprived from birth of one of the two senses, the blind are wiser than deaf-mutes.

437a18 The power that each sense has has now been discussed.

Commentary

436b8 Having presented a prologue in which he has shown his intention, here the Philosopher begins to follow up his proposal.

First he determines about what pertains to the external sense-power. Second he determines about certain things pertaining to inner sensitive cognition, namely memory and recollection, where he says *About memory and remembering* (449b4), for the treatise On memory and recollection is part of the present book according to the Greeks.

On the first point he does three things. First he takes up some things that were said about the sense-power in the book *On the soul* and that are to be used as suppositions, as was said above. Second, he determines the truth that he intends about the workings of the senses and of sensible objects, where he says *At present some inquire* (Chapter 2, 437a19). Third, he solves certain difficulties about the foregoing, where he says *But someone will raise an objection* (Chapter 14, 445b3).

On the first point he does two things. First he states what was said about the sense-power in the book *On the soul*. Second he takes up some of these points, where he says *Any animal as animal* (436b 10).

Accordingly he first says that in the book on the soul, something was said about sense and sensing—that is, about the sensitive power and its act. Two things were said about them, namely what each of them is, and the cause why they occur in animals. He calls sensing an “affection” (*passio*) because the action of sense comes about in a being-affected (*paciendo*), as was proved in *On the Soul* II. 

Near the end of *On the Soul* II he showed what sense is and why animals sense by the fact that animals are able to receive the forms of sensible things without matter. 

436b 10 Then, when he says *Any animal as animal*, he takes up three things that were said about sense in the book *On the Soul*. The first pertains to sense in general. The second pertains to the senses that are common to all animals; he takes this up where he says *Taking each of them by itself* (436b12). The third pertains to the other senses, which are found in perfect animals; he takes this up where he says *But the senses that go through what is external* (436b 18).

Accordingly he first says that every animal, inasmuch as it is animal, necessarily has some sense-power: for the nature (*ratio*) of animal, by which it is distinguished from what is non-animal, consists in its being sensitive.

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The reason is this. An animal reaches the lowest level of knowing things, which surpass things that lack knowledge by being able to contain several beings in themselves, by which their power is shown to be more open and to extend to more things. And inasmuch as a knower has a more universal grasp of things, its power is more absolute, immaterial, and perfect. Now the sensitive power that is in animals is certainly open to what is outside, but only in the singular. Hence it also has an immateriality inasmuch as it is receptive of forms of sensible things without matter, but it has the lowest immateriality in the order of knowers, inasmuch as it can receive these forms only in a bodily organ.

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436b12 Then, when he says *Taking each of them by itself* he presents what pertains to the senses that are common and necessary to animals.

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On this point it must be considered that the senses that are common and necessary to every animal are those that apprehend what is necessary to an animal. Now there are two ways in which something sensible is necessary to an animal: in one way inasmuch as the animal is a mixed body, composed of the four elements, and thus there is necessary to it the required balance of hot and cold, moist and dry, and other such differences of mixed bodies; and something else is necessary to the animal inasmuch as its body is a living thing capable of being nourished, and thus suitable food is necessary to it. By the contraries of these an animal is destroyed. And although the first is necessary to every mixed body, and the second is also necessary to plants, an animal has something more than these in being able to have knowledge of what is necessary, for the reason already stated, according to the level of its nature. Accordingly, in order for it to apprehend what is necessary or harmful to it according to its nature (*ratio*) as a mixed body, it has the sense of touch, which apprehends the above-mentioned differences; and in order for it to apprehend suitable nourishment, the sense of taste is necessary to it, by which it apprehends what tastes good and bad, which are signs of suitable and unsuitable nourishment.

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This is why he says that touch and taste necessarily accompany all animals. Concerning touch, the cause was given in the book *On the soul*, namely that touch is cognitive of the things of which an animal is

composed. But taste is necessary to an animal because of food, because by taste an animal distinguishes the pleasant and unpleasant, or good-tasting and badtasting, in food, so as to pursue one of these as suitable and avoid the other as harmful. And flavor as a whole is the affection of the nutritive part of soul—not that it is the object of the nutritive power, but that it is directed to the act of the nutritive power as its end, as was said.

But Alexander says in the commentary that in some manuscripts in Greek the text reads: “flavor is the affection of the tasting part of the nutritive part of the soul.”



For flavor is apprehended by taste, which is ordered to nourishment.

436b 18 Then when he says *But the senses that go through what is external*, he follows up on the senses that are only in perfect animals.

First he gives the general cause of these senses being in all animals of this kind. Second he gives the special cause of their being in the more perfect of them, where he says And they are in those that have prudence (437a1).

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On the first point it must be known that animals are called “perfect” in which there is not merely a sensitive part without forward movement, as in oysters, but which in addition have a moving part with respect to forward movement. And it must be considered that such animals surpass imperfect, that is, immobile animals as the latter surpass plants and other mixed bodies: for plants and inanimate bodies have no awareness of what is necessary to them; immobile animals have knowledge of what is necessary only inasmuch as it is immediately presented to them; but forward-moving animals also receive knowledge of what is necessary front a distance, and so they more closely approach intellectual knowledge, which is not confined to the here and now.

And just as in all animals taste is ordered to knowing the necessary pertaining to nourishment inasmuch as it is immediately presented, so smell is ordered to knowing it front a distance as well. For odor and flavor have an affinity, as will be said below, 

and just as by flavor the suitability of food taken in is known, so by odor the suitability of food at a distance is known. But the other two senses, sight and hearing, are ordered to knowing from a distance everything necessary or harmful to an animal, whether in its nature (*ratio*) as a mixed body or in its nature as a living body capable of being nourished, for it is clear that by sight and hearing animals avoid whatever is harmful and pursue what is healthy.

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And so he says that the senses that are actualized through external media, as

was said in *On the Soul*

II, 

namely smell, hearing, and sight, are in those among the animals that advance—that is, move with forward movement—in all of them for one general cause, namely because of health—that is, so that they might know what is necessary from a distance, just as by taste and touch they know it when present. And he adds: *so that, pre-sensing* —that is, sensing from a distance—they might pursue suitable food and avoid whatever is bad and harmful. For instance, a sheep flees a wolf as something harmful, but a wolf pursues a sheep that is seen, heard, or smelled, as suitable food.

437a1 Then, when he says *And they are in those that have*

prudence, he gives another, specific cause why these senses are in some more perfect animals.

First he presents this cause. Second he compares the senses with reference to the causes mentioned, where he says *Of these, sight is better* (437a3).

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On the first point it must be considered that prudence is directive in what is to be done. Universal prudence is directive with respect to anything to be done whatsoever, and so it is in none of the animals except human beings, who have reason, which is able to know universals. But there are certain particular prudences in other animals for certain predetermined acts, for instance in the ant, which in summer gathers food on which it lives in winter.

Now the above-mentioned senses, but especially hearing and sight, are advantageous to animals for particular prudences of this kind, and to human beings for universal prudence, in order that something might be done well. But smell seems to be wholly subservient to the need for nourishment, and not at all to prudence, and so this sense is extremely weak in all those who have perfect prudence, as is said in the book *On the soul*. 

He shows how the above-mentioned senses serve prudence by the fact that they show many differences among things, from which the human being goes on to discern what can be contemplated and what can be done. For by sensible effects the human being is raised to consideration of what is intelligible and universal; and also by what is sensible—that is, by what he has heard and seen—he is instructed about what is to be done. Other animals do not participate in any contemplation, although they do participate in action in a particular way, as is said in *Ethics* X. 

These two senses announce many differences because their objects are found in bodies as consequences of what is common to all bodies, both lower and higher. For color is a consequence of light and the transparent

(*dyaphanum*), which lower bodies have in common with the heavenly body; and sound is a consequence of local movement, which is also found in both kinds of body. But odor is a consequence only of the mixed bodies by which an animal is naturally nourished.

437a3 Then, when he says *But of these, sight is better*, he compares sight and hearing with reference to the above-mentioned causes.

First he presents the comparison. Second he proves it, where he says *For the power of sight* (437a 5).

On the first point he says that sight surpasses hearing in two ways. In one way with respect to what is necessary, for instance in seeking food and avoiding what is harmful, things that are apprehended with more certainty by sight, which is altered by things themselves, than by hearing, which is altered by sounds, which are consequences of the movements of some things. in another way sight is also of itself superior to hearing, because it is more able to know, and able to know more things, than is hearing. But hearing surpasses sight inasmuch as it serves understanding, although this is by accident, as will be shown below.

437a5 Then he clarifies what he said, where he says *For the power of sight announces*.

First that sight is in itself better. Second that hearing is better accidentally, where he says *But by accident hearing contributes* (437a 11).

Accordingly he first says that sight is in itself better because the power of sight by its apprehension announces to us in many differences among things and among various kinds of things. This is because its object, which is the visible, is found in all bodies: for a thing becomes visible by the transparent being illuminated in actuality by a shining body, and the lower bodies have this in common with the higher ones. And so he says that all bodies participate in color, the higher as well as the lower ones, because in all bodies either there is color itself in its proper nature (*ratio*) in the case of bodies in which there is a bounded transparent; or there are at least the principles of color, which are the transparent and light. And so more things are manifested by sight than by hearing.

Also, the common sensibles are better known by this sense, because inasmuch as sight has a power of knowing that is more universal and extends to more things, it is more effective in knowing, because the more universal any power is, the more powerful it is. And those are called "common" sensibles that are known not by one sense only, as are the proper sensibles, but by several, for instance size, shape, movement, and number. For the qualities that are the proper objects of

the senses are forms in a continuum, and so the continuum itself, inasmuch as it is the subject of these qualities, must move the sense-power not accidentally, but as the per se and common subject of all sensible qualities. And all the so-called common sensibles do in some way pertain to the continuum: whether with respect to measurement of it, in the case of size; or with respect to division of it, in the case of number; or with respect to limitation of it, in the case of shape; or with respect to distance and nearness, in the case of motion.

But hearing announces to us only differences among sounds, which are not found in all bodies, and are not expressive of the many diversities of things. But to a few animals hearing does show differences of voice. Voice is sound projected with an imagining from an animal's mouth, as is said in *On the soul* II, 

and so the voice of an animal as such naturally indicates the animal's inner feeling (*passio*), as the barking of dogs indicates their anger. Thus the more perfect animals know one another's inner feelings from voices, a knowledge that is not in imperfect animals.

Therefore hearing of itself knows only differences among sounds, such as high and low and so on, or differences among voices inasmuch as they are indicative of various feelings. And so the knowledge of hearing does not of itself extend to as many differences among things as does that of sight.

437a11 Then when he says But by accident hearing contributes, he shows that hearing is accidentally better for understanding.

He says that hearing contributes much to prudence. Here "prudence" is taken to mean any intellectual knowledge, not just "right reason about possible action," as it is described in *Ethics* VI. 

But this is by accident, because discussion, which is audible, is a cause of learning not of itself—that is, not by differences themselves among sounds—but by accident, that is, inasmuch as words of which discussion (*sermo*)—that is, speech (*locutio*) is composed are symbols—that is, signs—of meanings (*intentiones*) understood, and consequently of things. Thus a teacher teaches a student inasmuch as, through discussion, he signifies what his intellect conveys to the student. And a human being can know more by learning from someone else, for which hearing is useful, even though accidentally, than he can by discovering for himself, for which sight is especially useful.

Hence it is that, among those deprived from birth of one of the two senses—that is, sight or hearing—the blind, who lack sight, are wiser than deaf-mutes, who lack hearing. He adds "mutes" because everyone who is deaf from birth is necessarily mute, for he cannot learn to form the signifying words that signify by convention, and so he stands in relation to the speech of the whole human race

as one who has never heard a particular language stands in relation to that language. But it is not necessary, conversely, that every mute be deaf, for it can happen that someone is mute from some other cause, for instance obstruction of the tongue.

437a18 Finally, adding an epilogue, he concludes that the power that each sense has has been discussed.

CHAPTER 2

437A19–438A5

437a19 At presentsome inquire about the organs of the body in which these are actualized with reference to the elements of bodies. But not being able to adapt them to four, since there are five, they are concerned about the fifth.

437a22 But all of them have sight be made of fire, because they do not know the cause of a certain affection: when the eye is squeezed and moved, fire seems to shine. This happens in darkness, or when the eyelids are lowered, which also makes it dark.

437a26 But this presents another difficulty. For if something visible cannot escape the notice of one who is sensing and seeing, it will be necessary that the eye always be seeing fire. Why then does it not happen when it is at rest?

437a30 Now the cause of this—both for the objection and for the view that sight is made of fire—is to be understood as follows. Smooth things naturally shine in darkness, but they do not produce light; and the so-called black part and center of the eye is smooth. And what appears, appears to an eye that is moved because what happens is that what is one becomes as though it were two, and the speed of the movement makes it seem that what sees and what is seen are different. Hence it does not happen unless quickly.

437b5 This happens in darkness, for a smooth thing in darkness naturally shines, as do certain heads of fish, and the ink of the cuttlefish. And when the eye is gently moved, it does not happen that what sees and what is seen seem simultaneously to be one and two. But in the other case, the eye itself sees itself, as it does in refraction.

437b10 If it were fire, as Empedocles says, and as is written in the *Timaeus*, and seeing took place by a light going out, the way it does from a lamp, why does sight not also see in darkness?

437b14 To say that in going ont it is "extinguished" in darkness is

completely foolish.

437b15 For what is "extinction" of light? What is hot and dry is extinguished by either moisture or cold, as can be seen in the case of the embers of a fire, and flame. But neither appears to be the case with light.

437b19 If it were the case, but the light escapes our notice because of "weakness," it would have to be extinguished by day, and in water, and it would be more darkened where there is ice, for flame and burning bodies are affected in this way. But no such thing happens in this case.

437b23 Empedocles seems to think, as was said before, that seeing takes place by light going out. For he says:

As when someone contemplating going out on a winter night prepares a lamp, he kindles a light of burning fire in such a way as to block the force of all winds, for he deflects the breath of blowing winds.

But the light breaks out: however farther it expands it illuminates with rays subdued by a covering—

Likewise ancient light guarded in membranes—fine linens pours out around in a circle through the pupil, which will reveal a depth of water flowing around.

But the light comes out, however farther it expands.

Sometimes, then, he says that seeing is like this,

but sometimes that it takes place by emanations from what is

seen.

Commentary

437a19 After The Philosopher has summarized what is necessary for the present consideration of sensitive powers themselves, now he proceeds to his principal proposal in this book by applying the consideration of sense-powers to what is bodily.

First with respect to sense-organs. Second with respect to sensible objects, where he says *Concerning sensible objects* (Chapter 5, 439a6).

On the first point he does two things. He assigns sense-organs to elements, first disproving arguments of others; second determining what might more probably be the case, where he says *If, then, what happens in these cases* (Chapter 4, 438b 16).

On the first point he docs two things. First he touches in general on the way in

which the Ancients assigned sense-organs to elements. Second he focuses specifically on the organ of sight, about which many were mistaken, where he says *But all of them have sight be made of fire* (437a22).

Accordingly he first says that previous philosophers asked, with reference to the elements of bodies, What are the kinds of bodily organs in which, and by which, the operations of the sense-powers are exercised?

They did so because, as was said in *On the Soul* I, they held that like is known by like, and hence they held that the soul itself has the same nature as the principles of things, so that thereby it might know all things, being as it were conformed to all things, since all things share in the principles.



For the same reason they assigned sense-organs to elements of bodies, because all bodily things are known through sense-organs. But immediately one difficulty occurred to them: there are five senses and four elements. And so they looked for something to which they could assign the organ of the fifth sense.

Now between air and water there is an intermediary, denser than air but finer than water, which is called "smoke" or "vapor," and some held that it is also a first principle, to which they assigned the organ of smell, since odor is perceived by means of a smoky evaporation. And they assigned the other four senses to the four elements: touch to earth, taste to water (since flavor is perceived by means of moisture), hearing to air, and sight to fire.

437a22 Then, when he says *But all of them have sight be made of fire*, he proceeds specifically to the organ of sight, which they assigned to fire.

First he disproves the cause they gave for their position. Second he disproves the position itself, where he says *If it were fire* (437b 10).

On the first point he does three things. First he presents the cause that moved some to assign the organ of sight to fire. Second he raises a difficulty, where he says *But this presents another difficulty* (437a26). Third he determines the truth about both points, where he says *Now the cause of this* (437a30).

Accordingly he first says that all who assign the organ of sight to fire do so because they do not know the cause of a certain affection that occurs in the eye: if the eye is pressed and forcefully moved, it seems that fire shines. if the eyelids are open, this happens only when the surroundings are dark; it also happens when the surroundings are bright if the eyelids are first closed, because thus one

makes it dark to the closed eye. They thought that this affection is a clear sign that the organ of sight pertains to fire.

437a26 Then, when he says But this presents another difficulty, he raises a difficulty about the foregoing.

For it is clear that a sense-power apprehends a sensible thing that is present, and hence that sight apprehends a visible thing that is present; and fire, because of its light, is something visible. Therefore, if fire is always present to sight, that is, to the organ of sight, since it exists in it, it seems that sight should always be seeing fire.

But this does not follow from the principles that Aristotle has established, for he holds that a sense-power is in potentiality to a sensible thing, and that it must be altered by the thing through a medium. According to him, then, a sensible thing placed on top of a sense-power is not perceived, as is said in *On the Soul* II, 

so that if the organ of sight were made of fire, for this very reason sight would not see fire.

But according to the other philosophers sight and the other senses perceive sensible things inasmuch as they actually are of the same kind as—that is, like—the sensible things, because they have the same nature as the principles of things, as was said. According to them, then, just because the organ of sight is made of fire, it follows that it sees fire in the way described.

But then there remains the difficulty that Aristotle here introduces: Why does an eye at rest not see fire, as does an eye that is moved?

437a30 Then, when he says *Now the cause of this*, he gives the cause of the above-mentioned appearance, by which the difficulty raised is solved, and it is shown how foolish of them it was to think that sight is made of fire.

On this point it must be understood that smooth—that is, polished and clean—bodies have, from a property of their nature, a certain shine, one that does not occur in rough and uneven bodies because some parts rise above others and overshadow the latter. And although such bodies in a way shine in themselves, they do not have enough shine to be able to make a medium bright in actuality, as do the sun and such bodies.

Now it is clear that the center of the eye, which is called the black part of the eye, is as it were smooth and polished. Hence it has a shine by reason of its smoothness, not from the nature of fire, as the others thought. This already removes any need to assign the organ of sight to fire, since the cause of the brightness that appears can be attributed to something other than fire.

But whether it is caused by fire or the pupil's smoothness, there remains a

difficulty common to both positions: why an eye that is moved sees this shining, but an eye at rest does not.

So he gives the cause of this, and says that shining of this kind appears to an eye that is moved because what happens through the movement of the eye is that what is one becomes as though it were two. For the shining and seeing pupil is one and the same in subject: but inasmuch as it shines, it projects its shine outward; and inasmuch as it sees, it apprehends the shining by, as it were, receiving it from without.

When the eye is still, therefore, it emits the shine outward, and so sight does not receive the shine in such a way as to see it. But when it is quickly moved, its black part is brought, before the brightness fades, to the "external" place to which the pupil emitted its brightness. Thus the pupil, having been quickly brought to the second place, receives its own brightness as if from without, and so it seems that what sees and what is seen are different, although they are the same in subject. So this appearance of the shining does not happen unless the eye is quickly moved, because if it is moved slowly, the impression of the shining will fade from the "external" place the shining went to before the pupil gets there.

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But it seems that no speed of movement would suffice for this to happen. For however rapid local movement may be, it must be in time. But emission of shine at the presence of a shining body, and its cessation at the absence of it, occur instantaneously. Therefore it does not seem possible, however quickly the eye is moved, for the pupil to reach the "external" place before the shining, which came there from the pupil existing in the other place, ceases.

According to Alexander in the commentary, we must say in response that the pupil is a body, divisible into parts. Hence if the eye is quickly moved, when part of the pupil begins to reach the other place, the shining is still coming there from the rest of the body of the pupil that has not yet gotten to that place. This is why the pupil begins to see a shining that is, as it were, shining from elsewhere. A sign of this is that the shining does not seem to fade: rather, when it passes, the sight of it ceases abruptly.

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437b5 He also gives the reason why this kind of operation happens in darkness and not in light, namely because the shining of smooth bodies is so small that it is obscured by great brightness, although it is seen in darkness. This also happens with other things that have a small amount of light, and for this reason are seen in darkness but not in light, for instance certain heads of fish, and the dark fluid of the fish called the cuttle-fish. He adds that if the eye is gently—that is, slowly—moved, the above-mentioned appearance does not happen by what sees and what is seen seeming simultaneously to be one and two, as was said. But in the other case—that is, when the eye is quickly moved—then the eye sees

itself being as it were affected by itself in its other position. This also happens in "refraction"—that is, reflection—for instance when an eye sees itself in a mirror from which, as from without, the form of the eye returns to the eye itself by way of reflection, just as, in the above-mentioned appearance the shining of the eye returns to the eye itself, as was said.

437b 10 Then when he says If it were fire, he proceeds to disprove the position itself: first inasmuch as those philosophers assigned sight to fire; second inasmuch as they held that sight sees by extromission, where he says *It is altogether irrational* (Chapter 3, 43 8a25).

On the first point he does three things. He presents first the opinion of Plato; second the opinion of Empedocles, where he says *Empedocles seems to think* (437b23); and third the opinion of Democritus, where he says *Democritus says correctly* (Chapter 3, 438a5) .

On the first point he does two things. First he raises an objection against Plato. Second he disproves Plato's response, where he says *To say that in going out* (437b 14).

Concerning the first point it must be known that Empedocles, and Plato in the *Timaeus* , agreed on two things: one is that the organ of sight pertains to fire; the second is that vision occurs by a light going out from the eye as from a lamp. From these two positions the Philosopher concludes that sight should see in darkness, just as it does in light: for light can be emitted from a lamp to light up the medium in the dark; and so, if the eye saw by emission of light, it would follow that the eye should also be able to see in the dark.

437b14 Then, when he says *To say that in going out* , he disproves the response of Plato, who says in the *Timaeus* that when light goes out from the eye, if it encounters light in the medium it is preserved by it as by something like itself, and because of this vision occurs; but if it does not encounter light, but darkness, then because of the unlikeness of darkness to light, the light going out from the eye is "extinguished," and so the eye does not see. But Aristotle says that to give this cause is foolish.

437b15 And he proves this where he says For what is "extinction" of light?

For no reason can be given why the light of the eye is "extinguished" by darkness. The Platonists said that there are three species of fire, namely light, flame, and ember. 🗨️

Since fire is naturally hot and dry, it is extinguished by either cold or moisture, and this clearly happens in the case of embers and flame. But neither is a cause

of extinction in the case of light, for it is destroyed neither by cold nor by moisture. Therefore it is incorrect to say that light is extinguished in the way fire is.

But Alexander says in the commentary that there is another reading, as follows:

437b15 ... as is seen in fire in embers and flame. But neither seems to belong to darkness. For it is neither moisture nor cold by which the "extinction" occurs.

And on this reading Aristotle's argument seems to be more to the point: the fire-light that appears in embers and flames is found to be extinguished by cold and moisture; but darkness is neither something cold nor something moist; therefore the fire-light that goes out from the eye cannot be extinguished by darkness.

437b19 Someone might say that the fire-light going out from the eye is not "extinguished" in darkness, but that, because it is not "strengthened" by external light, and so is weak, it escapes our notice, and that this is why vision does not occur.

But Aristotle disproves this where he says *If it were the case* .

On this point it must be known that fire-light is "extinguished" or darkened in two ways: in one way with respect to a property of light, namely that a little light is extinguished by the presence of a greater light; in another way with respect to a property of fire, which is extinguished in water.

Accordingly if the weak light going out from the eye were made of fire, it would have to be extinguished in daylight, because of the greater brightness; and in water, because of its contrariety to fire; and the light of the visual power would be even more darkened where there is ice, for we see that this is what happens in the case of flame and burning bodies. But it does not happen in the case of sight, and so it is clear that the abovementioned response is foolish.

437b23 Then, when he says *Empedocles seems to think* , he relates the opinion of Empedocles, the disproof of which has already been touched on.

He says that Empedocles seems to think, as was said, that vision occurs by light going out.

And he gives the words of Empedocles, which were composed in meter. Empedocles said that what happens in vision is like when someone thinking of going out along a road on a winter night—that is, when wind is blowing—prepares a lamp. He kindles a light of burning fire, and to block the force of all winds he puts the light kindled in a lantern, and by this means he deflects the blowing of breathing winds—that is, he prevents their blowing from reaching the light of the fire. But the light contained within goes out, and however farther outward it expands, it illuminates the air more, but in such a way that the rays going out are subdued—that is, weakened—by a covering on the lamp, for

instance skin or some such thing; for the air is not as brightly illuminated by the lamp as it would be by unshielded fire.

And he says that something similar happens in the eye, in which ancient light—that is, light there since the eye's formation—is guarded—that is, safely preserved—for sensing, in membranes—that is, corneas of the eye—through which, as if through fine linens, light pours out around in all directions through the pupil. These corneas reveal, by the rays emitted through them, a depth of water flowing around the fire kindled in the pupil, water for nourishing, or rather tempering, the fire gathered in the depth. And so the light reaches out, however farther it expands, starting from inside.

Alternatively, his mention of “around in a circle” should be understood with reference to the roundness of the pupil.

It should be noted that he said, significantly, “with rays subdued by a covering,” to indicate the reason why a thing is not seen in darkness, namely that the light going out is weakened by passing through the above-mentioned coverings, so that it cannot completely illuminate the air.

Having presented the words of Empedocles, he adds that sometimes he said that vision occurs by emission of light, as was said, but sometimes he said that vision occurs by certain bodies emanating from visible things and coming to sight. And perhaps his opinion was that the two are united for vision.

CHAPTER 3

438A5-B2

438a5 Democritus says correctly that it is water, but not correctly that he thought that the appearance is the seeing itself. For this occurs because the eye is smooth. And it is not in that, but in what is doing the seeing. For the affection is a reflection. But it seems that it was not yet clear to him about appearances and reflection.

438a10 But it is inconsistent that it also did not occur to him to wonder why only the eye sees, and none of the other things in which “idols” appear.

438a12 For it is indeed true that sight is made of water, but seeing does not occur according as it is water, but according as it is transparent, which is something common to it and air. But water is more preservable than air and denser, which is why the pupil and eye are made of water.

438a17 This is manifested in the very workings. For when eyes are destroyed, water can be seen flowing out. And in completely new-formed ones, there is extreme cold and brightness. And in those that

have blood, the white of the eye is fat and thick, to keep the moisture unfrozen; and so the eye is the part of the body that feels cold least, for no one has ever felt cold inside the eyelids. The eyes of bloodless animals are made of hard skin, and this provides protection.

438a25 It is altogether irrational that sight should see by something going out, whether it extends all the way to the stars, or, as some say, it goes only so far and "coalesces."

438a27 For in the latter case it is better for it to be united at the beginning, that is, in the eye.

438a29 But this is also foolish. For what is it for light to be "united" to light? Or how is it possible, since not just anything is united with anything? And how is the inner light united with the outer, since the membrane is between?

Commentary

438a5 After the opinions of Plato and Empedocles, here, in the third place, The Philosopher follows up the opinion of Democritus.

On this point he does three things. First he shows what Democritus said correctly and what he said incorrectly. Second he follows up what he said incorrectly, where he says *But it is*

inconsistent (438a10). Third he follows up what

he said correctly, where he says *For it is*

indeed true that sight

is made of water (438a12).

Accordingly he first says that Democritus spoke correctly in assigning sight to water, but he spoke incorrectly in saying he thought that vision is nothing but the appearance in the pupil of the thing seen. For such an appearance occurs in the pupil because of the bodily disposition of the eye, that is, because the eye is smooth, that is, polished and clean, as it were. So it is clear that seeing itself is not located in the appearance of this form in the eye, but in what is doing the seeing, that is, in what has the power of sight: for the eye is a seeing thing not because it is smooth, but because it has the power of sight. For that affection—the appearing of the form of the thing seen in the eye—is a reflection; that is, it is caused by the reflection or rebound of the form from a polished body.

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We see something like this happen in a mirror also. For when the alteration of the transparent caused by a visible body reaches a body that is not transparent, the alteration can go no further, but is somehow turned back, like a ball thrown at a wall and bounced back, and because of this rebound the form of the thing seen

goes back in the opposite direction. Thus in a mirror one can see oneself, or even some other thing not directly presented to one's sight.

This takes place only if two things coincide. One is that the body be smooth on its surface, and therefore somewhat bright, as was explained above; the form reflected in it is manifested by this moderate brightness. The other is that the body be terminated within at some point so that the above-mentioned alteration does not go beyond; thus we see that this kind of appearance does not occur, unless glass is covered with lead or something similar to block its transparency, so that the alteration does not go beyond.

Now both of these coincide in the eye: it is moderately bright because of its smoothness, as was established above, and it has something in its depth that terminates its transparency. So it is clear that this event of the form of the thing seen appearing in the eye happens merely because of reflection, which is a bodily affection caused by the determinate disposition of a body.

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But it was not yet clear to Democritus about these reflections and about the forms that appear in mirroring bodies because of reflection. Vision itself, according to the truth of the matter, is not a bodily affection: rather, its principal cause is a power of soul. But Democritus held that soul is something bodily, and so it is no wonder that he called an operation of soul nothing but a bodily affection.

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It should be known, however, that the above-mentioned appearance is a cause of vision with respect to initial reception of the form. For vision is an act of soul only through a bodily organ, and so it is no wonder that it has a cause from the point of view of a bodily affection, but in such a way that the bodily affection is not the same thing as the vision: rather, it is a cause of it with respect to the initial "impact," if I may so call it, of the visible form on the eye. The subsequent reflection contributes nothing to the eye's seeing of the thing seen through the form appearing in it, but rather contributes to the form's being able to appear to someone else; thus the eye that sees the thing by means of the form that appears in it does not see this form itself.

438a10 Then, when he says *But it is*

inconsistent

incorrectly.

, he follows up what Democritus said

He says that since Democritus held that vision is nothing but the above-mentioned appearance, it seems very inconsistent that the following difficulty did not occur to him: Why do other bodies in which forms, which he called "idols"—of visible things appear as in a mirror not see, but only the eye? From this it is clear that the above-mentioned appearing is not the whole essence

(*ratio*) of vision, but that there is something else in the eye that

causes vision, namely the power of sight.

438a12 Then, when he says *For it is indeed true that sight is made of water*

, he follows up what

Democritus said correctly.

First he presents the truth. Second he clarifies it by signs, where he says *This is manifested* (43 8a 17).

Accordingly he first says that what Democritus said in assigning the organ of sight to water is true. However, it must be known that vision is assigned to water not according as it is water, but by reason of transparency, which water and air have in common: for a visible object is something that moves the transparent, as is said in the book *On the Soul* . 

However, vision is assigned to water rather than to air for two reasons. First, water can be preserved better than air (air is easily dispersed), and so it is more suitable for the preservation of sight than is air, and nature always does what is better. Second, water is denser than air, and by reason of its density it allows the form of a thing seen to appear in it by reflection, which is proper to the organ of sight. What is proper to the medium of sight is to be transparent, which is common to air and water. So he concludes that the eye and pupil are to be assigned to water rather than to air.

The heavenly body is also transparent, but because it does not enter into the composition of the human body, he passes over it here.

438a17 Then, when he says *This is manifested*, he shows that the organ of sight is made of water by three signs that are manifested in the very workings.

The first is that if the eyes are destroyed, there visibly appears water flowing out of them.

The second is that the new-formed eyes of embryos—eyes that, as it were, still retain much of the power (*virtus*) of their origin—have abundant cold and brightness, both of which are connatural to water.

The third sign is that in animals that have blood, in which there is the possibility of generating, so to speak, fat from the blood, the pupil is surrounded by the white of the eye, which has fatness and oiliness so that its heat will keep the water-moisture of the pupil from freezing, which would diminish the transparency of the water, and thus impede vision. And so, by reason of the above-mentioned fat, the eye, because of its heat, does not freeze: for no one has ever suffered cold in the whole of what is contained inside the eyelids. In animals that are bloodless, in which there is no fat, nature made eyes of hard skin to protect the water-moisture that is in the pupil.

438a25 Then, when he says it is altogether irrational, he goes on to disprove

what some held, namely that vision occurs by extromission, which was the reason for their assigning sight to fire. Thus, once the latter is eliminated, the former will be too.

On this point he does two things. First he presents two opinions of those who held that we see by extromission. Second he disproves the second opinion, where he says *For in the latter case* (438a27).

Accordingly he first says that it seems irrational that sight should see by something going out from it, which was held to occur in two ways.

In one way such that what goes out from the eye extends all the way to the thing seen, from which it would follow that even when we see the stars, what goes out from sight extends all the way to the stars.

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This involves an obvious impossibility. Since "going out" pertains only to bodies, it would follow that some body going out from the eye would reach all the way to the stars, which is clearly illogical, for many reasons.

First because it would follow that there are several bodies in the same place, both because what goes out from the eye would be in the same place as the air, and because these things going out from eyes would have to be multiplied in the same medium according to multiplicity of those who are seeing through the same medium.

Second because any projection of a body is stronger at the beginning but weaker at the end, which is why flame proceeding from a burning body tends towards an apex. But here the contrary happens, for the mathematicians, whose position this is, say that the apex of the body going out from the eye is inside the eye and the base at the thing seen.

Third because the size of an eye is insufficient for a body going out from it to be big enough to reach all the way to the stars, however much the body might be rarefied, for there is a limit to the rarefaction of natural bodies; besides, the more rarefied it became, the more easily it would be destroyed.

Again, the body emitted from the eye would have to be either air or fire. There is no need for air to be emitted from the eye because it is abundant outside the eye. And if it were fire we would also see at night; on the other hand, we would not be able to see through the medium of water; and we would only be able to see upwards, where the movement of fire tends.

But it cannot be said that the bodily thing that goes out from the eye is light, because light is not a body, as was proved in the book *On the soul*.

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The other opinion is that of Plato, who held that light going out from the eye does not go all the way to the thing seen, but only so far, that is, some determinate distance, namely to where it "coalesces" with the external light; and that vision occurs by reason of this coalescence, as was said before.

438a27 Then, when he says *For in the*

latter case, he passes over the first opinion as clearly unreasonable, and disproves the second in two ways.

First because it posits something uselessly and unnecessarily, which is just what he says: that it would be better to say that the inner light is united with the outer at the surface of the eye itself rather than outside at some distance. This is because if there is no outer light in the intermediate space, the inner light will be extinguished by darkness according to Plato's opinion, as was said above. But if light reaches all the way to the eye, it is better for the two to be united immediately, because what can occur without a medium is better than what occurs through a medium, since it is better for something to occur by means of fewer things than more.

438a29 Second, where he says *But this is*

also foolish, he disproves the union of inner light with outer even on the supposition that it occurs at the beginning, i.e. in the eye itself. He does this in three ways.

First because "being united and separated" is proper to bodies, each of which has subsistence per se, but not to qualities, which exist only in a subject. Hence, since light is not a body but an accident, it is meaningless to say that light is "united" to light, unless what is meant is that a luminous body is united to a luminous body. However, it is possible for light to be intensified in the air by multiplication of luminous bodies, as heat is intensified by increase in the cause of heat, although this is not by addition, as is clear from *Physics* IV.



Second he disproves the point as follows: even granted that both lights are bodies, it would still not be possible for them to be united, since they are not of the same nature. For not just any body is naturally united with just any body, but only those that are in some way homogenous.

Third, since an intervening body, namely the membrane—that is, the cornea of the eye—comes between the inner and the outer light, there cannot be a union of the two lights.

CHAPTER 4 43SB2-439A5

438b2 That it is impossible to see without light was said elsewhere. But whether it is light or air that is between the thing seen and the

eye, the movement through it causes seeing.

438b5 It is reasonable that what is inside be made of water, for water is transparent. And it seems that, as what is outside is not without light, so also what is inside. Therefore it must be transparent. Therefore it is necessarily water, because it is not air

438b8 For the soul, or the sensitive part of soul, is not at the limit of the eye, but clearly inside. Hence the inside of the eye needs to be transparent and receptive of light.

438b11 This is also clear from what happens. For when some are wounded in war about the temples in such a way that the passages of the eye are cut off, they experience a darkening as when a lamp is extinguished, because the transparent thing called the pupil is, like a torch, cut off.

438bl6 If then, what happens in these cases is as we have said, it is clear that, if one must, following this method, attribute and assign each one of the sensitive parts to one of the elements, one should think that eyesight is of water, what is perceptive of sounds is of air, and smelling is of fire.

438b21 For what smelling is in actuality the olfactory part is in potentiality. For a sensible object makes a sense-power act, and so the latter necessarily exists first in potentiality. But odor is smoky evaporation. But smoky evaporation is from fire.

438b25 For this reason the proper sensitive part of smell is in a place around the brain: for the potentially hot is the matter of what is cold.

438b27 And the generation of the eye also has the same mode: for it stems from the brain, and the brain is coldest and moistest of all parts of the body.

438b30 But the tactile part is of earth, and the tasting part is a kind of touch.

439a1 And so the sensitive part for these, namely taste and touch, is near the heart: for the heart is opposite the brain, and is the warmest of the parts.

439a4 Let it be determined in this way about the sensitive parts of the body.

Commentary

438b2 After the Philosopher has disproved the opinion of those who hold that vision occurs by extromission, here he determines the truth.

On this point he does three things. First he makes clear how vision occurs according to his own thought. Second, on this basis, he gives the cause of something mentioned above concerning the organ of sight where he says *It is reasonable* (438b5). Third he shows the cause by sign, where he says *This is also clear* (438b11).

Accordingly he first takes up something that was said in the book *On the Soul*, that it is impossible to see without light. 

For because vision occurs through a medium that is transparent, vision requires light, which makes a body be transparent in actuality, as was said in the book *On the Soul*. 

And so, whether the medium that is between the thing seen and the eye is air that is illuminated in actuality, or whether it is light—light existing not in itself, since it is not a body, but in something else that is a body, such as glass or water—the movement that occurs through this medium causes vision.

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This movement should not be taken to be local movement, as if, as Democritus and Empedocles held, it were a movement of bodies emanating from the thing seen to the eye, because then it would follow that the bodies that are seen would be reduced by this emanation until they were totally worn away. It would also follow that the eye would be injured by the continuous striking of these bodies. Again, it would not be possible for a whole body to be seen by anyone, but only as much as could be taken in by the pupil.

Rather, this is “movement” according to alteration: the alteration is a movement towards a form that is a quality of the thing seen. inasmuch as it is bright in actuality, the medium is in potentiality to this form; the medium is an unbounded transparent (color is a quality of a bounded transparent, as will be said below), and what is unbounded is related to what is bounded as potentiality to actuality, for form is a boundary of matter.

Now because of the different nature (*ratio*) of the transparent in a transparent medium, the medium receives the form of a color in a mode that is different from the mode in which it exists in the colored body, where there is a bounded transparent, as will be said below; for actualities are in receivers according to the mode of the latter. Thus color is in a colored body as a quality complete in its natural being, but it is in the medium incompletely, according to an intentional being. Otherwise something black and something white could not be seen through the same medium. For whiteness and blackness cannot simultaneously be in the same thing as forms complete in their natural being, but with respect to the above-mentioned incomplete being they do exist in the same thing: for this mode of being, because of its imperfection, approaches the mode

by which something exists in something else in potentiality, and opposites are simultaneously in potentiality in the same thing.

438b5 Then, when he says *It is*

reasonable , in keeping with what was said he gives the cause of the necessity of assigning sight to water, which he showed above only by signs.

He says that, because what causes vision is the alteration of a medium made bright by the body seen, it is reasonable that what is inside the pupil, which is the organ of sight, be made of water: for water is one of the transparent things. But the external medium is a transparent thing that has been illuminated, and nothing can be seen without this illumination: so the light must also be inside the eye. And because there can be light only in what is transparent, there must also be something transparent inside the eye. It is not the heavenly body, because this does not enter into the composition of the human body: and so it is necessarily water which is casier to preserve and thicker than air, as was said.

438b8 Then, when he says *For the soul*

, he makes clear why light within is required for seeing.

If the power of sight were on the outer surface of the eye, the light of the external transparent, through which the alteration by the color reaches the outer surface of the pupil, would alone suffice for seeing. But the soul, or the sensitive part of soul, is not on the outer surface of the eye, but inside.

It should be noted that he significantly adds "or sensitive part of soul." Since the soul is the form both of the whole body and of its individual parts, it is necessarily in the whole body and in each of its parts, because a form is necessarily in that of which it is the form. Now the sensitive part of the soul is called the sensitive "power," being the principle of sensitive operation; and the principle of an operation of soul that is exercised by means of the body must be in a determinate part of the body. Thus the principle of sight is within, near the brain, where two nerves coming from the eyes meet.

Therefore, inside the eye there must be something transparent, receptive of light, so that there is uniform alteration from the thing seen all the way to the principle of sight.

438b11 Then, when he says *This is also*

clear , he makes clear what he said by means of a sign, namely something that happens in some who are wounded around the temples in battle: when the passages that connect the pupil to the principle of sight are cut off, a darkening suddenly occurs through loss of sight, as if a lamp were extinguished. The pupil is like a torch lit up by an external light; thus, when the passages connecting the pupils to the principle of sight are cut off, the light of this torch cannot reach all the way to the principle of sight, and so sight is darkened.

438b16 Then, when he says *If, then, what happens in these cases*

having eliminated false opinions of others, he proceeds to the principal proposal.

First with respect to the organs of the non-necessary senses. Second with respect to the organs of the necessary senses, where he says *But the tactile part* (438b30).

On the first point he does two things. First he coordinates sense-organs with elements. Second he clarifies what he said, where he says *For what smelling is in actuality* (438b21).

On the first point it must be considered that it was not in keeping with the thought of Aristotle to assign the sense-organs to elements, as is clear in the book *On the Soul* .

But because other philosophers did assign the sense-organs to the four elements, therefore, condescending to them, as it were, in this matter, he says that, presupposing what was said about sight, if one must, following what others say, assign each of the sensitive parts—that is, sense-organs—to one of the elements, as others do, one should think that eyesight is to be assigned to water, what is perceptive of sounds to air, and smelling to fire.

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But this seems to be contrary to what was said in *On the Soul*: "The pupil is of water, hearing of air, and smell is of either of these; but fire either belongs to none or is common to all." .

In response to this must be said that what the sense of smell is can be taken in two ways: in one way according to potentiality, and thus the organ itself of smell is made either of air or of water, as is said in *On the soul* III; .

in another way according to actuality, and thus what is said here is true, as he himself will prove. Thus it is significant that he did not say that the "sense of smell" is made of fire, as he did say that "the part perceptive of sounds" is made of air and "eyesight" is made of fire. Rather he says that "smelling" is made of fire. For "sense of smell" refers to the potentiality, but "smelling" to the actuality.

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438b21 Then, when he says *For what smelling is in actuality*

, he proves what he has said about the organ of smell.

On this point he does three things. First he shows that the act of smelling in actuality is related to fire. Second he concludes to what should be the quality and

place of the organ of smell, which is the act of smelling in potentiality, where he says *For this reason* (438b25). Third he shows a resemblance of the organ of smell to the organ of sight, where he says *And the generation of the eye* (438b27).

Accordingly he first says that the olfactory part—that is, the organ that has power to smell—must be in potentiality what actual smelling is in actuality. He clarifies this as follows: a sensible object makes a sense-power act—that is, be in actuality, or again, operate. But the sensitive part must be in potentiality the sensible object: otherwise it would not be affected by it. Hence it remains that the sensitive part is in potentiality what sensing is in actuality.

Now it is clear that odor is smoky evaporation. Not that “smoky evaporation” is the very essence of odor, for this was disproved in *On the Soul* it on the grounds that odor spreads farther than does smoky evaporation. 🗨️

Rather this is said because smoky evaporation is a cause of odor being perceived. But smoky evaporation comes from fire, or whatever is hot. Therefore the sense of smell is brought to actuality by heat, which is in fire as in its principle. This is why flowers have stronger odor in hot times and places.

438b25 Then, when he says *For this reason*, he concludes from the foregoing that the organ of smell should be in a place near the brain.

For the organ of smell is, in potentiality, odor in actuality; odor in actuality exists by heat or fire; therefore the organ of smell must be hot in potentiality. But the potentially hot is the matter of what is cold, because the matter of contraries is the same, and it cannot be in potentiality to one of them without being in actuality under the other, either perfectly or, when it is under the form of an intermediate, imperfectly. So the substance of the organ of smell must be something that is cold and moist in actuality, and this is especially the case around the brain. Hence the organ of smell is around the brain.

438b27 Then, when he says *And the generation of the eye*, he shows a point of agreement between the organ of smell and the organ of sight.

He says that the generation of the eye also has the same mode, inasmuch as it stems from the brain. It does so because the brain is the coldest and moistest of all parts of the body, and so it has the nature of water, which is naturally cold and moist. Thus the brain fits both with the organ of smell, which should be hot in potentiality, and with the organ of sight, which should be made of water.

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But then it seems that Plato fittingly assigned sight to fire, as Aristotle here

assigns smell to fire.

To this it must be said that the organ of smell is made of water inasmuch as water is potentially hot, heat being a feature of fire. But the organ of sight is made of water inasmuch as water is transparent, and consequently luminous in potentiality.

But because fire is also luminous in actuality, as well as hot, someone might then say that sight is fittingly assigned to fire.

To this it must be said that, just as Aristotle assigned smell to fire, so nothing prevents sight from being assigned to fire—not according to the proper qualities of fire, which are heat and dryness, but according as fire is luminous in actuality.

The other philosophers seem to have focused on this, basing their argument on the shining that appears when the eye is moved. Aristotle disproved their opinion in this regard not because they held that sight in actuality is fire, which in a way would be true, inasmuch as sight in actuality does not occur without light, as the act of smelling in actuality does not occur without heat; rather, he did so because they held that the organ of sight is luminous in actuality, holding as they did that sight occurs not by a taking in, but by an extromission.

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438b30 Then, when he says *But the tactile part*, he makes a determination about the organs of the necessary senses.

First he shows the element to which they are to be assigned. Second he shows the place where they are situated, where he says *And so the sensitive part* (439a1).

Accordingly he first says that the organ of touch is assigned to earth, and similarly the organ of taste, which is a kind of touch, as was said in *On the soul* II. 

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Now this is not to be taken to mean that the organ of touch or taste is simply made of earth, for we do not perceive by means of hair, which contains even more earth. It is rather that, as is said in *On the Soul*

III, earth is mixed into the organs of these senses to the greatest degree. 

With respect to the organ of touch, the reason, as is said in *On the Soul* II, is this. 

In order for the organ of touch to be in potentiality to contrary tangible qualities, it has to have a composition that is intermediate. Therefore, it has to have the greatest amount of earth, which has less active power than do the other elements.

With respect to the organ of taste, the reason is clear. The organ of smell has to contain water in order to be in potentiality the hot thing without which there is no smelling in actuality. Similarly, the organ of taste has to contain earth in order to be in potentiality the moist thing without which there is no tasting in actuality.

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439a1 Then, when he says *And so the*

sensitive part

, he shows where the organ of

taste and touch is based.

He says that it is near the heart, and he gives the reason, namely that the heart is opposite the brain with respect to position and quality. As the brain is the coolest part of the body, the heart is the warmest of all the parts of the body. For this reason they are placed in opposition to one another in order for the heart's heat to be moderated by the brain's coolness.

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This is why those who have heads that are small in proportion to their other parts are impetuous, as if the heat from the heart were not being pushed back down enough by the brain. Conversely, those who have unusually big heads are very slow and dull, as if the heat from the heart were being impeded by the size of the brain.

Since the organ of touch is made of earth, it must be in the body's warmest place as in its principle, so that by the heart's heat the coolness of the earth can be brought to a moderate temperature. This does not prevent an animal from perceiving by means of touch through the whole of its body, because as other senses perceive through an external medium, touch and taste perceive through an internal medium, namely flesh. And just as the principle of sight is not on the surface of the eye, but within, the principle of touch is also within, near the heart, a sign of which is that the most painful wounds are those around the heart.

But it cannot be said that there are two sensitive principles in an animal, one near the brain, where the visual, olfactory, auditory principle is established, and one near the heart, where the tactile and gustatory principle is established. The sensitive principle is primarily in the heart, which is also where the source of heat is located in the body of an animal, because nothing is sensitive without heat, as is said in *On the Soul* . 

The sensitive power flows from the heart to the brain, and from there it proceeds to the organs of three senses, sight, hearing, and smell. But touch and taste are relayed to the heart itself through a medium united to the body, as was said.

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439a4 Finally, by way of an epilogue, he says let it be determined in this way about the sensitive parts of the body—that is, as was done above.

CHAPTER 5

439A6–B14

439a6 Concerning sensible objects, in relation to each sensitive part—I mean, for instance, color and sound and odor and taste and touch—it was said in a general way in the discussions *On the soul* what their action is; and what it is to operate in relation to each sensitive part. But it is necessary to say what each of them is; that is, it must be considered what color is, what sound is, what odor is, what flavor is, and similarly also concerning touch. And first concerning color.

439a12 Each, then, is spoken of in two ways: on one hand in actuality, on the other in potentiality. Accordingly, what color in actuality is, and sound, how they are the same as or other than the sense-powers in actuality, namely seeing and hearing, has been said in the discussions *On the soul*. But let us now say what each of them is that it should cause sensing and actuality.

439a18 Accordingly, as was said about light in those discussions, it is the color of the transparent accidentally. For when something lit up exists in the transparent, the presence is light, and the privation darkness.

439a21 But what we call the transparent is not a property of air or water or any of the bodies mentioned, but is a common nature and power. It is not separate, but it is present in these and in other bodies, in some to a greater extent, in some to a lesser.

439a25 Therefore, as there is necessarily a limit of bodies, so there also is of this. Now the nature of light is in the unlimited transparent. But it is obvious that there will be a limit of the transparent that is in bodies, and that this is color is clear from what happens: for color is on the limit or is the limit. Hence the Pythagoreans called color an “epiphany”; for it is on the limit of a body, but it is not the limit of the body.

439a33 Now one must think that it is the same nature that is colored from without and intrinsically. Air and water appear as colored things, for the dawn is such a thing. But in this case, because it is in something indeterminate, neither the air nor the sea has the same color to those who approach close up and from afar. But in bodies, unless something containing makes a change, there is a determinate fantasia of color. Therefore it is clear that both in the former and in

the latter it is the same thing that is receptive of color. Therefore the transparent, according as it exists in bodies—and it exists in all of them, to a greater or lesser extent—is what causes colors to be participated in. But because color is on the limit, it will be a limit of this.

439b1 Therefore color will be the limit of the transparent in a determinate body.

439b12 And in transparent things such as water and any other such thing, and in whatever seems to have a color of its own—in all these it is likewise at the limit.

Commentary

439a6 After The Philosopher has applied the consideration about sense-powers of animals to sense-organs, here he applies it to sensible objects themselves.

First he states his intention. Second he carries out his proposal, where he says *Accordingly, as was said about light* (439a18).

On the first point he does two things. First he proposes his intention. Second he clarifies what he said, where he says *Each, then, is spoken of in two ways* (439a12).

Accordingly he first speaks of proper sensible objects, those perceived in relation to each sensitive part, that is, each individual sense-organ, which he says to distinguish them from common sensibles. The proper sensibles are color, sound, and odor, which are sensed through sight, hearing, and smell; and taste and touch—that is, the objects of these senses. He says that it was said in *On the soul* in a general way both how these act on a sense-power and the nature of the sense-power's operation in relation to each organ affected by the above-mentioned sensible objects. For it was said in *On the Soul* II that a sense-power is a sensible object in potentiality, and that sensible objects make a sense-power be in actuality. 

But now it must be considered what each sensible object is in itself, that is, what color is, what sound is, what odor is, what flavor is, and similarly concerning touch—that is, the objects of touch. But first color, which is the object of sight, must be discussed, because sight is the most spiritual of the senses.

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It is not to be understood by this that he intends to make a determination about all these sensible objects in this book, but rather that consideration of them all is necessary to the proposed intention. But objects of touch are either properties of elements, namely hot, cold, moisture, and dryness, about which a determination

was made in the book on *Generation and Corruption* ; 

or they are properties of individual bodies, such as hardness and softness, and so on, about which a determination was made in the book the *Meteorologica* . 

So what is left now is to make a determination about three things, namely color, odor, and flavor, For a determination about sound was made in the book *On the Soul* , because the account of the production of sound is the same as the account of the alteration of the auditory organ by sound, and the way in which sense-organs are altered by sensible objects belongs to the consideration made in the book *On the Soul* . 

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439a12 Then, when he says *Each, then, is spoken of in two ways* , he explains what was said, namely that it must be considered what color is, what flavor is, etc.

For each of these exists in two ways: in one way inasmuch as it is sensed in actuality, and in another way inasmuch as it is sensible in potentiality. What each of them is according to actuality—that is, according as color, flavor, or any other sensible object, is in actuality perceived by sense—has been said in *On the soul* . That is, it was said how each of them is the same as or other than a sense-power in actuality, such as seeing or hearing: for the visible in actuality is the same as seeing in actuality, but the visible in potentiality is not the same as sight in potentiality. Accordingly what each of the sensible objects is in actuality was said in *On the Soul* , where a determination was made about the sense-powers in actuality. 

But what each thing that is of such a nature as to cause the sense-power to be in actuality, is in itself must be said now, in the present book.

439a18 Then, when he says *Accordingly, as was said about light* , he makes a determination about sensible objects in the order already established: first color; second flavor, where he says *Odor and flavor must be discussed* (Chapter 8, 440b28); and third odor, where he says *Odors must be understood in the same way* (Chapter 11, 442b27).

The first part is divided into two parts. in the first he shows what color in general is. in the second he makes a determination about differences among colors,

where he says *Accordingly, what causes light*

(Chapter 6, 439b14).

On the first point he does two things. First he presents the principles of color. Second he investigates the definition of color on the basis of these principles, where he says *Therefore, as there is necessarily a limit of bodies*

(439a25).

Now there are two principles of color: one is formal, namely light; the other is material, namely the transparent. Accordingly he first touches on the formal principle, light; and second on the material principle, the transparent, where he says *But what we call the transparent*

(439a21).

Accordingly he first says that, as was said in the book *On the Soul*, light is the color of the transparent. He says this according to an analogy (*proportio*): as color is the form and actuality of a colored body, so light is the form and actuality of the transparent. But they are different inasmuch as a colored body has the cause of its color in itself, but a transparent body has its light only from something else. This is why he says that light is the color of the transparent accidentally, that is, through something else, and not that light is the actuality of the transparent as such. He shows that light is the actuality of the transparent through something else in the following way. When a body that is lit up—that is, bright in actuality—is present to the transparent, light is caused in the transparent by the presence of that body, and darkness by its privation. But it is not so with color, because the color remains in a colored body whatever is present to or absent from it, although it may not be in actuality visible without light.

439a21 Then, when he says *But what we call the transparent*

, he

makes a determination about the transparent.

He says that what is called the transparent is not a property of either air or water or any such body—for instance glass and other transparent bodies—but is a common “nature” found in many bodies—that is, a natural property found in many things—one that he also calls a “power” (*virtus*) inasmuch as it is a principle of vision. Now Plato held that, just as what is common is separate in intelligibility (*ratio*), so it is also separate in existence (*esse*). Therefore, in order to eliminate this position, he adds that the nature of the transparent is not a separate nature, but is in these sensible bodies—namely air and water—and also others, in some to a greater extent, and in some to a lesser.

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To make this clear, it must be known that, as the Philosopher says in *On*

the Soul

II, the visible is not color alone, but also something else which is apprehended by reason but unnamed. 🗨️

Accordingly in the genus of the visible, taken in general, there is something that stands as actuality and something that stands as potentiality. What is in this genus as actuality is not a proper quality of any of the elements, but rather light itself, which exists first in the heavenly body, from which it is derived to lower bodies. What is in this genus as potentiality is what is properly receptive of light, which is arranged in an order of three levels.

The first level is reached when what is receptive of light is totally filled with it, being, as it were, perfectly brought to actuality, so that it cannot receive any further quality or form of this kind. Of all bodies this is most true of the sun, which is why the body of the sun cannot be a medium in sight that receives and transmits a visible form. And the property of shining, descending in a certain order, reaches fire, and then, beyond that, certain bodies that, because of the smallness of their light, can shine only at night, as was said above.

The second level belongs to what does not of itself have light in actuality, but is receptive of light through the whole of itself. Such bodies are properly called "perspicuous" or "transparent," or also "diaphanous," for in Greek means the same as "visible." This property of being transparent is found to the greatest degree in heavenly bodies, except for the bodies of the stars, which conceal what is behind them. Second, it is in fire, that is, fire in its proper sphere, because of its fineness. Third it is in air, fourth in water, and fifth even in certain bodies made of earth, because of an abundance of air or water that is also in them.

The third and lowest level belongs to earth, which is farthest away from the heavenly body, and is by nature receptive of light to the least degree, namely, only on its surface. For its external parts, because of their thickness, overshadow the internal ones so that light cannot reach the latter.

Now although it is only in the case of bodies of the intermediate level that one properly speaks of the "transparent" or "diaphanous" according to the proper meaning of the term, nevertheless, generally speaking, that can be called "transparent" which is receptive of light in any way whatsoever, and it is in this sense that the Philosopher seems to be speaking here of "the transparent." 🗨️

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439a25 Then, when he says *Therefore, as there is necessarily a limit of bodies*

, he investigates the definition

of color.

First he investigates its genus. Second he investigates its difference, where he says *No one must think that it is the same*

nature (439a33). Third he concludes to the definition, where he says *Therefore color will be* (439b11).

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Now it must be considered that one should always put the subject in the definition of an accident, as is said in *Metaphysics* VII, 

although this is done in different ways.

For if an accident is defined in the abstract, the subject is put in place of the difference and what pertains to the essence of the accident is put in place of the genus, as when it is said that "Snubness is curvedness of nose."

But when an accident is defined in the concrete, conversely the subject is put in place of the genus, as when it is said that "A snub is a nose that is curved."

Accordingly, because here color is to be defined in the abstract, Aristotle first begins by investigating, in place of a genus, what color itself essentially is.

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He concludes from what was said that, since the transparent is not a separate nature, but one existing in bodies, it is necessary that, just as there is a limit of bodies in which this nature is found if the bodies are finite, so also there must be a limit of the transparent itself, which signifies a quality of such bodies. And the argument is the same for all qualities of bodies that are accidentally quantities as a result of the quantities of the bodies, and hence are accidentally limited as a result of the limits of the bodies.

Accordingly it must be considered that, just as some bodies (for instance, those that consist of earth) are said to be "limited" because they are limited by limits of their own, and others are said to be "unlimited" because they are limited not by limits of their own, but by the limits of other things, so it is in the case of the transparent. One kind is "unlimited" of itself because it has in itself nothing determinate by which it may be seen, but another is limited because it does have something in itself by which it may be seen with respect to its own limit.

Accordingly, the unlimited transparent is receptive of light, the nature of which is such as to be received not only at a limit, but throughout a whole. But it is clear that there is a limit of this transparent that, as was said, is a quality existing in bodies. And that this is color is clear from what happens. For colored bodies are seen only at their limits, from which it is evident that color either is the limit of a body or is on the limit of a body. And hence it is that the Pythagoreans called color an "epiphany"—that is, an "appearance on"—because what appears on the surface of bodies is color. But it is not true that color is the limit of a body, as the Pythagoreans held, because thus it would be a surface or line or point. But it is on the limit of a body, just as the nature of the transparent is on bodies.

439a33 Then, when he says *Now one must think that it is the same nature*

, he investigates what is put in the definition of color as the difference, namely its subject, which is the transparent.

He says that one must think that it is the same nature that is receptive of color in bodies that are colored from without—that is, not by their own color but by something outside them—and in those that are colored intrinsically by their own color. Those that are colored from without are transparent, for instance air and water; he makes this clear with the color that appears at dawn through the shining of the sun's rays on certain bodies.

However, he does provide a difference between bodies that are colored from without and those colored of themselves. In those that are colored from without, because they do not have of themselves a determinate color, the color does not seem to be the same from close up and from afar, as is clear in the case of the air and the water of the sea, which from afar appear to be of another color than they do from close up; for because their color is seen by a reflection, its appearance necessarily varies with variation of the location of those looking at it because of the different angles of reflection. But in bodies that of themselves have a determinate color, there is a determinate "fantasia"—that is, appearance—of color and it does not vary with the different locations of those looking at it, except perhaps accidentally, for instance when a containing body causes a change of appearance; or when one color is seen through another, as when what is contained in a vessel of red glass seems red; or again by the kind of reflection of light such as appears in the pigeon's neck.

Therefore, because color, which is seen in both kinds of body, does not differ with respect to the proper subject of color, but only with respect to the cause of its appearance, which is either intrinsic or extrinsic, it is clear that in both cases it is the same thing that is receptive of color. And because the transparent is what is receptive of color in what is colored from without, the transparent is clearly also what causes intrinsically color things to participate in color. Indeed, the transparent is found in bodies according to more and less, as was said: bodies that have more air or water have more of the transparent, and those that have an overabundance of earth have less.

Therefore if we unite the two things said—that color is on the limit a body, and that bodies participate in color with respect to the transparent—it follows that color is the limit of the transparent.

439b11 Then, when he says *Therefore color will be*

, he concludes to the definition of color.

He does so first in the case of what is colored of itself, intrinsically. Second in the case of what is colored from without, where he says *An in*

transparent things

(439b 12).

Accordingly he concludes that color is the limit of the transparent. He adds in a determinate body, because such bodies are those that are themselves colored, and what is per se should be put in the definition of a thing.

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Now his saying that color is the limit of the transparent is not opposed to what he said above, that color is not a limit. For he said that with reference to the limit of a body, but here he is speaking of the limit of the transparent, which he calls a quality of a body, like hot and white. Thus color is not in the category of quantity—like surface, which is the limit of a body—but in the category of quality. The transparent is also in the category of quality, because a limit and that of which it is the limit belong to one category. And just as bodies have surface in their interior in potentiality but not actuality, so they are also colored in their interior in potentiality but not actuality, and this potentiality is brought to actuality when division of the body occurs. For what is interior does not in actuality have the power to move sight, a power that belongs per se to color.

439b12 Then, when he says And in transparent things, he clarifies the nature (*ratio*) of color in the case of unlimited transparent things such as water, or any other thing of this kind that has a color: in all these there is color only with respect to the limit.

CHAPTER 6 **439B14–440A15**

439b14 Accordingly, what causes light in the air may be present in the transparent. But it may also not be present in it; instead, its privation may be. Thus, just as in that case the one is light and the other darkness, so white and black are caused in bodies.

439b18 But we must speak about the other colors, dividing the number of ways they might come to be. It can happen that, if white and black are placed beside one another, each of them invisible because of their smallness, what is made up of both thus becomes visible. It is seen neither as white nor as black. But because it necessarily has some color, and neither of these is possible, it necessarily is mixed, and is another species of color. Thus one can admit of more colors than light and black.

439b27 But many are in a proportion, for they can be put together in the proportion of three to two, and of three to four, and according to other numbers. But some are together in no proportion at all, but in an incommensurable more and less.

439b30 So it must be the same as in harmonies: the most well-proportioned colors are those based on numbers, as in the case of harmonies, and these seem to be the most pleasant of colors, for instance scarlet and purple. But such are few, due to the same cause harmonies are also few. And the other colors are those not based on numbers.

440a3 Or, all colors are ordered on the basis of numbers, but some are disordered when they are not pure, and they become such because they are not based on number. This is one way for the generation of colors.

440a7 Another one is that they appear through one another, in the way that painters sometimes place one color over another, more manifest one, as they do when they wish to make something appear to be in water or in air And in this way the sun of itself appears white, but through fog and smoke it appears purple.

440a12 And there will also be many colors in the same way as described above: there will be a proportion of those on the surface to those in the depth; but some are not in any proportion at all.

Commentary

439b14 After the Philosopher has shown what color is, here he proceeds to distinguish the species of colors.

First with respect to extreme colors; second with respect to intermediate colors, where he says *But we must speak about the other colors* (439b18).

Now the differences by which species are distinguished should divide a genus per se, not accidentally, as is clear in *Metaphysics* VII. 

Therefore, he concludes to the variety of species of color from the very nature of color, which he explained through the definition given above.

It is established from the foregoing that the subject of color is the transparent at its limit in limited bodies. But the proper actuality of the transparent as such is light, the presence of which in the unlimited transparent, for instance air, causes light, but the absence of which causes darkness. Therefore, what causes light in the air may be present on the limit of the transparent belonging to limited bodies, where it will cause the color white; and the color black will be caused by its absence.

This is not to be understood as if there were no light in the color black, for thus black would not be contrary to white, since it would not participate in the same nature; rather, it would be a pure privation, like darkness. Black is said to be

caused by absence of light because it of all colors has the least light, as white has the most; for contraries are things that stand farthest apart in the same genus, as is said in *Metaphysics* X. 

439b18 Then, when he says But we must speak about the other colors, he proceeds to distinguish intermediate colors.

This is divided into two parts. In the first he presents certain ways for the generation and distinction of intermediate colors not according to their existence, but according to their appearance. Second he gives the true generation of intermediate colors according to their nature, where he says *But there is mixture of bodies not only* (Chapter 7, 440a31).

On the first point he does two things. First he presents two ways for the generation and distinction of intermediate colors according to appearance. Second he compares those ways to one another, where he says *But to say, like the Ancients* (Chapter 7, 440a15).

The first part is divided into two according to the two ways he presents; the second part begins where he says *Another one is that they appear* (440a7).

On the first point he does two things. First he presents the generation of intermediate colors. Second, where he says *But many are in a proportion* (439b27), he gives their distinction.

Accordingly he first says that since the extreme colors have been discussed, we must speak about the other colors—that is, the intermediate ones—distinguishing the number of ways they might be generated.

Let it be supposed, then, that there is something invisible because of its smallness. Thus it can happen that if two small bodies, invisible because of their smallness, are placed next to one another, one of them being black and the other white, what is composed of both can be seen, because of the greater quantity. Now everything that is seen in bodies of this kind is according to some color. But the whole is seen neither as white nor as black, because both what is white in it and what is black have been assumed to be invisible because of their smallness. Hence it is necessarily seen as a color mixed from both, as it were, so that thus there is another species of color besides white and black. From this it is clear that one can admit of more colors than black and white.

439b27 Then, when he says *But many are in a proportion*, he gives the distinction of intermediate colors.

First he assigns the cause of distinction of intermediate colors to various

proportions of black and white. Second he gives the cause why some intermediate colors are pleasant and some not, where he says *So it must be the same as in harmonies* (439b30).

On the first point it must be considered that, as the Philosopher teaches in *Metaphysics* X, the notion (*ratio*) of measure is found first in numbers, and second in continuous quantities. 

From the latter it is transferred even to qualities, insofar as among them one quality can be more than another, whether by way of intension, as one thing is said to be "whiter" than something else, or by way of extension, as whiteness on a bigger surface is said to be "bigger."

Now because proportion is a relation of quantities to one another, wherever one speaks of quantity in any sense, one can also speak of proportion.

First in the case of numbers, which are all commensurable with one another, for they all share in the first measure that is unity. And there are various proportions of numbers according as various numbers are related to one another: the proportion of three to two, which is called "sesquialteral," is different from that of four to three, which is called "sesquitermial."

But because continuous quantities cannot be resolved into some thing indivisible as numbers are into unity, not all continuous quantities are necessarily commensurate with one another; rather, one can find some in which one is more than another but they have no one common measure. However, whatever continuous quantities are proportioned to one another according to the proportion of number to number do have one common measure: for instance, if one is three cubits long and another four, both are measured by the cubit.

In this way too, there can be more and less among qualities either according to a numerical proportion or according to an incommensurable difference.

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And that is what he says: that there can be many intermediate colors in various proportions. For it can happen that white is juxtaposed to black in the proportion of two to three, or of three to four, or of any other numbers; or again, in no numerical proportion, but only in an incommensurable more and less.

439b30 Then, when he says *So it must be the same as in harmonies* , he shows why some colors are pleasant and some not.

He gives two reasons for this. He gives the second where he says *Or, all colors are ordered on the basis of numbers*

(440a3).

Accordingly he first says that, given that intermediate colors are distinguished according to various proportions of white and black, it must be the same with intermediate colors as it is with harmonies, which are caused according to a proportion between a low and a high tone. For just as in the case of harmonies, the most well proportioned and pleasant are those based on numbers, as the octave is in the proportion of two to one, and the fifth in the proportion of three to two; so also in the case of colors, those based on numerical proportion are the most well-proportioned. And these also seem to be most pleasant, for example scarlet and purple, that is, red and dark red. And just as pleasant harmonies are few, so also such colors are few. But other colors, those that are not pleasant, are not established in numerical proportion.

440a3 Then, when he says *Or, all colors are ordered on the basis of numbers*

, he gives another reason why some colors are pleasant and some not.

He says that all species of colors can be said to be ordered according to numbers. And he can make this change because now there will be a different species of color not merely if there is difference according to more and less, but only when there is more and less according to a numerical proportion. If this is supposed, it will follow that these same colors are disordered when they are not "pure," that is, if there is more white than black according to one proportion in one part, but according to another numerical proportion in another part, and this confusedly and without order. And so, because there will not be the same numerical proportion throughout the whole, it will follow that these colors will be disordered and unpleasant.

Finally he concludes that this is one way of generation of intermediate colors.

440a7 Then, when he says Another one is that they appear through one mother, he presents the second way of generation of intermediate colors.

First he explains the generation of intermediate colors; second their distinction, where he says *And there will also be many colors* (440a 12).

Accordingly he first says that, besides the above-mentioned way, there is one other way of generation of intermediate colors according to appearance: by one of the colors appearing through another so that from two colors there results an appearance of an intermediate color. And he gives two examples.

The first is taken from artificial things. Painters sometimes place one color over another, in such a way that the more manifest—that is, the stronger and more lively—color is placed underneath: otherwise, if the weaker one were placed underneath, it would not appear at all. And they do this in particular when they

wish to make something appear in their picture as if it were in air or in water, for instance when they paint fish swimming in the sea: for then they put over the stronger color of the fish some weaker color as the color of the water.

The other example is taken from natural things. The sun of itself appears white because of the brightness of light, but when it is seen by us through a medium of fog, or smoke released from dry bodies, then it seems purple—that is, ruddy. Thus it is clear that what is in itself one color, when it is seen through another color, causes the appearance of a third color: for smoke in itself is not red, but rather black.

440a12 Then, when he says *And there will also be many colors*, he gives the explanation of the distinction of colors according to this way.

He says that intermediate colors are multiplied, in this way of generating them, in the same way as they are in the above-mentioned way, namely according to different proportions: one can take a proportion of the color placed underneath—which he describes as “in the depth”—to the color placed above—which he describes as “on the surface.” However some colors placed above and below one another are not in a proportion—that is, a numerical one—and so unpleasant colors are caused, as was also said above.

CHAPTER 7

440A15–B28

440a15 But to say, like the Ancients, that color is an emanation, and is seen due to such a cause, is incoherent. For in any case it was necessary for them to make sensing occur through contact. Therefore it is better to say at once that sensing occurs by the medium of sensing being moved by the sensible object, than by contact and emanations.

440a20 Accordingly, in the position that bodies are juxtaposed, just as it is necessary to assume an invisible magnitude, so it is also necessary to assume a length of time imperceptible to sense, so that the movements escape notice as they arrive, and it is thought that they are one thing because they appear simultaneously. But in the latter case there is no such necessity: rather, the color that is on the surface, being immobile, and moved by the one placed under it, will cause a movement that is dissimilar, and so something else will appear, and it will be neither white nor black.

440a26 Therefore if it cannot be that any magnitude is invisible, but any one is visible from some distance, this latter case, too, will be a mixture of colors. But also in the former way, nothing stands in the

way of a common color appearing to those who are at a distance. For that there is no magnitude that is invisible is to be considered in what comes after.

440a31 But there is mixture of bodies not only in the way that some think here is: by minimal parts being juxtaposed, but being unapparent to us because of the sense-power. There is also that of a whole being wholly mixed with a whole, as was said of all bodies in the discussions of mixture in general. For in the former way only those things can be mixed that can be divided into smallest parts, like men, horses, or seeds: men can be divided to a man, and horses to a horse. And so, by juxtaposition of these there is mixed together a multitude that consists simultaneously of both. But we do not say that one man is mixed with one horse. But whatever is not divided into a smallest part cannot be mixed in this way, but by being mixed from the whole, and such things are by nature mixed most thoroughly. How it is possible for this to occur was said before in the discussions on mixture.

440b13 But at the same time it is clear what necessity there is, when these are mixed, for colors also to be mixed. And this—not overlay, nor juxtaposition—is the principal cause of there being many colors, for it is not just from a distance and not close up, that one of the mixed colors appears, but from anywhere.

440b18 And there will be many colors because what is mixed together can be mixed in many proportions, some on the basis of numbers, but some according to difference alone. And the other things that were said about colors placed beside one another, and about overlay, can similarly be said of mixtures also. But the cause of species of colors, and those of flavors and of sounds, being limited and not infinite, must be considered later.

440b26 What color is, then, and the cause of there being many colors, been said. But about sound and voice something was said before in the discussions *On the soul* .

Commentary

440a15 Having presented two ways of generation of intermediate colors, here he compares the ways mentioned to one another.

On this point he does three things. First he eliminates a position from which one of the ways mentioned followed. Second he compares the ways mentioned to one another, where he says *Accordingly, in the position that bodies are juxtaposed*

(440a20). Third he shows how far each of the ways mentioned can be maintained, where he says *Therefore if it can be that any magnitude is invisible* (440a26).

Accordingly he first says that the Ancients held that color is nothing but an emanation from bodies that are seen. For as was said above, Democritus and also Empedocles held that vision occurs from such a cause as this, namely emanation of "idols" from bodies that are seen. And because everything is seen by means of its own color, they believed that color is nothing but this emanation. But to say this is completely incoherent. For they could not hold that these bodies emanating from bodies seen enter inside the eye, because thus its substance would be destroyed. Hence in any case they had to hold that vision occurs through contact of the released bodies on the eye itself, which by this contact is altered to a state of seeing. Hence if such alteration suffices to cause vision, it is better to say that vision occurs by the medium being immediately from the beginning, moved by the sensible object, than to say that vision occurs through contact and emanation: for nature provides for herself by means of as few things as possible.

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But there are also other considerations that show the abovementioned position to be false.

First because if vision occurred by contact, the sense of sight would not be distinct from touch, which is clearly false, for sight is not apprehensive of the contraries of touch.

Second because bodies seen through continuous emanation would be diminished, and finally completely used up; or if their quantity were preserved by other emanations coming to them, < ... >.

Third because since these bodies emanating from things seen would be extremely fine, they would be driven by the winds, and so direct vision would not occur.

Fourth because sight would not need light for seeing, since vision would occur through contact of the visible.

And many other such inconsistencies follow, which, because they are obvious, the Philosopher passed over.

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440a20 Then when he says *Accordingly, in the position that bodies are juxtaposed* , he compares the two ways mentioned to one another.

Here it must be considered that the first way of generation of intermediate colors was given by those who held that color is an emanation; and so, after Aristotle shows the falsity of the position in itself, he concludes to an inconsistency that follows for them in this way of explaining the generation of colors.

He says that in holding that intermediate colors are generated by the extreme colors being juxtaposed, it is necessary for them to say not only that there is a magnitude that is invisible, but also that there is a length of time that is imperceptible, to maintain their proposal. For because they held that vision occurs through local motion of emanating bodies, and because nothing is moved any distance by local motion except in time, they must assign some time in which the emanation from the thing seen to the eye occurs, and they must posit a greater time to the extent that there is greater distance. Now it is clear that there is not the same distance to the eye for all the infinitesimal bodies juxtaposed, and thus there must be different lengths of time in which the movements from them reach the eye. Therefore the whole composed of such bodies will not be seen as one thing, as was held above, unless the time in which one movement precedes another escapes notice, in which case it is necessary to posit an imperceptible length of time in this way of explaining the generation of colors.

But in the latter case—that is, in the second way—there is no necessity for an imperceptible length of time to be posited, because it is not held that vision occurs through emanation by local movement. But although the color placed on the surface remains immobile with respect to place, it is nevertheless changed by way of alteration by the color underneath, so that it affects sight in a way dissimilar to that in which either the color placed on top or the one placed underneath would of itself. Hence another, intermediate color will appear, and it will be neither white nor black.

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Now it must be considered that, even if we set aside the generation of intermediate colors that they posit, it follows for those who hold that sight occurs through emanation and contact that there is a length of time that is imperceptible. For they must say that any whole body is not seen all at once, but only through a succession of time, since they hold that sight occurs by contact, and it is not possible for a whole large body or its emanation to be touched all at once by the pupil, because of its smallness. And so it follows that there is an imperceptible length of time, since in the case of some things, it does seem to us that we see the whole of them all at once.

But it must be considered that a body that presents itself to sight can be considered in two ways.

in one way according as it is one whole in actuality, and its individual parts existing in it are in a way in potentiality: thus vision is directed to the whole all at

once, as a unit, but not determinately to any part of it.

In the other way, a body that presents itself to sight can be considered according as a part of it is taken as determinate in itself, and distinct, as it were, from other parts. And thus sight is not directed to the whole all at once, but to one part after another. And this time by which the sight of the whole is measured is not simply imperceptible, since the soul, in sensing before and after in movement, senses time, as is clear from *Physics* IV. 

But this time is more perceptible to the extent that the sense-power is sharper, and greater attentiveness is applied.

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440a26 Then, when he says *Therefore if it cannot be that any magnitude is invisible*, he shows how the two ways of generation of colors can be maintained, and how far they extend, namely to appearance.

He concludes from what was said above that, if it cannot be that any magnitude is invisible, but any magnitude is visible from some distance, it indeed follows that there will be a mixture of colors, that is, by layered colors. And also in the former way—that is, by placing of colors next to one another—nothing prevents a common color from appearing from a certain distance from which neither of the simple colors can be seen because of the smallness of the bodies. But that no magnitude is simply invisible because of smallness he says is to be made clear in what follows.

440a31 Then, when he says *But there is mixture of bodies not only*, he presents the way of the generation of intermediate colors that is according to existence, not just appearance.

First he determines the generation of intermediate colors; second he gives the reason for their distinction according to this way of generation, where he says *And there will be many colors* (440b18).

But because this way of the generation of intermediate colors is understood in relation to mixture of bodies, first he prefaces something about mixture of bodies, and second he adds something about mixture of colors, where he says *But at the same time it is clear* (440b1 3).

Accordingly he first says that mixture of bodies with one another does not occur only in the way that some thought—namely by some infinitesimals being juxtaposed with others, all of them being unapparent to our senses because of their smallness. Rather, some bodies can be totally mixed into one another, in

such a way that whole is mixed with whole, as was said in the book *On Generation* , 

where there was treatment of mixture of bodies in general.

But it is true that some things are mixed in the former way—that is, by juxtaposition of minimal parts—namely whatever can be divided down to smallest parts, as a multitude of men is divided down to one man as its one smallest part, and a multitude of horses down to one horse, and a multitude of seeds down to one seed, i.e. one grain of wheat or some such thing. Hence it can certainly be said that a multitude of such things is mixed by the smallest parts being juxtaposed, for instance if men are confusedly mixed with horses or seeds of wheat with seeds of barley. However, the mixture of such things will not be total, for individual parts of the multitudes will remain unmixed, because one man will not be mixed with one horse, nor any other such thing with any other.

But whatever is not divided into a smallest part—that is, bodies that are continuous and have similar parts, such as wine and water—is not mixed in the above-mentioned way—that is, by juxtaposition of smallest parts—because one cannot take a smallest part in them. Rather, it happens by a whole being mixed with a whole in such a way that no part remains unmixed. And such things are by nature most thoroughly—and most truly—mixed. How this can occur was determined in the book *On Generation* . 

440b13 Then, after mixture of bodies, he touches on mixture of colors, when he says *But at the same time it is clear* .

He says that from what was determined above it is clear what necessity there is that when bodies are mixed, colors are mixed. For it was said above that the transparent, according as it exists in bodies, makes colors be participated, and that the transparent is found in bodies in different ways, namely according to more and less, as is also likewise brightness. And so when bodies, in which there are brightness and the transparent, are mixed, a mixture of colors necessarily occurs, and this is the principal cause of there being many colors besides white and black. The principal cause is not overlay—that is, one color being placed over another—nor is it juxtaposition—that is, infinitesimal colored bodies being placed next to one another—because an intermediate color besides white and black appears not just from afar and not close up, but from any distance. Thus it is clear that this is the way of the generation of intermediate colors according to their existence, but that the other two ways pertain only to their appearance.

440b18 Then, when he says *And there will be many colors*

, he gives the cause of the distinction of intermediate colors according to the way of generation just described. He says that many intermediate colors are generated because bodies can be mixed together in many proportions, and consequently so can colors

themselves: some according to determinate numbers, but some according to incommensurable difference alone. And all the other things must similarly be said here about mixture that were said above in the other two ways, namely juxtaposition of colors and imposition of one color over another.

There is one thing that remains to be determined later, namely why species of colors, flavors, and sounds are finite and not infinite.

440b26 Finally, by way of epilogue, he concludes that it has now been said what color is and the cause of there being many colors. He excuses himself from a determination of sound and voice because a determination was already made about these in the book *On the soul*. For the account of their generation is the same as that of the alteration by which they alter the sense-power, which pertains to the consideration of the book *On the Soul*.

CHAPTER 8

440B28–441A29

440b28 Odor and flavor must be discussed, for they are almost the same affection. But the two of them are not in the same things.

440b30 But the genus of flavors is more evident to us than that of odor. The cause of this is that we have a sense of smell that is worse than that of other animals and than the senses that are in us, but a surer sense of touch than do the other animals. But taste is a kind of touch.

441a3 The nature of water, then, tends to be flavor. Therefore, according to what Empedocles says, water necessarily has in itself the kinds of flavors, imperceptible because of the smallness. Or, such matter is present in it like a "panspermia" of flavors, and all of them are made of water, different ones front different parts. Or, water does not contain the difference, but the cause is something acting; as some might say, it is heat and the sun.

441a10 Now to say what Empedocles did is a very obvious falsehood. For we see that heat changes flavors when fruits are placed in the sun, or on a fire, in such a way that these flavors are not caused by a "drawing in" from water, but by a change and a drying in the fruit itself. And when they are laid out for a time, they are changed from sweet to harsh, bitter, and everything else. And when they are cooked they are changed to every kind of flavor, so to speak.

441a18 Likewise it is also impossible for water to be the matter of a "panspermia." For we see different flavors caused from the same

thing, and from the same food. It remains, then until the water is changed in being affected by something.

441a21 It is clear, then, that it does not get this power we call flavor only from the power of heat. For water is the finest of all moistures, finer even than oil itself. Oil spreads out farther than water because of its stickiness; water is easily broken up, which is why it is harder to hold water in the hand than oil. When water—water alone—is heated, it does not show thickening. Therefore it is clear that there is another cause. For all flavors have more density. But heat is a co-cause.

Commentary

440b28 After the Philosopher has determined about color, here he discusses about flavor.

First he says what his intention is about. Second he carries out the proposal, where he says *The nature of water* (441a3).

Accordingly he first says that after color odor and flavor must be discussed.

On this point he gives the cause of two things.

The first is why these should be treated in conjunction, namely because of their association, for the two are almost the same affection. He calls each of them an "affection" because both are in the third species of quality, which is "affection" or "passible quality." He says that flavor and odor are "almost the same" affection because both are caused by mixture of moistness and dryness following an alteration caused by heat. However, the two of them are not altogether in the same things, because odor is more a result of dryness, and so is more principally in evaporation of smoke, but flavor is more a result of moistness.

440b30 Second, where he says *But the genus of flavors*, he gives the cause why flavor must be discussed before odor. For it would seem that odor should be discussed immediately after color, because odor like color is perceived through an external medium, but flavor is not.

But the order of learning requires that one proceed from the more to the less evident, and the genus of flavors is more evident to us than that of odors. Hence flavors must be treated first.

Flavor is more evident to us because it is perceived by us with a surer sense. For we have a sense of smell that is worse both in comparison to other animals and in comparison to other senses that are in us.

The reason for this is that, as was said above, the sense of smell is brought to

complete actuality by heat of fire. Now the organ of smell is near the brain, which is cooler and moister than all other parts of the body, as was established above, and the human being of all animals has it the largest brain in relation to the size of his body, as is said in the book *On Parts of Animals* . 

Therefore the human being is necessarily deficient in the sense of smell.

But the human being has a surer sense of touch than do the other animals, for the following reason. Since an animal's body is constituted out of objects of touch—namely heat and cold, moistness and dryness, and othe such things that follow from these—it was impossible for the organ of touch to be divested of every tangible quality in the way that the pupil is without any color: rather, the organ of touch had to be in potentiality to tangible qualities in the way that an intermediate is in potentiality to the extremes, as is said in *On the Soul* . 

And so the sense of touch is necessarily surer to the extent that the body's complexion is more well-tempered, being brought, as it were, to an intermediate state. This must be most true in the human being, in order for his body to be proportioned to the noblest form, and so the human being of all animals has the surest touch, and consequently the surest taste, which is a kind of touch. A sign of this is that the human being is less able to withstand extremes of cold and heat than are other animals. And even among human beings, one is more mentally capable than others to the extent that he has a better sense of touch, which is evident in those who have soft flesh, as was said in *On the Soul* . 

441a3 Then, when he says *The nature of water* , be carries out the proposal.

First be makes a determination about flavor according to the truth; second he eliminates the false positions of some on the nature of flavor, where he says *Democritus and most students of nature* (Ch. 10, 442a29).

The first part is divided into two. In the first be determines what the nature of flavor is, in the second be determines the species of flavors, where he says *As colors come from mixture* (Ch. 10, 442a 12).

On the first point be does two things. First be eliminates some opinions about the generation of flavors. Second be determines the truth, where he says *However many flavors* (Ch.9, 441a30).

On the first point be does two things. First be presents three opinions about the

generation of flavors. Second he disproves them, where he says *Now to say what Empedocles* (441a10).

did

In determining the nature or generation of flavor he starts with water, which seems to be the subject of flavor.

He says that the very nature of water of itself tends to be—that is, has a natural aptitude to be flavorless, and if water does have some flavor, this is from admixture of something earthen. Yet although water is of itself flavorless, it is the root and principle of all flavors, and how this is possible was explained in three ways.

Empedocles said that all flavors are in water itself in actuality, but are imperceptible because of the smallness of the parts they are rooted in.

The second opinion was that of Democritus and Anaxagoras, as Alexander says in the commentary. It was that flavors are not in water in actuality, but that there is in water a matter of flavors like a “pansperma”—that is, a universal seed—in such a way that all flavors are made of water, different flavors from different parts of water; for they held that the principles of bodies are indivisible parts. But no indivisible part is flavored in actuality: rather, a flavored body must be something composite. And so they held that these parts are not flavors in actuality, but the “seeds” of flavors, in such a way that different indivisible bodies are seeds of different flavors, as well as of different natures.

The third opinion is of those who say that the difference among flavors is due not to water itself, but to an agent that alters water in different ways, such as the sun or some other hot thing.

441a10 Then, when he says *Now to say what Empedocles did*, he disproves the opinions mentioned in order.

First, the opinion of Empedocles. He says that the statement of Empedocles is an obvious falsehood. For if the difference among flavors were present in actuality in the small parts of water, it would have to be that a change of flavor could occur only by different parts of water being drawn into the body of which the flavor is changed. But this is not always what happens: if fruits picked from a tree are exposed to the sun, or again, cooked at a fire, it is clear that their flavor is changed by the action of heat, not by some “drawing in” from water. The latter might be said about fruits that change flavor while hanging on a tree by drawing different moistures from the earth. But in fruits cut from a tree we see a change of flavor that is caused by the fruits themselves changing when there is a dissolution of the moisture in them through drying. Thus, when they are laid out for a certain time in the sun, they change from sweet to bitter, or the reverse, or to any other flavors, according to different amounts of cooking.

441a18 Second, when he says *Likewise it is also impossible*

(441a18), he disproves the second opinion, that of Democritus and Anaxagoras.

He says that it is also impossible for water to be the matter of flavors in the sense that it contains the "seeds" of them all in such a way that its different parts would be the seeds of the different flavors, because we see the one and the same body changes to different flavors. For just as the same food taken by an animal or plant is converted into different parts of the animal or plant, so it is also converted into the different flavors appropriate to the different parts; for example, in one and the same plant there are different flavors in the root, the seed, and the fruit. And different plants fed the same nourishment have different flavors. This is clear indication that different flavors are not caused by different parts of water. It remains, then, that they are caused by the fact that water changes from one flavor to another according as it is somehow affected by something that alters it.

441a21 Third, where he says *It is clear,*

then (441a21), he disproves the third opinion, that of those who say that flavors are caused only by alteration of water by heat.

He says that it is clear that water does not get the quality of a flavor only from the power of heat that alters it. For water is the finest of all moistures, that is, of all bodies that are perceptibly moist; he does not say "of all moist things" because air, which is moist, is finer than water.

Now there might be a doubt about oil, because it floats on water and spreads out farther than water does. And so, to remove the doubt, he adds that water is finer even than oil itself. The fact that oil floats on water is because of its component of air, which is also why wood floats on water. The fact that oil spreads out farther than water is because of its slipperiness and stickiness; water is very easily divided, and so one part of it does not follow after another, as happens with oil. And because water is finer and more easily divided than oil, it is more difficult to hold water in the hand than oil, for the whole of it more easily slides out of the hand.

If water is pure and has nothing mixed with it, then, because of its fineness, it is not thickened by a hot agent as are other things, in which there are earthen parts that remain when the fine moisture evaporates. Therefore, it clearly follows that one must posit another cause of the generation of flavors than alteration of water by heat, because all flavors are found in bodies with some density. This does not exclude heat as a cause that changes water to a certain flavor; but it is not the whole cause, for something else is required. Hence it is a co-cause rather than a cause.

CHAPTER 9

441A30–442A11

441a30 However many flavors show up in fruits, these exist also in earth.

441b1 Therefore many of the ancient students of nature say that water is of the same kind as whatever earth it passes through. This is most evident in salty water, for salt is a kind of earth. And that which is filtered through ash, which is bitter, produces a bitter flavor. There are also many springs, some bitter some sharp-tasting, and others with every other kind of flavor.

441b7 And so it is reasonable that the genus of flavors is produced especially in growing things.

441b8 For the moist is naturally affected by its contrary, as are other things, and the contrary is the dry. Therefore it is also affected in some way by fire, for the nature of fire is dry. And heat is proper to fire and dryness to earth, as was said in the discussion of elements.

441b12 As fire, then, and as earth, they by nature neither act nor are affected at all; nor is this the case with anything else. Rather, they act and are acted on inasmuch as there is contrariety in each of them.

441b15 Accordingly, just as those who soak colors and flavors in moisture make the water be of the same kind, nature does likewise with the dry and earthen: by filtering the moist through what is dry and earthen, and by changing it through heat, it makes the moist be of a certain quality.

441b19 And this is flavor: an affection caused in moistness by the dryness just mentioned, an affection capable of changing the sense of taste in potentiality or actuality.

441b21 For it brings the sensitive part which already exists in potentiality to this. For sensing is not like learning, but contemplation.

441 b23 Now we must take it that flavors are affections or privations not of every kind of dryness, but only the kind that nourishes, because it is neither dryness without moistness nor moistness without dryness. For food for animals is not one simple thing, but something mixed. Neither is food for plants: it is something mixed.

441b27 Of the sensible qualities of the food provided to animals, the objects of touch are what produce growth and diminution: for the cause of these is the heat and cold that is provided, for these produce growth and diminution. But what is provided nourishes

according as it is an object of taste: for everything is nourished by sweetness, whether it is simple or mixed.

442a3 We must determine about these points in the discussion of generation, but touch on them now as far as is necessary. Heat augments, and it prepares nourishment, because it draws out what is light, but leaves what is bitter and salty because of its weight. Thus what the external heat does in external bodies is what the heat in the nature of animals and plants does. Therefore they are nourished by sweetness.

442a8 But other flavors, like spicy and sharp, are mixed into food for seasoning. And they are for opposing, because sweetness is excessively nourishing, and floating.

Commentary

441a30 After the Philosopher has eliminated opinions of others on the cause of the origin of flavors, here he gives the true cause according to his own opinion.

On this point he does three things. First he gives the cause of the generation of flavors. Second he defines flavor, where he says *And this*

is flavor (441b19). Third he clarifies something he said,

where he says *Now we must take it*

that flavors are

affections (441b2 3).

On the first point he does three things. First he shows that flavors pertain to earth, and not only, as the Ancients held, water. Second he shows that water is changed with respect to flavors by dryness of earth, where he says *For*

the moist is naturally

affected (441b8). Third he concludes to the cause of

generation of flavors, where he says *Accordingly,*

just as those who soak

colors (441b15).

On the first point he does two things. First he proposes what he intends. Second he clarifies the proposal, where he says *Therefore*

many of the ancient

students of nature (441b1).

Accordingly he first says that all flavors that show up in fruits of plants, in which flavors are clearly differentiated, are also present in earth. Not that pure earth has flavor, for it has no moisture: but with a small admixture of moisture, together with an alteration caused by heat, it does acquire a flavor.

441b1 Then, when he says *Therefore many of the ancient students of nature*, he clarifies what he said by means of two signs.

The first is taken from a saying on which many of the ancient natural philosophers agree, namely those who say that water is of the same kind of flavor as the earth it passes through. This is most evident in salty water: not that of the sea itself, for that has another cause, as was shown in the book *The Meteorology* . 

rather, this is evident because the waters of certain springs are salty, having passed through earth that is similar. This should not seem surprising, because salt is a kind of earth, as are alum and sulphur; thus some mountains are made of salt. The point is also clear in the case of waters filtered through ash, which have a bitter flavor, as does the ash through which they are filtered. And there are also springs of different flavors because of the different kinds of earth through which they pass.

It should be considered that Aristotle does not introduce this point to show the universal cause of the generation of flavors, because it only clarifies the cause of flavors in water. Rather, he introduces all this as a sign to show that flavors pertain to earth, and not only to water.

441b7 He presents the second sign where he says *And so it is reasonable* .

He says that because flavors pertain to earth, it is reasonable that the genus of flavors is most evident and most various in what grows directly out of the earth, because of the affinity of such things with earth.

441b8 Then, when he says For the moist is naturally affected, he proves that moisture of water is changed with respect to flavors by earth.

First he proves the proposition. Second he eliminates an obstacle, where he says *As fire, then* (441b12).

Accordingly he first says that the moist is naturally affected by its contrary, just as all other things are also affected by their contraries, as was proved in *On Generation* I. 

But what is contrary to the moist is the dry. Hence the moist is naturally affected by the dry. And because not only earth is dry, but also fire, the moist is also affected by fire.

Now although two of the four elemental qualities belong to each individual element—fire is hot and dry, air is hot and moist, water is cold and moist, earth is cold and dry—each individual quality is in one individual element principally, as proper to that element.

Heat is proper to fire, for because fire is the noblest of the elements and the one closest to the heavenly body, what belongs to it properly and itself is heat, which is the most active quality. Dryness belongs to fire because of the extremity of the heat: the moistness is as it were consumed.

Heat belongs to air secondarily because of the latter's affinity with fire. What belongs to air of itself is moistness, which is the nobler of the passive qualities. The heat as it were dissolves the moistness, but does not completely consume it, because of air's greater distance from the first cause of heat, the heavenly body.

What properly and of itself belongs to water is cold, which is the second active quality, being as it were privatively related to heat. What belongs secondarily to water is moistness, in keeping with the nearness of water to air.

Cold belongs to earth secondarily, because of earth's nearness to water, as it were. Dryness belongs properly and of itself to earth: because of earth's very great distance from the source of heat, as it were, it is not dissolved into moistness, but remains at the extreme of density.

These points were determined in the book on elements—that is, in *On Generation* II. 

Hence the moist is by nature most affected by dryness of earth.

441b12 Then, when he says *As fire, then* , he eliminates an obstacle.

It does not follow that the moist is more affected by a greater dryness unless it is affected by dryness as dryness. But someone might deny this by saying that the moist is most affected by fire as fire.

So to eliminate this, he says that fire, as fire, by nature neither acts nor is affected at all; nor is this the case with any other body. He proves this as follows. Things by nature act and are affected by one another, according as they have contrariety, as was shown in *On Generation* I.

But nothing is contrary to fire inasmuch as it is fire, or to earth inasmuch as it is earth, or to any substance. Hence it remains that these bodies do not act and are not affected inasmuch as they are fire or earth or any such thing, but inasmuch as they are hot and cold, moist and dry.

Difficulties

I

But against this there seems to be a difficulty: if it belongs to fire of itself to be hot and dry, then, if fire acts inasmuch as it is hot, it seems to follow that it acts inasmuch as it is fire.

On this point it must be known that some thought that heat is the substantial form of fire, and according to this position, fire will have a contrary according to its substantial form, and consequently will be active according to it. But because "fire" signifies not the form alone, but the composite of matter and form, it is said in the text that fire is not active and that there is nothing contrary to it. This is how Alexander solves the difficulty in the commentary.

But this cannot stand, because the same thing cannot be in the genus of

substance and that of accident, according to the Philosopher's remark in *Physics* I: what truly is does not become an accident of anything. 

But substantial form is reduced to the genus of substance. Hence it cannot be that heat is the substantial form of fire, since it is an accident of other things.

Again, substantial form is perceived not by sense but by intellect, for "what something is" is the proper object of intellect, as is said in *On the Soul* III. 

Hence, since heat is something sensible per se, it cannot be the substantial form of a body.

Therefore it must be said that heat per se is present in fire not as its substantial form, but as its proper accident. And because natural action belongs to a contrary that causes alteration, fire acts according to its heat, to which there is something contrary, and not according to its substantial form, which has no contrariety.

This is unless "contrariety" is taken in a wide sense with respect to the difference between perfect and imperfect in the same genus. In this sense contrariety is also found in numbers according as a smaller number stands as something imperfect, and a part, in relation to a larger one. The substantial forms of things are like numbers, as is said in *Metaphysics* VIII. 

And in this sense there is also contrariety between the differences of any genus, as is said in *Metaphysics* X, for thus animate and inanimate, and sensible and insensible, are contraries. 

II

But there still might be a difficulty. For if the principle of action in the elements is not substantial, but accidental, form, then, since nothing acts beyond its own nature, it does not seem that matter is changed by the natural action of the elements with respect to substantial form, but only with respect to accidental form.

For this reason some held that all substantial forms are from a supernatural cause, and that a natural agent merely disposes to a form by altering. 

This reduces to an opinion of the Platonists, who held that separate forms are the cause of generation and that all action is from an incorporeal power. On the other hand the Stoics, as Alexander says, held that bodies act of themselves, that is, inasmuch as they are bodies. But Aristotle here holds the middle way, which is that bodies act according to their qualities.

And so it must be said that each thing acts according as it is (*ens*) in actuality, as is clear from *On Generation I* .



But just as the being (*esse*) of elemental qualities is derived from their essential

principles, so, necessarily, power of acting also belongs to such qualities from the power of the substantial forms. But everything that acts by the power of something else produces something like that in the power of which it acts: for instance a saw makes a house by the power of the house that is in the soul; and natural heat generates animate flesh by a power of soul. And it is also in this way that matter is changed by the action of elemental qualities with respect to substantial form.

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441b15 Then, when he says Accordingly, just as those who soak colors, he concludes from the foregoing to the generation of flavors.

He says that just as those who soak colors and flavors—that is, colored and flavored bodies—in moisture of water make the water be of the same kind of color and flavor, so, conversely, when moistness of water is filtered through dryness of earth, and at the same time there is a change caused by heat digesting the moistness, and making a kind of mass moistness with dryness, then the moistness of water becomes qualified by a flavored quality.

441b19 Then, when he says *And this is flavor*, he introduces a definition of flavor on the basis of the foregoing.

He says that flavor is nothing but an affection caused in moistness of water by the dryness mentioned—that is, dryness of earth—with addition of heat; an affection that, by changing the sense of taste in potentiality, brings it to actuality. This last part is added to differentiate odor from other affections that are caused by moistness and dryness through action of but that alter not taste, but other senses.

441b21 Then, when he says *For it brings the sensitive part*, he clarifies the definition of flavor just stated with respect to its last part. For the first part is clear from the foregoing; but he said that flavor alters the sense of taste “in potentiality.”

To clarify this he adds that flavor, like any sensible object, brings to actuality the sensitive part, which previously was in potentiality to the sensible object, because sensing, which follows from the action of a sensible object on a sense-power, is not like learning, but contemplation. That is, it is unlike what learning is, because a habit of science is newly produced in one who learns, but a sense-power is not newly produced by the action of the sensible object in one who senses: rather, the sense-power is made operative in actuality, which is like what happens in one who contemplates in actuality.

441b23 Then, when he says *Now we must take it that flavors*

are affections , he clarifies something he said above, namely that flavor is not only in moistness or in dryness.

On this point he does three things. First he shows that flavor is based on the moist and the dry together. Second he proves something he presupposed, where he says *Of the sensible qualities* (441b27). Third he clarifies the proof, where he says *We must determine* (442a3).

Accordingly he first says that flavors are affections—with respect to sweet—or privations—with respect to bitter, which is related to sweet, as black is to white, that is, as something imperfect and a privation—not of just any dryness, but of nourishing dryness—that is, the dryness by which animals or plants can be nourished. From this we can take it that neither dryness without moistness nor moistness without dryness pertains to flavor, because the food by which animals are nourished is not what is just moist or dry, but something mixed front these. For we are nourished by the same things out of which we are composed, as was said in *On Generation* II. 🗨️

And the argument is the same in the case of plants.

441b27 Then, when he says *Of the sensible qualities* , he proves something he presupposed, namely that flavor is an affection or privation in nourishment.

Here it must be considered that the food that is provided to animals serves them for two purposes, namely growth, by which they are brought to perfect size, and nourishment, by which their substance is preserved. Food also serves them for generation, but this no longer pertains to the individual, but the species.

Accordingly he says that the food provided to animals, being sensible objects inasmuch as they are objects of touch, cause growth and diminution, because heat and cold cause growth and diminution: heat properly causes growth, for it belongs to heat to expand and spread out, moving, as it were, towards a circumference; cold causes diminution, because it belongs to cold to constrict, moving, as it were, towards a center. Hence animals grow in youth and shrink in old age. The remark in *On the Soul* it that food causes growth inasmuch as it is quantitative does not contradict this, because quantity would not suffice for growth if there were not heat to couvert and digest it. 🗨️

But the food provided nourishes inasmuch as it is an object of taste. He proves this as follows: everything is nourished by sweetness, which is perceived by taste, whether by simple sweetness or by sweetness mixed with other flavors. And the remark of *On the Soul* it that touch is “the sense of food” does not contradict this, because there he places “moisture”—that is, flavor—among the objects of touch, and in the same place he says that flavor is “the

pleasurable in food” inasmuch as it indicates suitability of food. 

442a3 Then, when he says We must determine, he confirms the foregoing proof.

First inasmuch as he said that everything is nourished by sweetness. Second inasmuch as he said something about admixture of other flavors, where he says *But other flavors* (442a8).

Accordingly he first says that we must determine what pertains to growth and nourishment in the discussion of generation. He said something about this in the book *On Generation* in general, 

but still more has to be said about it in the book *On the Generation of Animals*

, to which the consideration of food of animals pertains. it But now, as far as pertains to the present proposal, one point must be touched on, namely that natural heat actively augments by an expansion, and prepares nourishment by digesting, inasmuch as it draws out what is light and sweet and leaves what is salty and bitter because of its heaviness, which is why all feces of animals are quite bitter or salty. He illustrates this by something similar in the universe as a whole. What natural heat does in animals and plants, the sun’s heat does in external bodies: it draws out the fine moistness and leaves what is earthen and dense. Hence rainwater is sweet, although the sea, from which most evaporation occurs, is salty. From this he concludes that all things are nourished by sweetness, which is drawn out by natural heat.

442a8 Then when he says *But other flavors*, he gives the cause of the admixture of other flavors into food.

He says that other flavors are mixed in sweet food, which alone nourishes, for seasoning, as is evident with the spicy and sharp flavor, so that they may restrain the sweetness from nourishing excessively. For sweetness is extremely filling, and floating, for it is easily drawn out by heat because of its lightness.

CHAPTER 10 442A12–B26

442a12 As colors come from mixture of white and black, so flavors from sweet and bitter.

442a13 And these are also according to proportions, for each is more or less, whether according to numbers in the mixture and the change, or indeterminately. But the ones that cause pleasure are only those mixed numerically.

442a17 The sweet flavor is rich-tasting; bitter and salty are almost the same; pungent, harsh, astringent, and sharp are in the middle.

442a19 The species of moistures and of colors are almost equal. If one posits seven species of each, then, as it is reasonable for gray to be a kind of black, it follows that yellow belongs to white as oily does to sweet. And in the middle between black and white are punice, alurgon, green, and cyanum. And the others are mixed from these.

442a25 As black is privation of white in the transparent, so bitter and salty are of sweet in the nourishing moist. Therefore the ash of all burnt things is bitter, for the potable has been evaporated from them.

442a29 Democritus and most students of nature—whichever ones speak about the senses—do something very inconsistent: they make all sensible objects, objects of touch. If this is so, it is clear also that each of the other senses is a kind of touch. But it is not difficult to discern that this is impossible.

442b4 Moreover, they treat the common objects of all the senses as if they were proper. Size and shape, rough and smooth, and the sharp and dull that are in masses, are common objects of the senses—if not of all of them, then of sight and touch. Therefore they are deceived about these, but they are not deceived about the proper objects; for instance, sight is not deceived about color or hearing about sounds.

442b10 Some reduce the proper objects to these, as Democritus does. Of white and black, he says that one is "rough," the other "smooth." And he reduces flavors to shapes.

442b13 But to know the common objects belongs either to no sense, or above all to sight. If it were above all to taste, then, since it belongs to the surest sense to discern what is smallest in any genus, taste would have to be best at perceiving the other common objects, and best at discerning shapes.

442b17 Moreover, all sensible objects have contrariety, for example of white to black in color, and of bitter to sweet in flavors. But shape is not thought to be contrary to shape. For to which of the polygons is the circumference contrary?

442b21 Moreover, since there are infinite shapes, there would necessarily be infinite flavors. Why then does this one cause a sensation but not that one?

442b23 Something, then, has been said about flavor and the object of taste. Other affections of flavors have their proper consideration in the philosophy about plants.

Commentary

442a12 After the Philosopher has determined the generation of flavor, here he distinguishes species of flavors.

On this point he does three things. First he shows the generation of intermediate flavors in general. Second he shows how intermediate flavors are diversified, where he says *And these are also*

according to

proportions

(442a13). Third he shows how sweet

and bitter are related to one another, where he says *As*

black is privation of

white

(442a25).

Accordingly he first says that as intermediate colors are generated from mixture of white and black, so intermediate flavors are generated from mixture of sweet and bitter, whether from these in themselves or from mixture of the causes of sweet and bitter.

Heat causes the sweet flavor by thoroughly digesting the moisture.

The cause of bitterness is privation of this completely digested moisture. Other flavors are caused according as the moisture is in an intermediate state because it is neither wholly consumed nor wholly undigested.

Flavor more immediately follows from moisture than from heat.

Therefore, one should consider the intermediate and extremes not in relation to heat, but in relation to moisture affected in a way by dryness and heat, for the nature of flavor principally consists in this. Otherwise, if the intermediate and extremes in flavor were taken in relation to heat, sweet and bitter would not be extremes, but sweet would be intermediate. For intense heat that consumes the cold, but does not digest <the moisture>, causes bitterness; heat that, because of the dominance of cold, entirely fails to digest <the moisture> causes the pungent or the sour flavor; and a moderate heat sufficient to digest <the moisture> causes sweetness.

442a13 Then, when he says *And these are*

also according to

proportions

, he treats of the distinction of

intermediate flavors.

First with respect to the difference between pleasant and unpleasant; second with respect to terms, where he says *The sweet*

flavor is rich-tasting

(442a17); third with respect to number, in a comparison with colors, where he

says *The species of*

moistures

(442a 19).

Accordingly he first says that intermediate flavors vary according to different proportions of the mixture, that is, inasmuch as each of them either more or less approaches sweetness or bitterness. This happens in two ways, as described in the case of colors: in one way according to a numerical proportion observed in the mixture described, and in the alteration of the moisture by the heat; in another way according to an indeterminate difference without numerical proportion. And only those flavors are pleasing to taste that are mixed according to a numerical proportion.

442a17 Then, when he says *The sweet flavor is rich-tasting*, he distinguishes intermediate flavors by name.

He says that the rich-tasting flavor is almost the same as the sweet, for both indicate digestion of the moisture by the heat. However, the heat evidently dominates the moisture more in the sweet flavor. Thus the rich-tasting flavor is closer to a watery or insipid flavor, because of an abundance of the moisture in it.

Likewise the bitter flavor and the salty are almost the same, for both evidence an extreme heat that consumes the moisture. However, there seems to be greater consumption of moisture in the bitter than in the salty: in the salty the moisture infused into the body seems to be consumed; but in the bitter the moisture binding together the substance of the body seems to be not just consumed, but dissolved, whether in whole or in part. Hence the remains of dissolved and burnt bodies are bitter.

In the middle are the pungent flavor, i.e. the flavor with "bite"; the harsh, i.e. vinegary flavor; the astringent; and the sharp.

The pungent and the vinegary consist in moisture that, because of the weakness of the heat, is undigested. For this reason unripened fruits have either a vinegar flavor, like sour plums, or a pungent flavor, like sour pears. But the pungent seems to have more earth, which is why earth has an almost pungent flavor. The vinegary seems to have more (old).

The astringent flavor seems also to have much earth: it is close to the pungent, but it has more heat, for it more closely approaches digestion <of the moisture>. Hence some dried fruits (digesta), for example myrtle-berries, have an astringent flavor.

The sharp flavor indicates an excess of heat that does not consume, but thoroughly digests, the moisture.

442a19 Then, when he says *The species of moistures*, he distinguishes intermediate flavors with respect to number by means of a comparison with colors.

He says that the species of "moistures"—that is, flavors—are almost equal in number to the species of colors. Seven species of flavors are to be enumerated,

in such a way that the rich-tasting flavor is not distinguished from the sweet, but the salty is distinguished from the bitter. Thus, if to the other four are added these three flavors, there will be seven flavors.

Likewise it is reasonable to say, on the side of colors, that gray is related to black as salty is to bitter; and that yellow is related to white as rich-tasting is to sweet.

In the middle will be these colors: "punic," i.e. red; "alurgon," i.e. citron; green; and "cyanum" or blue, i.e. the color of the sky. These are arranged such that green and blue more closely approach black, while red and citron more closely approach white.

There are also very many other species of colors and flavors by mixture of the species mentioned with one another.

442a25 Then, when he says *As black is privation of white* , he compares bitter to sweet.

He says that as black is the privation of white in the transparent, so bitter or salty is the privation of sweet in nourishing moisture. For one of two contraries always stands as a privation, as is clear from *Metaphysics* X.



Because bitter is the privation of sweet, the ash of all burnt things is bitter, because of evaporation of the nourishing moistness, which he calls "the potable."

442a29 Then, when he says Democritus and most students of nature, he eliminates false opinions of others about the nature of flavors.

First with reference to all sensible objects in general. Second with reference to flavors in particular, where he says *Some reduce the proper objects* (442b 10).

On the first point he does two things. He disproves the opinion of the Ancients, first inasmuch as they reduced all sensible objects to tangible qualities; second inasmuch as they reduced proper sensible objects to common sensibles, where he says *Moreover, they treat the common objects* (442b4).

Accordingly he first says that Democritus and most natural philosophers—whichever ones got involved in speaking about the senses—do something very inconsistent, because they say that all sensible objects are objects of touch. If this were true, it would follow that any sense-power would be touch, since powers are distinguished according to objects. But it is easy to see that this is false, because other senses perceive through an external medium, and touch does not.

442b4 Then, when he says *Moreover, they treat the common*

objects , he criticizes the Ancients for treating the common sensible objects as if they were proper. They reduced colors, flavors, and other sensible objects to size and shape. Size and shape; rough and smooth according as they pertain to shape; and likewise sharp and dull, which pertain to features of shapes that have angles—these are common objects of the senses. Although not all of them are perceived by all senses, all are perceived at least by touch and sight, and so they are not proper sensibles, because thus they would be perceived by only one sense.

He speaks of the sharp and the dull “in masses” (*in glebis*), or, according to another reading, “in bulks” (*in molibus*). He means the sharp and the dull “in bodies,” and he says this in order to distinguish them from what is called “sharp” in the case of voices, and in the case of flavors.

He shows that the foregoing are common sensibles by means of a sign: the senses are deceived about the kinds of things mentioned, but are not deceived about the proper sensibles; for instance, sight is not deceived about color or hearing about sounds.

442b10 Then, when he says *Some reduce the proper objects* , he eliminates the opinions on a specific point.

First he relates them. Second he disproves them, where he says *But to know the common objects* (442b13).

Accordingly he first says that some reduce the proper sensible objects to these common ones. For example, Democritus said that black is rough, thinking that the darkness of black is caused by higher parts in the roughness hiding the other parts; and he said that white is smooth, thinking that the brightness of white comes from the smoothness being completely illuminated because its parts lie level. And he reduced flavors to shapes, because he found “sharp and dull” in flavors as well as in shapes, being deceived by an equivocation.

442b13 Then, when he says *But to know the common objects*, he disproves the abovementioned opinion about flavors by three arguments.

The first is that no sense apprehends shapes as its proper objects, and if they were the proper objects of a sense, they would pertain above all to sight. But if flavors were shapes, it would follow that taste above all would know them. If this is true, then, since any sense is surer inasmuch as it can better discern even what is smallest in any genus, it would follow that taste, as the surest sense, would be best at sensing the common sensibles, and best at discerning shapes, which is obviously false, because sight is more powerful in this regard.

442b17 He presents the second argument where he says

*Moreover, all sensible
objects* .

It is this. All sensible objects have contrariety, because alteration occurs with respect to them, as was proved in *Physics* VII. 

For example, in color the contraries are black and white, in flavors sweet and bitter, and the same is clear in other cases.

There seems to be an exception in the case of light, which of itself does not have contrariety: for it exists as a proper quality of the highest body, which is without contrariety; and darkness is opposed to it as a privation, not a contrary. However, light does have contrariety according as it is participated in colors.

But shape does not seem to be contrary to shape, for it is impossible to determine to which of the polygons—that is, figures with several angles—the circumference—that is, the circle, which has no angles—is contrary. For contraries stand farthest apart, but no shape can be instanced such that another shape with more angles cannot be found. Therefore flavors are not shapes.

442b21 He presents the third argument where he says
*Moreover, since there
are infinite shapes* .

It is this. Shapes are infinite, as are also numbers, for they are multiplied according to the number of angles and lines, as is clear in the triangle and the square. Therefore, if flavors were shapes, it would follow that there are infinite species of flavors. This is clearly false, because there is no reason why one flavor would be perceived and not another. But the sense-power does not discern an infinite number of flavors. Therefore flavors are not shapes.

442b23 Finally, adding an epilogue, he concludes that something has been said about flavor and the object of taste, but other properties of flavors have their proper consideration in the book *On Plants* . However, Aristotle did not write this book, but Theophrastus, as Alexander says at this point in the commentary.

CHAPTER 11

442B27–443B16

442b27 Odors must be understood in the same way. For what dryness causes moistness, enchyous moistness causes in another genus, namely air, and was well.

442b29 We now call what is common in these the transparent. But this is an object of smell not according as it is transparent, but according as it is capable of being soaked or cleansed by enchyous dryness.

443a2 The odorous is not only in air, but also in water. This is clear in the case of fish and testacea, for they seem to smell. And air does not exist in water, for it floats to the top when it is in water. And these animals do not breathe.

443a6 Accordingly, if one holds that water and air are both moist, odor will be the nature of enchymous dryness in moisture, and the odorous is what is such.

443a8 That this affection is caused by the enchymous is clear both from what has and from what does not have odor. For the elements, namely fire, air, earth, water, are odorless, because both the dry and the moist ones are achymous unless a mixture is made. This is why the sea has odor, for it has moisture and dryness. And salt is more odorous than niter (the fact that oil flows out of these is revealing), but niter has more earth.

Moreover, a stone is odorless, for it is achymous. But woods are odorous, for are enchymous, and those that are watery are less odorous.

Moreover, among metals, gold is odorless, for it is achymous. Brass and iron are odorous, but when the moisture is burned out of them, their slag is made odorless. Silver and tin are more odorous than some, but less than others, for they are watery.

443a21 Now it seems to some that odor is a smoky evaporation, and that this common to earth and air. They all speak of odor on this basis. Thus Heraclitus says that if all beings became smoke, the nostrils would discern them. They all introduce some such cause of odor, some presenting it as an "exhalation," some as an "evaporation," and some as both of these. Vapor is a kind of moisture, but smoky exhalation, as was said, is something common to air and earth. Water is produced from the former, but a kind of earth from the latter.

443a29 But odor seems to be neither of these, for vapor belongs to water, but smoky evaporation cannot occur in water. For animals in water also smell, as was said above.

443b1 Moreover, they use the term "evaporation " as they do the term "emanations." Therefore, if the latter is not correct, neither is the former.

443b3 Therefore it is not hard to see that moisture—both that in wind and that in water—can receive and be affected in some way by enchymous dryness. For air too is by nature moist.

443b6 Moreover, if this produces in what is moist and in air

something like dryness that has been soaked, it is clear that odors must be analogous to moistures.

443b8 And in some cases they are so, for odors are also "sour" and "sweet" and "harsh" and "pungent" and "rich." And one might say that what is putrid is analogous to what is bitter: as the latter is difficult to drink, what is putrid is dysanapneustic. It is clear, then, that what flavor is in water, odor is in air and water.

443b14 For this reason cold and cohesion make flavors dull and drive out odors: for cold and cohesion remove the heat that moves and generates them.

Commentary

442b27 After the Philosopher has made a determination about flavors, here he begins to make a determination about odors.

This is divided into two parts. In the first he makes the determination about odors. In the second he compares the sense of smell to the other senses, where he says *The senses exist in an odd number* (Chapter 13, 445a4).

On the first point he does two things. First he determines the generation and the nature of odor. Second he determines the species of odor, where he says *There are two species of the odorous* (Chapter 12, 443b 17).

On the first point he does two things. First he shows what is passive in the generation of odors. Second he shows what is active in it, where he says *That this affection is caused by the enchymous* (443a8).

On the first point he does three things. First he presents his intention. Second, he explains something he said, where he says *We now call what is common* (442b29).

Third he proves it, where he says *The odorous is not only in air* (443a2).

Accordingly he first says that the generation of odors must be understood in the same way as that of flavors: that is, there is something passive and something active. What was said about flavors was that the moistness of water is affected by the dryness of earth, and thus is brought by the action of heat to the condition of being flavored. But what is active in the generation of odor is enchymous moistness. It is called "enchymous" from "en," which means "in," and "chymous," which means "moisture": for the moisture exists as, so to speak, drunk in by and incorporated into something dry. This, then, is what is active in odor. What is

passive is another genus that includes air and water.

442b29 Then when he says *We now call what is common*

, he explains that this genus is that is common to air and water and is receptive of odor.

He says that what is common to the two is called the transparent. However, the transparent as transparent is receptive not of odor, but of color, as was established above: but it is receptive of odor according as it is capable of being soaked or cleansed by enchymous dryness, that is, according as it is receptive of enchymous dryness. He calls this reception a "soaking" or a cleansing" inasmuch as a thing is naturally washed or cleansed by the moisture it receives.

443a2 Then when he says *The odorous is not only in air*

, he proves something he presupposed, namely that not only air but also water is receptive of odor.

First he introduces a proof of this. Second he concludes to what is properly receptive of odor, where he says *Accordingly, if one holds that water and air*

(443a6).

Accordingly he first says that odor is received not only in air, but also in water. This is clearly shown by the fact that fish and testacea—that is, hard-shelled animals that live in water—seem to smell from the fact that they are attracted from a distance by odor to food they cannot see. From this it is clear, by two arguments, that water is receptive of odor.

First, these animals live not in air but water. And he proves that there is no air under water, where fish of this kind live, by the fact that air floats to the top of water even if it is put underwater. This is evident in the case of an inflated bag, which, if submerged by force, will float to the surface of the water.

Second, even granting that there is air under water, nevertheless such animals do not breathe air. Therefore, if only air were receptive of odor, they would not perceive odor.

443a6 Then, when he says *Accordingly, if one holds that water and air*

, he concludes to what is properly receptive of odor.

He says that because air and water, which are receptive of odor, are moist, it follows that odor is nothing but the "nature"—that is, the form—impressed by enchymous dryness on the moisture that is air and water. And the odorous is what is such: that is, moisture with a "nature" impressed on it by enchymous dryness.

443a8 Then, when he says *That this affection is caused by the enchymous*

, he proves that the enchymous

causes odor.

He proves this in three ways: first by what has and what does not have odor; second, where he says *Now it seems to some* (443a2 1), by different opinions some have held about odor; third, where he says *Moreover, if this produces* (443b6), by the affinity of odor with flavor.

Accordingly he first says that it is clear, both from what has and from what does not have odor, that this affection that is odor is impressed by the enchymous—that is, by moistness instilled in and absorbed by dryness, as was said above.

First, because all the elements, namely fire, air, water, and earth, lack odor. For whether they are moist or dry, they are *achymous*—that is, without moisture absorbed by dryness—for those that are moist have moistness without dryness, and those that are dry have dryness without moistness. This is the case unless a mixture of elements is made. Thus the sea has an odor, because dryness of earth has been mixed into moisture of water in it, as is clear from its salty flavor: for salt has even more odor than does niter. And that these two—salt and niter—do have something of the enchymous, is clear from the oil that is brought out of them by means of a certain technique, which shows that there is in them an oily moisture absorbed by dryness. But niter has less of this moisture than does salt, and so is less odorous.

Second, he shows the same thing in the case of stones and woods. He says that a solid and hard stone lacks odor because, due to its great component of earth, it does not have the odor-causing moisture mentioned. But woods do have odor because they do have something of the moisture mentioned, as is clear from the fact that they are inflammable because of an oiliness that exists in them. Hence woods that have a more watery and less oily moisture—one that is not absorbed, as it were, by dryness—are less odorous. This is clearly the case with poplar wood. But fir and pine woods are very odorous because of the oiliness of their moisture.

Third, he shows the same thing in the case of metals, among which gold is completely odorless, because it lacks the moisture mentioned; this is due to its large component of earth, which is indicated by its very great weight: for it is heavier than other metals. Brass and iron are odorous, because the moisture in them is digested and drunk in by the dryness, but not wholly overcome by it, as it is in the case of gold; hence their slag is less odorous because of the burning off of the moisture in them. Silver and tin are more odorous than gold, but less than brass and iron: for they have a moisture that is more watery and less absorbed by dryness than do brass and iron; however, because their moisture is in a way absorbed by dryness, they are not completely odorless like gold.

443a21 Then, when he says *Now it seems to some*, he shows that the enchymous is what is active in odor through

opinions of others.

On this point he does three things. First he presents the opinions of the others. Second he eliminates them, where he says *But odor seems to be neither of these* (443a29). Third he concludes to his proposal, where he says *Therefore it is not hard to see* (443b3).

Accordingly he first says that it seems to some that odor is a smoky evaporation, smoke being common to air and earth, i.e. an intermediary between them, as it were, because it is something dissolved from dryness of earth that does not achieve the fineness of air. All of the Ancients speak of odor in a way close to this position. Hence Heraclitus says that if all beings were dissolved into smoke, the nostrils, in perceiving odor, would discern all beings, as if to say that all beings would be odors. For Heraclitus thought that vapor is a principle of things. But not all philosophers held that odor is smoke; some held that it is just something like it. Therefore, in order to show this diversity, he adds that some assigned "exhalation" to odor, some "evaporation," and some both. And he shows the difference between these two: evaporation is nothing but dissolved moisture of water, but exhalation or smoke is something common to air and earth, since it is something dissolved from dryness of earth, as was said. A sign of this difference is that when vapor is condensed, water is generated from it, but when exhalation of smoke is condensed, something earthen is generated from it.

443a29 Then, when he says *But odor seems to be neither of these* , he eliminates the above-mentioned positions by two arguments.

The first is that vapor pertains to water, which is not odorous without an admixture of dryness, as was said above. But smoke cannot occur in water, although odor does occur in it, as was shown above by the fact that some animals can smell in water. Therefore odor is neither smoke nor vapor.

443bl Then, when he says *Moreover, they use the term " evaporation,* " he presents the second argument.

It is this. The argument that odor should be called an "evaporation" is similar to the argument that colors should be called "emanations. " But as was shown above, the latter is not a correct description of colors; therefore, neither is the former a correct description of odors. For in both cases would follow that sensing occurs through contact, whether of the odors or of the colors, and that bodies seen and smelled are diminished and finally completely dissolved by the emanation or dissolution. And this is unreasonable, especially since a thing can be seen and smelled from such a distance that there is no way that something

dissolved from the body could be carried that far. Rather, perception of both color and odor occurs at such distance through a spiritual alteration of the medium.

443b3 Then, when he says *Therefore it is not hard to see* , he concludes to the proposal, namely that, because odor is neither vapor nor smoke, it is clear that moisture in "wind"—that is, air—and water is affected by enchymous dryness, and thus odor occurs and is perceived. For moisture is present not only in water, but also in air.

443b6 Then, when he says *Moreover, if this produces* , he shows that the enchymous is what is active in odor by the affinity of odor with flavor.

On this point he does three things.

First he presents the proposal. He says that if the enchymous causes odor in the moisture of water and air, in the way that the dryness of earth soaked by the moisture of water causes flavors, it is clear that odors must be analogous to flavors.

443b8 Second, where he says *And in some cases* , he clarifies the proposal by co-coordinating odors with flavors.

He says that in some cases this coordination is evident. For odors are called "sour" and "sweet" and "harsh"—that is, astringent—and "pungent" and "rich," just like flavors. But we do not call odors "bitter": rather, putrid odors correspond analogously to bitter flavors, for just as bitter flavors are swallowed with difficulty, so what is putrid is "dysanapneustic"—that is, difficult to inhale. Hence it is clear from this affinity of odor with flavor that flavor occurs in water in the way that odor occurs in air and water.

443b14 Third, where he says *For this reason* , he proves the abovementioned affinity through impediments to flavor and odor.

Flavors are made dull, and odors are driven out, by cold and freezing, as the heat that generates and moves odors and flavors is removed by cold and freezing, as is clear from what was said.

CHAPTER 12

443B17–444B7

443b17 There are two species of the odorous. For it is not the case that, as some say, there are no species of the odorous; there are. But the ways in which there are and are not must be determined.

443b19 One kind of odor is ordered according to flavors, as was

said. These contain the pleasant and unpleasant accidentally. For because odor is an affection of nourishment, these odors are pleasant to those that have an appetite. But to those that are full and not in need, neither the odors nor the food that has the odors is pleasant. Therefore, as we said, these contain the pleasant and unpleasant accidentally, and for this reason they are common objects for all animals.

443b26 But some odors, such as those of flowers, are pleasant of themselves.

443b28 For they do not follow from food with respect to more and less. And they do not contribute anything to desire, but rather the contrary. For what Thracius said in criticism of Euripides is true: "When you cook lentils, you don't pour on ointment."

443b31 And those who do mix such virtues into drinks do violence to pleasure by the practice until it becomes pleasant to two senses, in the way that one thing is pleasant to one.

444a3 This species of the odorous, then, is proper to the human being. But the kind that is ordered according to flavors is also an object for other animals, as was said above. And because the latter contains the pleasant accidentally, its species are divided according to flavors. But the former is not, because its very nature is, of itself pleasant or unpleasant.

444a8 Now the cause of this kind of odor being proper to the human being is the coolness around his brain. For the brain is cool by nature. And the blood around it in narrow veins is fine and pure, but easily cooled. For this reason, fumes from food, when cooled because of the coolness of this region, cause rheumatic illnesses in human beings. This kind of odor is produced as an aid to health, for it has no other function than this, and this it clearly has.

444a16 The odor that is pleasant because of food, dry or moist, is often unhealthy. But that which is pleasant because of odor that is of itself odorous, whatever it may be, is always useful, so to speak.

444a19 For this reason it is done by breathing—not in all animals, but in human beings and those that have blood, such as quadrupeds and those participate more in the nature of air.

444a22 When odors rise to the brain because of the lightness of the heat in them, this area is healthier. For odor by nature has the power of heat. Nature uses breathing for two things: actively as an aid to the chest, and adventitiously for odor. For in breathing one causes movement through the nostrils as through passageway. This

genus of odor is proper to the nature of the human being because he has a bigger and moister brain in proportion to his size than do the other animals. And for this reason the human being, alone among the animals so to speak, senses and enjoys the odors of flowers and such things: for their heat and movement are commensurate with the hyperbole in this area of coolness and moistness.

444b2 To the other animals that have lungs nature gave sensation of the other kind of odor by means of breathing, so as not to make two sensitive parts. For this is sufficient. Just as it is by breathing that human beings have sensation of both kinds of the odorous, in the same way these animals have sensation of just one kind.

Commentary

443b17 After the Philosopher has determined the generation and nature of odor, here he determines the species of odors.

On this point he does two things. First he determines the various species of odor. Second he determines the modes of smelling, where he says *For this reason* (444a 19).

On the first point he does three things. First he proposes that there are species of odor. Second he determines the species of odor by correspondence with species of flavor, where he says *One kind of odor* (443b19). Third he determines the species belonging to odor of itself, where he says *But some odors* (443b26).

Accordingly he first says that there are two species of the odorous, one by correspondence with flavors, the other pertaining to odor in itself. For what some say, that the odorous does not have species, is false, for it does. But we have to determine the ways in which it does and does not have species.

It is possible to determine species of odors by agreement with species of flavors, as was said above. But the species of odor in itself are determined only by reference to the different kinds of odorous things, as when we say that the odors of roses, violets, and other such things are different. It is in these odors that the pleasant and the unpleasant are discerned.

443b19 Then, when he says *One kind of odor*, he determines about the species of odors that follow from the species of flavors.

He says that among odorous things, one kind is ordered according to the species of flavor, as was said above, and so the pleasant and unpleasant are in them accidentally, that is, not inasmuch as they have odor, but inasmuch as their odor indicates nourishment. For odor is an affection of nourishment, as flavor also is:

for an animal discerns appropriate nourishment from a distance by means of odor, as it discerns appropriate nourishment taken in by means of flavor. And so these odors are not pleasant to animals that are full and not in need of food, just as neither is food that has these odors pleasant to them; but it is pleasant to animals that have an appetite for food—that is, ones that are thirsty or hungry—just as food or drink is also desirable to them. Hence it is clear that this kind of odorous contains the pleasant and unpleasant accidentally—that is, because of nourishment—as was said. And because nourishment is common to all animals, all animals perceive these odors. But the “all” must be understood with reference to animals that have forward movement, and have to seek food from a distance by means of odor; in the case of immobile animals, taste and touch suffice for discerning suitability of food.

443b26 Then, when he says But some odors, he determines the per se species of odor.

First he presents these species odor. Second he shows which animals perceive them, where he says *This species of the odorous* (444a3).

On the first point he does three things. First he presents what he intends. Second he proves the proposal, where he says *For they do not follow* (443b28). Third he eliminates an objection to the contrary, where he says *And those who do mix* (443b31).

Accordingly he first says that some odors are pleasant of their very selves, that is, not in relation to food, and this is said to be the case with the odors of flowers.

443b28 Then, when he says *For they do not follow*, he proves that such odors are of themselves pleasant.

This is because they are not related to food as a consequence of it, that is, such that animals with an appetite for food take more pleasure in these odors, and animals that are full less full less pleasure. Also, such odors do not contribute anything to desire for food in the way that the odors discussed above provoke an appetite for food. Rather the contrary occurs: food is made unpleasant by being mixed with things that have this kind of odor, because often what smells good inasmuch as it has this kind of odor, nevertheless has a bad taste. To confirm this he introduces a saying of a certain comic poet named Thracius or Stratides, who, in criticism of another poet—namely Euripides, who devised very fastidiously prepared dishes—said: “When you cook lentils, you don’t pour on ointment”—that is, sweet-smelling perfume; as if to say: “You shouldn’t add anything sweet-smelling to your relish.”

443b31 Then, when he says *And those who do mix*, he eliminates an objection that could be made because of the custom of some who do mix such things into food.

He answers by saying that those who do mix “virtues”—that is, odorous things—of this kind with food and drink do violence to natural pleasure by their custom in order to reach a point where one and the same thing is pleasant to two senses, namely taste and smell, whereas by nature one thing is pleasant to one sense.

444a3 Then when he says *This species of the odorous* , he shows by what animals such objects of smell are perceived.

On this point he does three things. First he presents what he intends.

Second he gives a cause of what was said, where he says *Now*

the cause of this kind

of odor

(444a8). Third he excludes an objection, where he says

The odor that is

pleasant

(444a 16).

Accordingly he first says that this species of the odorous that of itself pleases or displeases is proper to the human being, for the human being alone discerns such objects of smell and is pleased or displeased by them; hence, to this extent, the sense of smell is richer in the human being than in other animals. But odor that is coordinated with flavor is also an object for other animals, which have a more acute sense than does the human being for discerning such odors; and to this extent, as he said above, we have a worse sense of smell than do other animals. And because those odors that are coordinated with flavors contain the pleasant accidentally—that is, in relation to food—their species are distinguished according to species of flavors, which is not the case with these odors that of their own nature contain the unpleasant or pleasant: rather, species of this kind of odor can be distinguished only with reference to odorous things, as was said.

444a8 Then, when he says *Now the cause*

of this kind of odor

, he gives the

cause of what was said.

He says that odor that is of itself pleasant is an object proper to the human being for moderating the coolness of his brain. For the human being has a larger brain, in relation to the size of his body, than do other animals. But the brain is by its nature cool, and the blood contained in fine veins around the brain is easily cooled. Because of this, vapors dissolved from food, rising upwards and being cooled because of the coolness of the region, sometimes become thick, which causes rheumatic illnesses in human beings. And so this kind of odor was given to human beings as an aid to health, to counter the excessive coolness of the brain. And if such odors sometimes cause headache, this is because they are not applied as they should be, but rather overheat the brain and cause too much evaporation. But if they are applied in the right way they contribute to health. And this clearly appears from their effect, although no other usefulness of such odor is apparent: for perception of such odors hardly serves intellect at all for

investigating natures of things, whereas sight and hearing serve it very much, as was shown above.

444a16 Then, when he says *The odor that is pleasant*, he eliminates an objection. For someone might say that the other kind of object of smell which is coordinated with flavor, would suffice for the remedy of health mentioned.

He answers that the kind of odor that is pleasant because of food often rather causes headache, because of either excessive moistness or excessive dryness. But the kind of odor that is in itself pleasant is always useful for health of its own nature. He adds "so to speak" because of the improper use.

444a19 Then, when he says *For this reason*, he concludes from what was said above to the appropriate modes of smelling. First in the human being and other breathing animals; second in non-breathing animals, where he says *It is clear that the ones that do not breathe* (Ch. 13, 444b7).

On the first point he does three things. First he presents what he intends. Second he gives the cause proposed with reference to human beings, where he says *When odors rise to the brain* (444a22); and third with reference to other animals where he says *To the other animals* (444b2).

Accordingly he first says that because odor is useful for moderating coolness of the brain, smelling is done by breathing—not in all animals, but in human beings and those that have blood, such as quadrupeds and birds, the latter of which also participate more in the nature of air, as their movement shows.

444a22 Then, when he says *When odors rise to the brain*, he shows the cause why odor is perceived by breathing with reference to human beings.

He says that odors rise to the brain because the heat of fire that releases odors gives them a lightness so that they move towards higher regions, and from this there follows a condition of health in the area of the brain. For odor has power to heat because of the heat of fire by which it is caused and released. Hence nature uses breathing for two things: actively—that is, principally—as an aid to the chest—that is, the breast; in other words, for cooling the heart's heat—but adventitiously—that is, secondarily—for perceiving odor. For when the human being breathes, he moves air through the nostrils by drawing it in, and so causes odors to go to the organ of smell. The reason why this genus of sensible objects is proper to human nature is because the human being has a bigger brain in proportion to its size, and a moister one, than do the other animals. And the

reason why the human being alone among the animals senses and takes pleasure in the odors of flowers and other such things is that the heat of such odors and their movement towards the brain reduce the "hyperbole"—that is, the excess of the brain's coolness and moistness to the right measure. He added "so to speak" because other animals do flee bad odors inasmuch as they are destructive.

444b2 Then, when he says *To the other animals*, he gives the cause of smelling by breathing with reference to other animals.

He says that nature gave to animals with lungs, which are the only ones that breathe, sensation of the other kind of odor—that is, the one related food—by means of breathing so as not to make two organs, one an organ of breathing and the other an organ of smelling. For the organ of breathing is sufficient also for smelling: just as for the human being it suffices for the two kinds of the odorous, so for other animals it suffices for the one alone.

CHAPTER 13

444B7–445B2

444b7 It is clear that the ones that do not breathe have sensation of the odorous. For both fish and the whole class of insects keenly sense from a distance because of the nutritive species of odor, although they are very far from their proper food. So do bees in relation to honey; and the genus of small ants some call "hexapods"; and, among marine animals, the purple-fish. And many other such animals acutely sense their food because of odor.

444b15 But what they sense it with is not so clear. Therefore someone might raise the difficulty what it is they sense odor with, since smelling takes place in all animals that do breathe in one and the same way: for this is what seems to happen in all animals that do breathe, but none of these animals breathe, and yet they do sense. Unless there is some other sense besides the five? But this is impossible: for the odorous is the object of the sense of smell, and the odorous is what they sense.

444b21 But perhaps not in the same way. In the ones that breathe, the breath removes something that lies over as a covering, which is why they do not sense when they are not breathing. But in the ones that do not breathe this is absent. It is similar with the eyes. Some animals have eyelids, and when these are not opened they cannot see at all. But animals that have hard eyes do not have these, and so they do not need anything to open them; rather, they see immediately by the faculty in them.

444b28 Likewise, none of the other animals disdains what is of itself foul with respect to odor, unless something happens to be injurious, and they are inured by such things in the same way. Just as human beings suffer cold in the head from coal-smoke, and are often injured by it, and are injured by the power of sulfur, so other animals also avoid these because of the affection. But they do not care about the foulness itself in itself—although many growing things have foul odors—but only whether it affects the taste or the food.

445a4 The senses exist in an odd number, and an odd number has a middle. The sense for smelling seems to be a middle between the tactile senses, touch and taste, and those that sense through something else, sight and hearing. Thus the odorous is an affection of nourishment; the objects of the former senses are in the same genus. But it is also in the genus of the visible and the audible; thus things are smelled both in air and in water. So the odorous is something common to both; it is both in the genus of the tangible, and in that of the transparent and the audible. Therefore odorous enchyous dryness in moistness and fluidity is reasonably compared to a tincture and a wash. Let this much be said, then, about how we should speak of species of the odorous, and how we should not.

445a16 What some Pythagoreans say is not reasonable: they say that some animals are nourished by odors.

445a17 For, first, we see that food must be composite, for what is nourished is also non-simple. This is also why a superfluity of food is produced, whether inside, or, in the case of plants, outside. Moreover, water alone is not going to nourish by itself for what is going to build up has to be something bodily. Moreover, it is much less reasonable that air should become bodily.

445a23 In addition to this, we see that all animals have a place that is able to receive food, from which, after the food enters, the body receives it. But the place for the odorous is in the head, and odor enters with the breath, and so goes to the place for breathing. It is clear, then, that the odorous as such does not contribute to nourishment.

445a29 But it is clear that it does contribute to health, both from observation and from what has been said. Thus the odorous is to health what flavor, in nourishing part, is to nourishment.

445b1 Let this be the determination, then, with respect to each sensitive part.

Commentary

444b7 After the Philosopher has shown that men and certain other animals smell by breathing, here he inquires into the way non-breathing animals smell.

On this point he does two things. First he shows what is clear in such animals; second what is unclear, where he says *But what they sense with it* (444b 15).

Accordingly he first says that it is clear that animals that do not breathe sense the odorous, because, as we see, fish and the whole class of insects—that is, partitioned animals such as ants, bees, and the like—acutely sense their nourishment from a distance, when they are too distant from their proper food to be able to perceive it by their own sense of sight. Hence it is clear that they perceive it because the nutritive species of odor—that is, inasmuch as they perceive the kind of odor that is analogous to flavor, and indicates quality of nourishment. He gives the example of bees, which are moved from a distance to seek honey; and that of small six-legged ants, which are also moved from a distance to seek their food; and that of certain other animals called purple-fish because of their color. Likewise many non-breathing animals are found that acutely sense their food from a distance because of odor.

444b 15 Then, when he says *But what they sense it with*, he shows what the difficulty is with such animals.

On this point he does three things. First he raises the difficulty. Second he solves it, where he says *But perhaps not in the same way* (444b2 1). Third he clarifies the solution by means of a comparison, where he says *Likewise, none of the other animals* (444b28).

Accordingly he first says that although it is clear that the above-mentioned animals perceive odor, what they sense it with is not so clear. The reason for the difficulty is that all breathing animals sense odor in one and the same way, namely by breathing: for it is clear from experience that this seems to happen in all breathing animals. But in the case of the abovementioned animals, it is clear that they do not breathe, and that yet they do sense the odorous.

However, one might give a reason for this difference by saying that such animals sense the odorous by some other sense besides the five senses to which names have been given. This answer might seem probable for the following reason. To sense is to be affected by something, and so a different mode of sensing is as it were a different mode of being affected that indicates a difference of passive power. It is like the way in which a different mode of acting signifies a difference of active power; as we see, the stronger heat is, the more vehement is the action of heating. Likewise, then, on the side of what is passive, what is affected in a

different mode seems to have a different passive power, and thus what senses in a different mode seems to have a different sense-power.

But it is impossible for them to sense the odorous in a different mode, because where there is the same sensible object there is the same sense-power, for powers are distinguished according to objects. But it is the same sensible object that both kinds of animal sense, namely the odorous. Hence it cannot be that the sense-powers are different.

444b21 Then, when he says *But perhaps not in the same way*

, he solves the difficulty presented as follows: the two kinds of animal perceive the same object of smell, and with the same sense-power, but not in the same way.

For it must be considered that the mode of sensing can be varied in two ways.

One is per se: this is according to the different relationshipss of sensible objects to sense-powers, and such variation in mode of sensing makes for different senses. For example, one sense, such as touch, perceives an object united to it, but another, such as sight, perceives a remote object.

But there is another variation in mode of sensing that is accidental: this does not make for different sense-powers; rather, it is understood with respect to removal of an impediment. It is this kind of variation in mode of sensing that is under discussion.

For in animals that breathe, something that lies over the organ of smell a covering is removed by the breathing, and so when they are not breathing they are prevented from smelling because of this covering. But animals that do not breathe lack such a covering, and so they do not need to breathe in order to smell.

Likewise we see that some animals have eyelids, and if these are not opened such animals cannot see. Nature gave such eyelids to animals that need a more acute sense of sight in order to preserve their eyes, which are soft. Hence animals that have hard eyes—animals that, as it were, do not need an acute sense of sight—do not have such eyelids, and so do not need any movement of opening the eyelids in order to see. Rather the eye has the faculty for seeing immediately, without the removal of anything.

444b28 Then, when he says *Likewise, none of the other animals*

, he clarifies the above-mentioned solution through another comparison involving the sense of smell, in which there is another variation among animals that does not make for difference of sense-power.

None of the other animals besides the human being is pained by what has foul odor of itself—that is, not in relation to nourishment. He said this above, but there might be a difficulty on the point, because some animals seem to avoid foul

odors of this kind; and so he has returned to the point to remove this difficulty.

He says that the other animals do not avoid odors that are of themselves foul except accidentally, that is, inasmuch as a foul odor of this kind happens to be injurious. For since odor is caused by heat, moisture, and dryness, as was said above, it sometimes happens that a foul odor comes from a great disorder in the qualities mentioned, and so, in receiving the odor, the medium is simultaneously altered to an extremely harmful condition that destroys the bodies of the other animals as well as that of the human being. The other animals sense this alteration by touch, and so flee such foul things. He gives the example of human beings suffering cold in the head from coal-smoke, because of its disorder, sometimes to the point of destruction; and it is the same with sulfur. Hence animals avoid these destructive things because of the affection of destruction they perceive. But they do not care about the foulness itself of the odor considered in itself—although many things that grow from the earth have foul odors—but only according as the foulness of the odor represents something concerning taste, or concerning the suitability of their proper nourishment.

445a4 Then when he says *The senses*

exist in an odd number

, be

compares the sense of smell to other senses.

First he determines the truth. Second he eliminates an error, where he says

What some Pythagoreans

say (445a16).

On the first point it must be considered that, following the custom of the Pythagoreans, the Philosopher here uses a property of number in order to draw a comparison among the senses.

An odd number cannot be divided into two halves like an even one: rather there remains something undivided in the middle between two equal parts, as in a group of five there remains an intermediate unit between two groups of two. Now the senses are set up in an odd number, that is, a group of five. Two of them are tactile, because they do not perceive their objects, which are united to them, through external media, and these are touch and taste. Two of them, namely sight and hearing, perceive their remote objects through something else, that is, external media. But smell is in the middle between the two groups of two, and so it also has something in common with both groups.

It has something in common with touch and taste, which are the senses of nourishment, as is said in *On the Soul* II 

inasmuch as the odorous is an affection of nourishment, according as odor is analogous to flavor, and thus objects of touch and taste are in the same genus with objects of taste.

The genus of the visible and the audible is the same as that of the odorous

inasmuch as both are apprehended through external media; hence animals smell through air and water, just as they also see and hear through them.

Thus it is clear that the odorous is something common to both genera of sensible objects. For it is in the genus of the tangible according as it is an affection of nourishment and thus comes together in the same genus with the tangible and tastable qualities. Likewise, it is in the genus of the transparent and the audible—that is, it is perceived through the transparent medium through which a thing is seen as well as heard, namely air and water, although it is perceived through these not inasmuch they are transparent, but inasmuch as they are receptive of enchyous dryness, as was said above. And so some reasonably compare it to two things: the being of odorous enchyous dryness in moistness of water and fluidity—that is, fluidity of air—is, because of its ready diffusion, like a tincture—which refers to alteration of a medium by color—and like a wash—which refers to flavors—for odor has something in common with both.

After this, as an epilogue, he concludes that it has been said how we should distinguish species of the odorous, and how we should not, namely inasmuch as odors are taken in themselves.

445a16 Then when he says *What some Pythagoreans say*, he eliminates an error.

On this point he does three things. First he relates the erroneous opinion. Second he disproves it, where he says *For, first, we see that food* (445a17). Third he responds to a tacit objection, where he says *But it is clear* (445a29).

Accordingly he first says that what some Pythagoreans said—that some animals are nourished by odors—is not reasonable. According to them, smell would not be intermediate among the senses, as was said, but would have to be completely included with the senses of nourishment. They were moved to say this because they saw that human beings and other animals are fortified by odors.

445a 17 Then, when he says *For, first, we see that food*, he disproves the above-mentioned opinion by two arguments.

The first is that food must be composed of more than one element. For simple elements do not nourish, because animals that are nourished by them are composed of the four elements, and a thing is nourished by the same things by which it exists, as was said in *On Generation* II.



He concludes that a sign of this is that a superfluity is produced from food: whether within, as is evident in animals, in the bodies of which are places assigned for the gathering of superfluities, or outside, in the case of plants, the

superfluities of which are immediately expelled outward, as is clear in the case of gums of trees and other such things. If an animal or plant were nourished by one simple element, no superfluity would occur, since in a simple element there is uniformity of parts. And although no one element is suitable for nutrition, because of its simplicity, water in addition has a special impediment because of which it cannot nourish alone, without the admixture of something earthen, which is why farmers add manure to nourish plants with water mixed with something: nourishment builds up and generates something in the substance of what is nourished, and so it has to be something bodily and solid, which is not true of water. Hence water alone cannot nourish, and much less can air. And hence it remains that neither can odor nourish: for it is clear that odor, since it is a quality, cannot of itself build up a substance by nourishing it, except perhaps by reason of what is receptive of it, namely air or water. Even if odor were evaporation, or exhalation of smoke, as the Ancients said, the argument would still stand, because both of these pertain to the nature of air, as was said above.

445a23 Then, when he says *In addition to this, we see*, he presents the second argument.

He says that all animals have a place in which food is first received—that is, the stomach—from which it is drawn off into individual parts of the body. If we consider the odorous itself, it is clear (since most animals smell by breathing) that it is perceived by an organ near the brain, as was said above. But the air inbreathed, with which odor is drawn in, goes to the place for breathing, that is, the lung. Now it is clear that neither the brain nor the lung is the place in animals that first receives food. Hence it is clear that odor does not nourish. But it does fortify because of alteration by heat, moistness, and dryness, and because of pleasure; just as bad odor is destructive, as was said above.

445a29 Then, when he says *But it is clear*, he responds to a tacit objection. For one might object: if odor does not nourish, it is utterly useless. He answers that although it does not nourish, nevertheless it does contribute to health, as is clear from observation, and from what has been said above. Hence he concludes that, as flavor is ordered to nutrition, so odor is ordered to health.

445b1 Finally, by way of epilogue, he concludes that sensible objects have been discussed with respect to each organ of sense.

CHAPTER 14 445B3–446A20

445b3 But someone will raise an objection: if every body is infinitely divisible, are sensible affections also? For instance, color and flavor and odor and sound, and heaviness and coldness, and hot and light, and hard and soft.

445b6 But this is impossible. For each of these is something that activates a sense-power. For all are named from the fact that they are able to move a sense-power. Necessarily, then, sense is infinitely divisible, and every magnitude is sensible. For it is impossible to see something that is white but not a quantity.

445b11 For if this is not so, then there can be a body that has no color, or heaviness, or other such affection, and so is not sensible at all: for these are the sensible objects. Therefore, there will be something sensible composed of what is not sensible. But it necessarily is, for it is not composed of mathematical objects.

445b15 Moreover, what will we assign them to other than intellect, or how will we know them? But they are not intelligible, for intellect does not understand what is outside except with sensation.

445b17 But if this is so, it seems to support those who make indivisible magnitudes: thus the discussion is resolved. But this is impossible, as was said before in the discussions of motion.

445b20 With the resolution of this, it will at the same time also be made clear why the species of color and flavor and sounds and other sensible objects are limited. For what is inside the extremes is necessarily determinate, and extremes are contraries. But every kind of sensible object has contrariety, for instance black and white in color, sweet and bitter in flavor. And so in all the others there are extremes that are contraries.

445b27 A continuum, then, is divisible into an infinite number of unequal parts, but into a finite number of equal species. And what is not of itself continuous is divisible into finite species.

445b29 We must speak of the affections as "species," although they exist in a continuity and in these parts. Therefore, we must take it that what is in potentiality and what is in actuality are different. For this reason a tenth of a thousandth of a grain of millet escapes the notice of sight, although sight goes over it. And the sound in a diesis escapes notice, although all of the singing, which is continuous, is heard. The distance between the extremes escapes notice. It is similar with the extremely small in other sensible objects. They themselves are visible in potentiality, but not in actuality when they are not separated. Thus a one-foot length exists in potentiality in something two feet long, and exists in actuality when it is divided off.

446a7 But it is reasonable that separated parts of such extremely small size are dissolved into the surroundings, like a tiny amount of flavor poured into the sea.

446a10 But there is no extremity of the sense-power to correspond to that of the sensible object itself, even if it is separated. The extreme smallness is in potentiality to a surer sense-power. And a separated sensible object of such a size will not be sensed in actuality. Still, it will be a sensible object, for there is already the power, and it will be in actuality when a sense-power comes to it. Thus it has been said that some magnitudes and affections escape notice; and for what cause; and the way in which they are sensible objects, and the way in which they are not.

446a16 But since there are quantities existing within so as to be sensible in actuality, and not only as in the whole, but also separately, they—colors and flavors and sounds—are necessarily finite according to some number.

Commentary

445b3 After the Philosopher has determined about sense-organs and sensible objects, here he determines some questions about the sense-power and sensible objects.

First he raises a question about sensible objects themselves. Second he raises another about alteration of the sense-power by a sensible object, where he says

But someone will raise an objection

(Ch. 15, 446a20). Third he raises a

third about the sense-power itself, where he says *But there is also another*

such objection

(Ch. 16, 447a 12).

On the first point he does three things. First he raises the question. Second he introduces arguments about it, where he says *But this*

is impossible

(445b6). Third he solves it, where

he says *With the resolution*

of this

(445b20).

Accordingly he first says that every body is infinitely divisible: for this is of the nature of a continuum, as is clear in the book the Physics. 

But sensible qualities—which are called affections, as is said in the Categories 

—are in a body as in their subject. Therefore there is a question someone can raise in objection: whether sensible qualities themselves, such as color and flavor and so on, are infinitely divisible also.

445b6 Then, when he says *But this is*

impossible

, he raises objections concerning the question

posed.

First he raises objections to show that sensible qualities are not infinitely divisible.

Second he raises objections on the other side, where he says *For if this is not so* (445b1 1). Third he eliminates a false solution, where he says *But if this is so* (445b 17).

Accordingly he first says that it seems impossible for sensible qualities to be divided infinitely, because each of the above-mentioned sensible qualities naturally acts on a sense-power. For the proper nature of each of them consists in this: it is able to move a sense-power; for example, it belongs to the nature of color to be able to move the sense of sight. If, then, the above-mentioned qualities are infinitely divisible, the consequence will be that sense—that is, the act of sensing itself—is infinitely divisible. Now an instance of being moved is infinitely divisible according to division of the magnitude through which a thing is moved; and so it would follow that, as something moved goes through every part of the magnitude, so one who senses would sense any magnitude, however small, and so every magnitude would be sensible.

But he adds a reason why he does not conclude that even points are perceptible to sense: because it is impossible to see something white that is not a quantity; and the argument is the same with respect to other sensible objects. The reason for this is that a sense-power is a power in a magnitude, since it is the actuality of a bodily organ, and so it can be affected only by what has magnitude: for what is active must be proportioned to what is passive.

There remains the problem that every magnitude is perceptible; how is this to be understood will be made clear below. Hence it can be concluded that sensible qualities are not infinitely divisible.

445b11 Then, when he says *For if this is not so*, he raises objections on the opposite side with two arguments. The first is this. If sensible qualities are not infinitely divisible, then there can be a minimal body that transcends division of sensible qualities and has no sensible quality, i.e. neither color nor heaviness nor any other such quality. And so such a body will not be sensible, because only the qualities mentioned are sensible objects. Therefore, since these tiny bodies are parts of a whole body that is sensible, it will follow that a sensible body is composed of what is not sensible. But a sensible body is necessarily composed of what is sensible, for it cannot be said that a sensible body is composed of mathematical bodies, in which quantity is considered without sensible qualities. Therefore it remains that sensible qualities must be infinitely divisible.

445b15 He presents the second argument where he says *Moreover, what will we assign them to*.

His argument proceeds from the point that the soul by nature knows all things, whether by sense or intellect, as was established in *On the*

Soul

III. 

Accordingly, if the above-mentioned minimal bodies that transcend division of sensible qualities are not sensible because they lack sensible qualities, they can be assigned only to intellect as the power that knows them. But it cannot be said that they are intelligible: for intellect understands none of the things outside the soul except with sensation of them—that is, by simultaneously sensing them. If, therefore, these minimal bodies are not sensed, they will not be able to be understood.

He says this to eliminate an opinion of Plato, who held that the forms understood exist outside the soul. But according to Aristotle the things understood are the very natures of things in singulars, which, inasmuch as they are in singulars, fall under the apprehension of the sense-power. But the intellect apprehends these natures in an absolute way and assigns to them certain intelligible intentions, namely that of being a genus or species. These intentions exist only in the intellect, not outside it: hence only the intellect knows them.

445b17 Then, when he says *But if this is so* , he eliminates a false response.

One might argue as follows. A problem follows from positing the infinite divisibility of magnitude, whatever may be said about sensible qualities, whether that they are infinitely divisible or not. This, then, seems to support the opinion of those who posit indivisible magnitudes, because the difficulty is solved in this way: for if a body is not infinitely divisible, then, since sensible quality is not infinitely divisible, it will not follow that there are bodies that cannot be sensed. But this opinion that some magnitudes are indivisible is impossible, as is evident from what was said in the discussions of motion, that is, in

Physics

VI 

445b20 Then, when he says *With the resolution of this* , he solves the question he raised above about division of sensible qualities.

And first he treats their formal division, that is, of genus into species. Second their quantitative division, where he says *A continuum, then* (445b27).

Accordingly he first says that, together with the solution of the abovementioned difficulties, at the same time it will have to be made clear why the species of color and flavor and other such things are finite: for he promised above that this would be determined.

He gives the following reason for this. If it is possible to reach the furthest point starting from either extreme, what is in the middle is necessarily finite, as was proved in *Posterior Analytics* I.



Now it is clear that in any genus of sensible objects there is a contrariety that is the greatest distance, and so the contraries must be the extrernes, for instance black and white in color, sweet and bitter in flavor, and likewise in the others. Hence it remains that intermediate species are finite.

445b27 Then, when he says *A continuum*, then , he solves the question raised earlier about quantitative division of sensible qualities.

First he makes some presuppositions. Second he proceeds to solve the question where he says *We must speak of the affections* (445b29).

On the first point he makes two presuppositions.

The first is that a continuum is in a way divisible into an infinite number of parts, and in another way into a finite number. For if a division into equal parts is made, it will not be able to proceed to infinity as long as the continuum is finite, because if one repeatedly removes something the size of a palm from anything finite, it will be completely taken away. But if a division into unequal parts is made, it will proceed to infinity: for instance, if a whole is divided in half, and again the half in half, which is a quarter of the whole, the division will proceed to infinity.

The second supposition is that what is continuous not of itself but accidentally, for example color and other such things, is of itself formally divided into finite species, as was said a little before.

445b29 Then, when he says *We must speak of the affections* , he proceeds to solve the principal question, which was about division of sensible qualities.

Because he had taken his argument on this question from what appears in sensation, first he inquires about division to infinity with respect to the act of sensing itself. Second he concludes to his proposal with respect to sensible things themselves, where he says *But since there are quantities* (446a16).

On the first point he does two things. First he inquires whether sensing proceeds to infinity with respect to parts existing in a whole. Second, whether it does so with respect to separated parts, where he says *But it is reasonable* (446a7).

Accordingly he first says that because we must speak of the affections—that is, the sensible qualities—as “species” and forms that are not, considered in themselves, infinite, as was said; and nevertheless they exist in a continuum as their subject, by division of which they are accidentally divided; it follows that, as in a continuum there is something in actuality—namely a separated part—and something else in potentiality—namely a part existing in the continuum

unseparated—so also in these qualities that are divisible accidentally a separated part exists in actuality, and hence can be sensed in actuality, but a part not divided off exists in potentiality, and so is not sensed in actuality. And thus, although sight goes over a grain of millet, nevertheless some tiny part of the latter—say a tenth of a thousandth—escapes the notice of sight. Likewise, although a whole continuous singing is heard, nevertheless some small part of the singing—such as a diesis, which is the smallest unit in melody, being a distance between a tone and a semitone—escapes the notice of hearing. For this kind of intermediate distance between the extremes escapes notice. And so in the case of other sensible objects what is extremely small altogether escapes the notice of the sense-power. For it is visible in potentiality, but not in actuality, except when it is separated. Similarly we see in magnitudes that a one-foot line exists in potentiality in a two-foot line, but exists in actuality when it is divided from the whole.

It is clear from the foregoing that what some mathematicians say is false: that nothing is seen whole all at once, but rather sight runs over the parts of a visible object as if seeing were a continuum, like being moved. They are mistaken in this, because the parts of a continuum are visible not in actuality, but only in potentiality. Hence sight takes a visible whole as an indivisible unit belonging to a genus of its own—unless it takes parts that are not divided off as if they were, as when it looks at each, one by one. Nevertheless, even this does not reach as far as every minimal part, because then sensing would be infinitely divisible, which was dismissed above as inconsistent.

446a7 Then, when he says *But it is reasonable*, he shows that not even parts separated off are infinitely perceptible by sense.

First from the point of view of the parts themselves. Second from the point of view of the sense-power itself, where he says *But there is no extremity* (446a10).

Accordingly he first says that if extremely small parts are separated from a whole, it seems reasonable, because of the smallness of their power of self-preservation, that they cannot continue to last; for bodily power is divided according to division of magnitude, as is clear from Physics VII. 🗨️

And so those separated minimal parts are immediately converted into the surrounding body, for instance air or water, as is clear in the case of flavored drink poured into the sea.

From this it is clear why a mathematical body—in which only the nature of quantity, which has nothing to oppose infinite division, is considered—is infinitely divisible. But a natural body, which is considered under a whole form, cannot be infinitely divided, because once it is reduced to its smallest part, it is immediately, because of the weakness of its power, changed into something else. Hence one

can find a smallest part of flesh, as is said in *Physics*

I. 

But a natural body is not, as was said in objection, composed out of mathematical ones.

446a10 Then, when he says *But there is no extremity*

, he shows the proposal from the point of view of the sense-power itself.

For evidence on this point it must be known that the more excellent a sensitive power is, the more it can perceive a smaller alteration of the organ by a sensible object. But it is clear that the smaller a sensible object is, the smaller the alteration it causes of the organ, and so the more excellent power of sense it needs in order to be sensed in actuality. But it is clear that sensitive power cannot be increased infinitely, any more than can other natural powers.

Hence even if sensible bodies were infinitely divisible, nevertheless there would not always be extremity of the sense-power in superiority of power to correspond to the extremity of the sensible object in smallness—not even if the extreme smallness of the sensible object continued to last when separated. For the extreme smallness of the sensible object exists in potentiality, to be perceived by a surer and more perfect sense-power, and if the latter is not present, it will not be able to be sensed in actuality. Still, it will be a sensible object in itself, for already, by being separated, it has active power to alter a sense, and when a sense comes to it, it will be perceived in actuality. Therefore it is clear that what be said above is true, that no magnitude is invisible—that is, in itself, although a magnitude may be invisible because of imperfection of sight.

Therefore he concludes that it has been said that some magnitudes and affective qualities escape the notice of the sense-power; and for what cause; and the way in which they are sensible objects, and the way in which they are not.

446a16 Then, when he says *But since there are quantities*

, he concludes from the foregoing that since some parts of sensible bodies have quantity in this way—so as to be sensible in actuality not only when existing in a whole, but also when divided off—parts of this kind are necessarily finite according to some number, whether in the case of colors or flavors or sounds. And thus, according as they are perceptible in actuality, they are not infinitely divisible.

CHAPTER 15

446A20–447A11

446a20 But someone will raise an objection: do either the sensible objects or the movements caused by the sensible objects—however sensation occurs—first reach a midpoint when they act? Odor and

sound seem to do this: for one who is closer senses odor earlier, and sound arrives after the striking. Is it the same, then, in the case of a visible object and light?

446a26 Empedocles says that light from the sun in this way arrives at a midpoint before arriving at the sense of sight or the earth.

446a28 It might be thought reasonable that this is what happens. For what is moved is moved from something to something, and so there is necessarily a time in which it is moved from one to the other. But every length of time is divisible. Thus there was a time when the ray was not seen, but was still being brought in the medium.

446b2 Everything simultaneously hears and has heard, and in general senses and has sensed. There is no generation of sensations; they have no coming into being. Nevertheless sound is not already at the sense of hearing when the blow is struck. The reconfiguration of letters when they are carried through a medium makes this clear: people apparently have not heard what was said, because the air carried is reconfigured in being carried. It is thus in the case of color and light: for it is not the case that this sees and that is seen if they are related in just any way. This is how it is with things that are equal: neither has to be in a particular place, since when things are made equal, it makes no difference if they are either near to or far from one another.

446b13 On the other hand, it is reasonable for this to happen in the case of sound and odor. For air and water are indeed in a way continua, but the movements of both are divisible. For this reason too, it is the same thing that the first person and the last person hears and smells, but in a way it is not. But there seems to some to be an objection also about this. For some say that it is impossible for each person, by means of what is different, to hear and see and smell the same thing. For it is not possible for many who stand apart from one another to hear and smell the same thing, that is, for it to be cut off from itself. On the other hand, all sense the original mover—for example the quince, or incense, or fire—which is numerically one and the same. What is individual is numerically different, but specifically the same. Therefore many simultaneously see and smell and hear.

446b25 But these things are not bodies, but an affection and a movement. For otherwise this would not happen. Nor are they independent of body.

446b27 But the account of light is different, for there is light through

some one single being, but there is not a movement.

446b28 In general, alteration and transfer are not alike. For it is reasonable that transfers should first reach a midpoint; and sound seems to be a movement of transfer. But what is altered is not like this.

447a1 For it can happen that a whole is altered all at once, not half of it first, for example when a whole body of water is solidified all at once.

447a3 Nevertheless, if what is heated or solidified is large, what is contiguous is affected by the contiguous. But the first is necessarily altered, all at once and instantaneously, by the very thing that is acting. And tasting would be like odor if we existed in moisture, and sensed it from a distance before touching it.

447a8 But it is reasonable, where the sensitive part has a medium, that not all of it be affected all at once, except in the case of light, because of what was said above, and, for the same reason, in the case of seeing: for light causes seeing.

Commentary

446a20 After the Philosopher has followed up the first question, which concerns sensible things themselves, here he proceeds to the second question, which concerns the alteration of the sense-power by sensible objects.

On this point he does three things. First he raises the question. Second he argues it, where he says *Empedocles says* (446a26).

Third he solves it, where he says *On the other hand* (446b 13).

On the first point it must be considered that, as was established above, some held that a sense-power is changed by sensible things by way of an emanation, so that it is the sensible things themselves—that is, the emanations from them—that reach the sense-power. But Aristotle himself held that the sensible things change the medium by way of a certain alteration, so that it is the changes of this kind that reach the sense-power.

Therefore there is a question, however sensation occurs: whether the sensible objects themselves—according to the opinion of others—or alterations caused by the sensible objects—according to Aristotle's own opinion—first reach a midpoint before reaching the sense-power. There is no difficulty about this in the case of hearing and smell, for it is clear that one senses odor earlier from nearby, and similarly that sound reaches hearing after the striking of the blow that causes sound occurs, as one who sees the blow from a distance can clearly perceive. And it is clear that this question has no place in the case of taste and touch,

because they do not perceive through an external medium. Hence the difficulty seems to be about sight alone, that is, whether a visible object and the light that causes seeing first reach a midpoint before reaching the sense-power or any terminus.

446a26 Then, when he says *Empedocles* says ,
he raises an objection oncerning the question asked.

First he argues on the false side of the question. Second he eliminates a false solution where he says *Everything simultaneously hears* (446b2).

He argues in response to the question first by the authority of Empelocles, who said that light proceeding from the sun first reaches a midpoint before reaching the sense of sight that sees the light, or the earth that is seen by means of the light, and beyond which the sun's ray does not proceed.

He touched on this question in *On the Soul* II, but
disproved the opinon as follows: in such a great distance as there is from the rising sun to ourselves, it is impossible for a temporal succession to escape our notice. 🗨️

446a28 Second, where he says *It might be thought reasonable* , he argues the
same point by reason.

He says that it seems reasonable for this to happen—that is, for the visible object or light to first reach a midpoint before reaching the sense of sight. For there seems to be some movement of the visible object itself, or of the light, in coming to the sense of sight. But everything that is moved is moved from something to something, in such a way that before, it is in the terminus from which it is moved, and after, it is at the terminus to which it is moved: otherwise, if it were simultaneously at both termini, it would not be moved from one to the other. But before and after in movement are counted by time. Therefore there is necessarily some time in which the visible object, or the light, is moved from the visible or illuminating body to the sense of sight. But every length of time is divisible, as was proved in *Physics* VI. 🗨️

Therefore if we take the midpoint of the time in question, at that point the ray of light, or the visible object itself, has not yet reached the sense of sight, but is still being moved through the medium, because the magnitude through which something is moved must be divided according to division of time, as was proved in *Physics* VI. 🗨️

446b2 Then, when he says *Everything simultaneously hears* , he
eliminates an inadequate response.

Someone could think that sensible objects do not first reach a midpoint before

reaching the sense-power because sense perceives a sensible object all at once, without successiveness. Thus, in hearing, hearing does not come before having been heard in the way that, in what is successive, being moved does come before having been moved: rather, when someone is hearing, he simultaneously already has heard, because the whole act of hearing is completed in an instant. And this is universally true of every sense, that is, that it simultaneously senses and has sensed something. This is so because there is no generation of sensations; they have no coming into being.

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We say that there is a "generation" of things that have a being (*esse*) which is reached by a successive or gradual movement: whether the terminus of the successive movement is the very form of the things, as when a white thing is said to be generated because a thing reaches whiteness through successive alteration; or whether the terminus of the successive movement is a disposition to their form, as fire and water are said to be generated because dispositions to their forms—that is, elemental qualities—are acquired through successive alteration.

But those things begin to be without being generated or coming into being that are not—either of themselves or with respect to any preceding dispositions in them—caused through successive movement. For example, "to the right" is caused in a thing not by any successive movement pre-existing in it, but by something else having been made "to the left" of it. Likewise, air begins to be illuminated not by any movement pre-existing in it, but at the presence of an illuminating body. And likewise, a sense-power begins to sense not by any movement pre-existing in it, but at the requisite placing of a sensible object before it.

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Thus one simultaneously senses and already has sensed. Nevertheless it is not for this reason necessary that sensible objects, or movements of sensible objects, reach a sense-power without succession. For it is clear that one simultaneously is hearing and has heard, and nevertheless sound does not reach hearing immediately when the blow that causes the sound is struck.

This is made clear by the reconfiguration of letters that occurs when someone's speech is heard from a distance, indicating that the sound of the voice formed into letters is being carried successively through the medium. It is for this reason that those who hear the sound apparently have not by hearing distinguished the letters pronounced: because the air moved in the medium is reconfigured, as if losing the impression made by the one who first caused the sound. This sometimes happens because of some other alteration in the air, for example when, because many are speaking, it is impossible to make out what one of them is saying, for it the movements impede one another. But sometimes it happens

because of distance: for as the action of heating is weakened in what is farther away, so also does the alteration of the air by the one who first produces the sound, and as a result the sound of the speech may reach those who are near the speaker perfectly, with the requisite articulation of letters, but reach those who are farther away with some confusion.

446b9 The case of color and light, then, seems to be similar, for color and light also cannot be seen by being positioned in just any way: rather, a determinate distance is required. For just as utterances are heard by those at a distance without distinction of the letters, so also bodies are by those at a distance without distinction of the arrangement of individual parts. The relation between the sense of sight and the visible object is not like the relation of equality: for no determinate location is required in order for things to be equal; rather, however their location varies, they always remain equal in the same way, and it makes no difference whether they are near or far. Therefore it seems that just as the configuration of letters makes it clear that sound reaches the sense of hearing by succession, although once it has reached hearing, it is heard at once; so the incomplete vision of remote visible objects seems to indicate that color and light reach the sense of sight by succession, although they are seen all at once.

446bl3 Then, when he says *On the other hand*, he presents the true solution, showing the difference between sight and the other two senses that perceive through external media, namely hearing and smell.

This is divided into two parts. First he gives the difference of sight from hearing and smell. Second he concludes to his proposal, where he says *But it is reasonable* (447a8).

The first part is divided into two according to the two differences he gives. The second begins where he says *In general, alteration and transfer* (446b28).

Accordingly he first says that it is reasonable for this to happen in the case of sound and odor, namely that they reach the sense-power by succession. He gives as the reason for this the fact that air and water, which are the media by which these objects are brought to the sense-power, are indeed in their substance, continua, and yet movements distinct from one another can take place in them.

This can happen because of the easy divisibility of air and water which, as the Philosopher shows in Physics VII, is evident in the movement of throwing something, where there are many movements, many movers, and many things moved. 🗨️

For one part of the air is moved by another, and thus there are different movements succeeding one another, because a part of the air that has been moved still remains a mover after it ceases to be moved. Thus the movements of

the parts of the air are not all simultaneous; rather they succeed one another, as is shown in Physics VIII. 🗨️

This is also evident in the case of sound, which is caused by a striking of air, but not in such a way that the whole of the air in between is moved by what strikes it in one movement. Rather, there are many movements succeeding one another, for one part, having been moved first, then moves another. Thus in a way it is the same thing that the first person hears—the one who is close to the striking that causes the sound—and that the last person hears—the one who is at a distance. But in a way it is not the same thing.

446b17 According to some, there seems to be a difficulty on this point: some say that, since different people sense by means of different organs, it is impossible that they sense the same thing. Now this is true if it refers to what proximately moves the sense-power, because the senses of different people are immediately altered by the different parts of the medium that are close to them, and so what one senses is "cut off," and distinct from, what another senses. But if what is understood is what first moved the medium, then all sense one and the same thing. For instance everyone, whether near or far, hears the sound of the one blow; likewise, everyone smells the one odorous body, for example the quince, or the incense burning in fire. What reaches each one individually one is numerically different, but is specifically the same, because all these alterations are caused by the same form, the form of what first activates them. Hence many simultaneously see and smell and hear the same sensible object by the different alterations that reach them.

446b25 But these things that reach the senses of each individual are not bodies emanating from a sensible body, as some held: rather, every individual one of them is a movement and an affection of a medium that has been altered by the action of a sensible object. For if they were different bodies that reached different individuals by emanation, then this—that is, everyone sensing the same thing—would not happen, but each would perceive only the body that reached him. And although they are not bodies, nevertheless they are not independent of body, or of the medium that is as it were affected and moved, or of the sensible object that is as it were what first moves and acts.

446b27 It is clear, then, from what has been said that sound reaches the sense of hearing through many successive movements of parts. And it is similar in the case of odor, except that alteration by odor occurs through alteration of a medium, but alteration by sound through local movement. But the account of light is different. For light does not reach the sense of sight through many movements succeeding one another in different parts of the medium, but through one single being (*esse*)—that is, by the whole medium being moved, as one moveable thing, in one movement, by an illuminating body. In this case there is not one movement succeeding another, as there was said to be in the case of odor and sound.

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The reason for this difference is that what is received in something as in its proper and natural subject can remain in it and be a principle of action, but what is received in something only as an adventitious quality can neither remain in it nor be a principle of action.

Now because substantial forms are the principles of qualities and of its accidents, that quality is received in a subject according to its proper and natural being which disposes the subject to the natural form of which it is receptive. For instance, water, by reason of its matter, is receptive of the substantial form of fire, which is the principle of heat; and so heat is received in water as disposing it to the form of fire, and when fire is removed, the water still remains hot and capable of heating. Likewise odor is received in air and water, and sound in air, both according to their proper and natural being, and according as air and water are altered by enchymous dryness, or air by the striking of a body. Thus, when the striking ceases, sound remains in the air; and when the odor causing body is removed, odor is still perceived in the air. The reason is that the part of the air that has been changed so as to take on a sound or odor can likewise change another part, and thus different movements are produced that succeed one another.

But the transparent is not receptive of the substantial form of the illuminating body, for instance the sun, which is the first "root" of light, and neither is it disposed by reception of light to any substantial form. Hence light is received in the transparent as an adventitious quality that neither remains when the illuminating body is absent, nor is able to be a principle of action on something else. Hence one part of the air is not illuminated by another, but the whole of the air is illuminated by what first illuminates it, however far the power of the illuminating body is able to reach. Thus, there is one thing illuminated, and one illumination of the whole medium.

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446b28 Then, when he says *In general, alteration and transfer*

, he shows the second difference.

He says that, to speak generally about alteration and "transfer"—that is, change of place—the two are not alike. It is reasonable that changes of place should first reach the midpoint of the magnitude over which the movement takes place before reaching the terminus, since in change of place there is movement from one extreme of a magnitude to the other extreme. Hence, the moveable thing must reach the midpoint of the magnitude at the midpoint of the time. Thus the argument introduced above has a place in the case of change of place. And sound is a consequence of local movement inasmuch as the air is disturbed by the

striking that causes the sound all the way to the power of hearing. it is reasonable, then, that sound should reach a midpoint before reaching the sense of hearing.

But in the case of what is altered, it is not like this. For the termini of alteration are not extremes of a magnitude, and so the time of the alteration is not necessarily, of itself, commensurate with a magnitude in such a way that at the midpoint of the time, the movement would reach the midpoint of the magnitude, whether the midpoint of the magnitude over which the movement occurs (for this cannot be given in alteration, which is not a movement in a quantity or a "where," but in a quality), or the midpoint of a magnitude that is itself moved.

447a1 For it can sometimes happen that the whole of a body is altered all at once, not half of it first, as we see that a whole body of water may be frozen all at once.

In local movement, the time is commensurable with the magnitude over which the movement passes, and is divided according to division of the magnitude, as is proved in *Physics*

VI. 

Likewise, in alteration, the time is commensurable with the distance between the termini, and so, other things being equal, more time is required for something cold than for something tepid to be made hot. Thus if there are some extremes between which one cannot take a midpoint, transition from one extreme to the other must occur without intermediary. Now a contradiction is an opposition that of itself has no intermediary, as is said in *Posterior*

Analytics

I. 

And, with the supposition of the receptivity of a subject, the account of privation is the same, for privation is nothing but negation in a subject. Hence all alterations of which the termini are being and non-being, or privation and form, are instantaneous and cannot be successive, for in successive alterations the succession is noted by means of determinate intermediaries with respect to the distance of one contrary from the other.

447a3 Within this distance, the whole magnitude of the body over which the power of the first cause of the alteration immediately extends is considered as one single subject that instantaneously, all at once, begins to be moved. But if there is a body that is capable of being altered, but is so large that the power of the first cause of the alteration cannot reach it as a whole, but only part of it, it will follow that after the first part has been altered, it will subsequently alter another one.

And so he says that if it is a large body that is heated or frozen, what is contiguous is necessarily affected by the contiguous—that is, a subsequent part is necessarily altered by the immediately preceding one. But the first part is altered, all at once and instantaneously, by the very thing that first causes the alteration,

because here there is not succession from the point of view of magnitude, but only from the point of view of contrary qualities, as was said. It is because of this that odor first reaches a midpoint before reaching the sense-power, even though this occurs by alteration without local inovement. For an odorous body cannot alter the whole medium all at once; rather, it alters one part, which alters another, and so the alteration reaches the sense of smell by succession, through several movements, as was said above. And it would be the same in the case of taste as it is in the case of smell if we lived in watery moisture, which alone is receptive of flavor, as we now live in air, which is receptive of odor; and if, again, flavor could be sensed by alteration of the medium from a distance before we touched a flavored body, as is the case with smell.

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Now what is said here seems to be contrary to the argument by which the Philosopher proves in *Physics* VI that everything that is moved is divisible, because part of it is at the terminus a quo and part at the terminus ad quem. 🗨️

Thus it can be seen that while something is being changed from white to black, when one part of it is white, another is black. This it cannot be that the whole is altered all at once, but rather part after part.

But some say that the intention of the Philosopher there is to show not that one part of a moveable thing is at the terminus a quo and another at the terminus ad quem, but that the moveable thing is at one part of the terminus a quo and at another part of the terminus ad quem. And so in alteration it is necessary not that one part of the moveable thing be altered before another, but that the whole moveable thing that is altered, for instance from white to black, have a part of whiteness and a part of blackness.

But this does not agree with Aristotle's intention, because this would not directly prove that a moveable thing is divisible, but rather that the termini of movement are somehow divisible. Nor again does it agree with the words Aristotle uses, as is clear to anyone who carefully looks at his text, where the passage clearly refers to the parts of the moveable thing.

Thus a different explanation has to be given, namely that the demonstration is understood with reference to local movement, which is truly and of itself continuous. For in *Physics* VI Aristotle treats of movement under the aspect of the continuous. But movements of growth and alteration, as was said in *Physics* VIII, are not simply continuous. 🗨️

Hence Aristotle's remark is not universally true of all alteration, but only of alteration inasmuch as it gets continuity from a moveable thing in which one part alters another. But a moveable thing that the power of the first cause of the alteration reaches all at once, as a whole, is something indivisible inasmuch as it

is altered all at once.

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447a8 Then, when he says *But it is reasonable*, he concludes from the foregoing to the principal intention.

He says that it is reasonable, in the case of the senses for which there is a medium between the sensible object and the organ of sensing, that the whole medium be affected and moved not all at once, but by succession, except in the case of light, and this because of what has been said: first, because illumination does not, as Empedocles held, occur by local movement, as the spread of sound does, but by alteration; second, because in illumination there are not several movements, as there were said to be in the case of odor, but only one. To these points we must add a third: that light has no contrary, but darkness is rather opposed to it as simple privation, and so illumination occurs all at once.

And the same must be said about vision, because light causes seeing. And hence the medium is altered by visible objects analogously to the way it is altered by light.

CHAPTER 16

447A12–448A1

447a12 But there is also another such objection raised concerning the senses: whether it can happen that two sense simultaneously at the same indivisible point of time, or not?

447a14 If a greater movement always drives off a lesser, which is why people do not sense what is brought under their eyes if they are intensely thinking about something, or are afraid, or are hearing a loud sound.... Let this, then, be supposed, and also that one can sense anything better when it exists as simple than when mixed: for example, wine that is unmixed can be better sensed than wine when that is mixed; and honey; and color; and a note alone better than one with the octave, because they obscure one another. Now it is things from which some one thing is made that do this.

447a21 If, then, a greater drives off a lesser, then, if they are simultaneous, even the former is, necessarily, less able to be sensed than if it were alone. For something is taken away by admixture of the lesser one, if indeed everything that is simple is better able to be sensed. Therefore, if they are equal, but exist as separate, neither will be sensible, for each obscures the other; and it is impossible to sense either as simple. Therefore either there will be no sensation, or there will be a different one out of the two. This seems to be

brought about by things mixed together, whatever they may be mixed together into.

447a29 From some objects, something else can be made; but from some it cannot, and these are objects that come under different senses. For objects that can be mixed together have extremes that are contraries. But one object cannot be made out of white and high-pitched, except accidentally, but not in the way that a harmony is made out of high-pitched and low-pitched.

447b3 Therefore it is not possible to sense them simultaneously. For when their movements exist as equal, they will drive out one another, because one movement is not made out of them. But if they are unequal, it will be the stronger that causes sensation.

447b6 Moreover, it is more likely that the soul will simultaneously sense two objects of one sense, such as high-pitched and low-pitched, with the one sense: for it is more likely that movements of one sense would occur simultaneously than of two, for instance sight and hearing.

447b9 But it is not possible to sense two objects simultaneously with one, if they have not been mixed. For a mixture tends to be one thing. But one sense-power at one moment has one object. And it is itself one at the one moment. Therefore it necessarily senses mixtures all at once, because it senses by means of one sense-power in actuality. For as numerically one in actuality, it has one object; but as specifically so, it is one in potentiality or power.

Therefore, if it is one sense-power in actuality, it will say that one object. Therefore, they are necessarily mixed together. Therefore, when they are not mixed, there will be two senses in actuality. But, with respect to one power, at one indivisible moment, there is necessarily only one operation, for there is only one use, and one movement, of one thing at one time, and it is one power. Therefore it is not possible to sense simultaneously two objects with one sense-power.

447b21 But if this is impossible simultaneously in the case of objects that come under the same sense-power if there are two of them, it is obvious that it is still less possible to sense simultaneously objects of two senses, such as white and sweet.

447b24 The soul seems to say that something is numerically one by nothing other than this "all at once"; but it seems to say that something is specifically one by the sense that judges and by the manner. What I mean is this. The same proper one will judge that, say, white and black are different. And one sense, different from

that one, but itself the same, will judge that sweet and bitter are different. They judge each of the contraries in a different way, but they judge the corresponding elements in the same way: For instance, as taste judges sweet, sight judges white; and as the latter judges black, the former judges bitter.

Commentary

447a12 Having solved two questions, here the Philosopher follows the the third, which is from the point of view of the sense-power itself.

On this point he does three things. First he raises the question. Second he argues for the false position where he says *If a greater movement* (447a14). Third he determines the truth where he says *With respect to the objection* (Ch.18, 448b17).

Accordingly he first says that concerning the senses themselves there is another such objection raised, namely whether it can happen that two senses sense simultaneously and at the same indivisible point of time, for instance that while sight sees a color hearing simultaneously hears a voice.

447a14 Then, when he says *If a greater movement*, he argues for the false position, attempting to show that two senses cannot sense simultaneously.

First he presents arguments to show this. Second he eliminates a false solution by which this position was maintained, where he says *Some of those who discuss symphoniae* (Ch. 17, 448a 19).

On the first point he presents three arguments. The first is based on alterations caused by sensible objects. The second is based on the sense-power itself; it starts where he says *Moreover, it is more likely* (447b6). The third is based on contrariety of sensible objects; it starts where he says *Moreover, if movements of contraries are contrary* (Ch. 17, 448a 1).

He prefaces the first argument with two presuppositions.

The first is that a greater movement drives back a lesser. Because of this, he says, the result is that often human beings do not sense what lies under their eyes, because of a more powerful movement. This may be an interior movement, whether of reason, as when they are intensely thinking about something, or of appetitive power, as when they are intensely afraid. Or it may be an external movement caused by some sensible object as when they are hearing a loud

sound. This, then, he says, is to be supposed as evidence.

The second presupposition is that anything is sensed better if it is simple than if it is mixed with something else, as wine has a stronger taste if it is pure than if it is mixed with water. The same is true of honey with respect to taste; and of color with respect to sight. And, with respect to hearing, it is true of one single note, which is better sensed if it is alone than if it heard in harmony with another tone such as the octave, or in any other harmony. This is so because things mixed together obscure one another. But this second presupposition applies only to things from which one thing can be made, for such things alone are thoroughly mixed together.

447a21 From these two presuppositions he goes further when he adds *If, then, a greater drives off a lesser* .

He says that if a greater movement drives back a lesser, as the first presupposition says, then, if both movements are simultaneous, even the greater one is necessarily less able to be sensed than if it were alone, because something of it is taken away by admixture of the lesser one, as appears from the second presupposition, namely that what is simple is better able to be sensed than what is mixed. It is significant that he has said "if they are simultaneous," because the greater movement is sometimes so strong that it does not allow another movement to occur, and then it is not at all diminished by a lesser movement, because there is none. But if it does not prevail to the extent that it completely prevents the lesser movement from occurring, then, while the two movements exist, the lesser movement necessarily obscures the greater one to some extent. Therefore, if the movements are completely equal, but exist as different, neither will be sensible, because each wholly obscures the other—unless perhaps from the two movements one movement is made by mixture, but then what is simple in them cannot be sensed. And thus it must be either that no sensation of the equal movements occurs, or that there is a different sensation composed from both, that is, inasmuch as what is sensed is composed out of the two. And this is clearly the case in everything that is mixed together, because the mixture is not any of the things that are mixed together, but something else composed out of them. It is clear, then, from the foregoing that if two movements are unequal, the greater obscures the lesser, but if they are equal, either nothing or a mixture is sensed.

447a29 And from these points he proceeds further.

He proposes that there are some objects out of which some one thing can be made, but there are some out of which one thing cannot be made, and such are objects, such as color and odor, sensed by different senses. For only those objects can be mixed together in which the extremes are contraries, because mixture occurs by alteration. But objects that are sensed by different senses are

not contrary to one another, and hence cannot be mixed together. For example, some one object is not made out of a white color and a high-pitched sound, except perhaps accidentally, inasmuch as they come together in the same subject; but not per se, in the way that a harmony is constituted out of a low-pitched and a high-pitched tone.

447b3 From this he concludes that it is in no way possible to sense objects of different senses simultaneously, because if their movements are equal, they will entirely destroy one another, since one thing cannot be made out of them; but if they are unequal, the greater movement will prevail, and it alone will be sensed.

447b6 Then when he says *Moreover, it is more likely* , he presents the second argument, which is based on the unity and plurality of the senses. He argues by denial of what is more likely.

It seems more likely that the soul is able to sense simultaneously two objects pertaining to one sense—such as high-pitched and low-pitched in sounds—by means of the one sense, than that it is able to sense simultaneously different objects pertaining to different senses by means of the two senses. He gives the following reason for this. To the extent that movements are more different, they seem less able to be attributed to the same thing But two movements by which the soul, by means of different senses, senses different objects belonging to different genera are more different from one another than are two movements by which the soul perceives through one sense different objects belonging to the same genus. Hence it seems more likely that there could simultaneously be in one soul movements of one sense in relation to different sensible objects of the same genus, than movements of two senses, for instance sight and hearing.

447b9 Having presented this comparison, he eliminates what seems more likely.

He says that it is not possible to sense simultaneously, by means of one sense, two objects, unless the two have been mixed together, and then when they have been mixed together, they are not two objects, because, a mixture is naturally some one thing.

He proves in the following way that one sense cannot simultaneously know several things except to the extent that they become one thing by means of mixture. One sense-power can be in actuality at one moment with respect to only one object, just as the terminus of any one operation or movement can be only something that is one. And a sense-power in actuality must, at one and the same moment, be one and the same sense-power in actuality; for no power simultaneously receives different forms. Thus if a sense-power, for instance sight or hearing, has to sense several things simultaneously, it necessarily senses them inasmuch as they have been made one by mixture, because the sensitive power senses the two things by means of one sense-power in actuality—that is, one sensitive operation. A sense-power in actuality—that is, a sensitive operation has

numerical unity because it has one sensible object. But it is specifically one sense-power in actuality—or one sensitive operation—because it is one in potentiality or power. For instance, all seeings of any visible thing are specifically the same because of the unity of the power; but the seeing of one thing differs numerically from the seeing of another.

Therefore, if it is one sense-power in actuality, it must “say”—that is, judge of—one object. Therefore, if there are many objects, they must be mixed together into one. Therefore, if they are not mixed, there must be two senses in actuality—that is, two sensitive operations. But there is necessarily only one operation of one power at one and the same indivisible moment, because here can only be one use, and one movement, of one thing at one time. Hence, since sensitive operation is nothing but a “use” in which the soul uses a sensitive power, as well as a “movement” of the power itself, inasmuch as the sense is moved by a sensible thing, therefore, since one sense is one power, it is not possible to sense simultaneously two objects with one sense.

447b2l Therefore, if objects of one sense cannot be sensed simultaneously if there are two of them, it seems clear that it is still less possible to sense mnultaneously objects of different senses, such as white and sweet.

447b24 Next he clarifies this inference.

He says that the soul seems to judge that something is numerically one in no other way than the thing’s being perceived by it all at once, for sensitive operation itself is numerically one inasmuch as it is all at once, as was said. But the soul says that something is specifically one not because the latter is sensed all at once, but because it is the same sense that judges of each of two objects, and because it is the same manner in which it senses each. To explain what he said, he adds that the same proper one—that is, the same proper sense-power—judges of two different objects, namely white and black. Likewise, a sense that itself is the same, judges sweet and bitter, for both are apprehended by the same sense, namely taste. But this sense that, while being the same, knows sweet and bitter, is different from the one that knows white and black. Nevertheless, one and the same sense knows each of the contraries in a different way: for it knows one as a possession and something perfect, and the other as a privation and something imperfect, since all contraries are related in this way. However the way in which both senses know the corresponding elements—that is, the principles that analogously correspond to one another—is the same: for sight senses white the way taste senses sweet, and taste senses bitter as sight senses black.

Therefore it is clear that the soul judges that things are specifically different either by a different sense-power, as in the case of white and sweet, or by a different manner of sensing, as in the case of white and black; but it judges that a thing is numerically one by perceiving it all at once. if, then, it is impossible for

what is specifically one to be numerically one, it seems to be impossible for the soul to sense simultaneously either things that are known by different senses, or even things that are known by one sense but in different ways, and which seem to be less different from one another than are things known by different senses.

CHAPTER 17

448A1–B16

448a1 Moreover, if movements of contraries are contrary; and contraries cannot simultaneously be in the same atomon; and there are contraries, for instance sweet and bitter, under one sense-power—then one cannot sense them simultaneously.

But likewise, clearly, neither can one simultaneously sense objects that are not contraries. For some belong to white and some to black. And likewise in other cases: for instance some flavors belong to sweet and some to bitter.

Nor can one simultaneously sense mixtures simultaneously, for the proportions belong to opposites, for instance the octave and the fifth; unless they are perceived as one, but thus one proportion is made of the extremes, but otherwise not.

For there will be simultaneously many to few, or odd to even, or few to many, or even to odd.

If then, the so-called “corresponding elements,” which are in different genera, stand apart and differ from one another still more than do objects in the same genus (I call sweet and white, for instance, corresponding elements in different genera, and sweet differs specifically from black much more than white does); then one can sense these simultaneously still less than those in one genus. So if not the former, then neither the latter.

448a19 Some of those who discuss symphoniae say that sounds do not arrive simultaneously, but they seem to, and it escapes notice, since the time is insensible. Is it correct to say this or not? Perhaps someone will say that it is also because of this that one thinks that he simultaneously sees and hears, namely because the intervening lengths of time escape notice.

448a24 Or perhaps it is not true that any length of time can be insensible or escape notice: rather, absolutely all of them can be perceived.

448a26 For if when one senses oneself or something else in a continuous length of time, it cannot escape his notice that it is existing; and something is existing in a continuous length of time;

and it is so brief as to be completely insensible; it is clear that it will then escape his notice whether he himself is existing, and that he is seeing, and that he is sensing, and whether he is sensing.

448a30 Moreover, there will be no length of time (and no thing that one senses) during which it is not the case that it is being sensed in some part of it (or that one sees some part of the thing)—if indeed there is some magnitude of time, and of a thing that is insensible because of smallness.

For if one is seeing and sensing the whole during the same continuous length of time not because one does so in some part of it—then let GB, in which it was not being sensed, be subtracted.

Accordingly, one does not sense “during a part of it,” or “a part of it,” in the way that one sees the whole earth because one sees a part of it, and one walks during a year because one does so during this part of it. Rather, one senses nothing in GB. Therefore, it is because one senses it in a part, namely AG, that one is said to sense the whole of AB, and the whole thing. But the same account also applies to AG: it is always a case of “during a part of it,” and “a part of it,” and it is impossible to sense the whole of AGB.

448b12 All things, then, are sensible, but do not appear to be everything that they are: the size of the sun appears from far away to be four cubits. A thing does not appear to be everything that it is: rather, sometimes it is indivisible, but one sees what is not indivisible. The cause of this has been stated in the foregoing.

448b16 Therefore it is clear from these remarks that no length of time is insensible.

Commentary

448a1 Having presented two arguments to show that it is impossible for two senses to sense simultaneously, here he presents a third argument for the same conclusion based on the contrariety of sensible objects.

He says that alterations caused by contraries are contrary, for instance heating and cooling. But contraries cannot simultaneously be in the same “atomon”—that is, the same indivisible part (contraries can simultaneously be in the same divisible part with respect to different parts of it) But it is clear that objects under one sense-power are contraries, for instance sweet and bitter. Therefore they cannot be sensed simultaneously.

The argument is similar in the case of objects that are not contraries, that is, intermediate objects, some of which more closely approach one extreme, and some the other. For instance, as was said above about colors and flavors, some

intermediate colors pertain to white and some to black, and likewise some intermediate flavors pertain to sweet and some to bitter.

And the argument is the same in the case of all mixtures, for different mixtures have a contrariety between themselves because they are made in different proportions, and different proportions have an opposition to one another. This is clear in harmonies: one is called the octave, which consists in the double proportion, that of two to one; another is called the fifth, which consists in the sesquialteral proportion, that of three to two. Such things, I say, thus mixed together in different proportions, cannot be simultaneously sensed, because of the opposition between proportions—unless, perhaps, two are perceived as one, because thus one proportion will be made out of two extremes.

Next he shows that different proportions are opposed according to the two kinds of opposition found in numbers. One is according to many and few, by which the proportion of double and the proportion of half are opposed: for the proportion of double is one of many to few, but the proportion of half is one of few to many. The other kind of opposition is according to even and odd, by which the double proportion and the sesquialteral proportion are opposed: for the double proportion is one of two to one, that is, of even to odd, but the sesquialteral proportion is of three to two, that is, of odd to even.

Thus it is clear that objects falling under the same sense cannot be sensed simultaneously. But objects that correspond to one another as “elements” existing in different genera—for instance sweet and white—stand farther apart from one another than do objects belonging to one genus. For objects belonging to one genus, such as white and black, are specifically distinguished only because of the manner of sensing. But objects belonging to different genera can differ specifically not only from the point of view of the sense-power, but also from the point of view of manner of sensing: for instance, sweet differs from black more than white does. Hence they are less able to be sensed simultaneously, which is, as it were, to be numerically one, as was established above. Therefore, if objects belonging to one genus cannot, because of their contrariety, be sensed simultaneously, much less can objects belonging to different genera be sensed simultaneously.

448a19 Then when he says *Some of those who discuss symphoniae*, he eliminates a false solution of this question.

First he relates it. Second he disproves it, where he says *Or perhaps it not true* (448a24).

Accordingly he first says that some who treated of “symphoniae”—that is, musical harmonies—said that the harmonizing sounds do not reach the sense of hearing simultaneously, but that they seem to reach it simultaneously because the intervening time is insensible on account of its brevity. There might be doubt

about this: Is it correct to say this or not? If it is correct, someone who agrees with the arguments presented above will be able to say that, likewise, with respect to the question posed, it is not possible to simultaneously see and hear, although this does seem to the sense-power to happen, because the intervening lengths of time between the vision and the hearing escape our notice.

448a24 Then when he says *Or perhaps it is not true*, he disproves the above-mentioned solution.

On this point he does three things. First he eliminates something that the solution stated presupposes. Second he proves what he has said, where he says *For if when one senses oneself* (448a26). Third he clarifies what is true in the solution, where he says *All things, then, are sensible* (448b 12).

Accordingly he first says that something that the solution stated presupposes is not true, namely that there is a length of time that is insensible, or escapes the notice of the sense-power. For no length of time is like, this: rather, all lengths of time can be sensed.

448a26 Then when he says *For if when one senses oneself*, he prove what he has said by two arguments.

Concerning the first of these, we must consider that time is not sensed as a permanent thing presented to a sense-power in the way that color or size is presented to sight. Rather, time is sensed because something that is in time is sensed. It follows, then, that if there is some length of time that is insensible, what is in that length of time is insensible.

Accordingly he says that if at some point, in some continuous length of time, a human being senses that he himself is existing, it cannot escape his notice that that length of time is existing. Now it is clear that the human being, or the something else, is existing in some continuous length of time. And however brief you say the insensible length of time is, it is clear that it will escape the human being's notice that he himself is existing during that time, and it will escape his notice that he is seeing, or sensing, during that time, which is entirely unreasonable. Therefore it is impossible for a length of time to be insensible.

448a30 He presents the second argument where he says *Moreover, there will be no length of time*.

Concerning this it must first be considered that, as the Philosopher says in Physics V, a thing is said to move or be moved in three ways: in one way accidentally, for instance, if we say that the one who is musical is walking; in

another way with respect to a part, for instance, if we say that a man is healed because his eye is healed; and in a third way primarily and per se, that is, when a thing is moved or moves not because just one part of it is moved or moves, but because the whole is moved with respect to every one of its parts. 🗨️

Likewise, a thing can be said to be sensed in three ways: in one way accidentally, as, for instance, what is sweet is seen; in another way with respect to a part, for instance, if we say that a man is seen because just his head is seen; and in a third way primarily and per se, that is, not because just some part of it is seen.

Accordingly he says that if there is some magnitude—whether of time, or of a bodily thing—that is insensible because of smallness, what will follow is this: there will be no length of time and no thing that one senses (i.e. no thing that is sensed, or that a sense-power senses) during which (i.e. during which length of time) it is not the case (i.e. during which the time is not being sensed) because it is being sensed in some part of it. In other words: there will be no length of time that is sensible “primarily,” i.e. that is not said to be sensed because some part of it is being sensed. And with reference to the bodily thing he adds *or* because one sees some part of the thing. In other words: there will be no bodily magnitude that is not sensed because some part of it is sensed, which means that no bodily magnitude is sensible “primarily.”

To prove what he has said he adds that if someone sees, or senses by any sense, during some continuous length of time not by reason of a part of the time or magnitude; and nevertheless some magnitude and length of time are held to be insensible because of smallness; then let there be a magnitude—whether of time or of a bodily thing—namely AGB, and let the part of it that is the GB be insensible because of smallness. Accordingly, it cannot be said of this part that is insensible because of smallness that it is sensed “in a part of it”—if it is an insensible length of time—or that “a part of it” is sensed—if it is an insensible body—as the whole earth is said to be seen by someone because a part of the earth is seen, and as someone is said to walk during a year because he walks during a part of the year. Therefore, because one senses nothing in GB, it remains that one is said to sense the whole of AB—whether it is a time or a body—because the whole of AB is sensed in the part of it that is left, namely AG. And the account of the magnitude AG, which is held to be sensed, is the same, because a part of it will be insensible because of smallness. And so anything sensible will always be said to be sensed because it is sensed in a part of it—if it is a length of time—or because a part of it is sensed—if it is a body. But it will be possible to sense nothing whole, such as AGB.

But this seems unreasonable. Therefore there is no length of time or body that is insensible because of smallness.

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But this argument does not seem to work. For a thing is sensed because it has

power to alter a sense. Now it is proved in *Physics* VII that if some whole moves something moveable in some length of time, it need not be the case that a part of the whole moves the moveable thing in any length of time. 

But although no part of the whole, perhaps, could cause the movement, nevertheless, the whole that causes the movement is said to be the first mover. Likewise, it seems, one could say that a thing can be sensible "primarily" although some parts of it are insensible because of smallness.

In response to this it must be said that there is a difference between speaking of a part existing in a whole and a part separated from a whole. If a part of what primarily causes movement is separated, it may not be able to cause movement. But if, while existing in the whole, it did not cooperate in the power to move of the whole, but completely lack power to move, it would follow that the whole would be the mover not "primarily," but by reason of the part to which power to move does belong.

Likewise, too, nothing prevents a part taken separately from escaping the notice of a sense-power because of smallness, as was established above, while nevertheless, the part as existing in the whole does fall under the sense-power inasmuch as the sense-power is brought to bear on the whole, with no part left out.

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448b12 To address this doubt, next, when he says *All things, then, a sensible*

, he shows what is true in the foregoing.

He says that all things, whether big or small, are sensible, but do not appear to be everything that they are, that is, they do not appear as they are in every way. This is clear in the case of the sun, the size of which is far greater than that of the earth, and nevertheless, because it is far away, it appears to be four cubits in size, or even smaller. Likewise, although all things are sensible by their nature, nevertheless an object does not appear in actuality to be everything that it is: rather, sometimes it is indivisible, but one sees what is not indivisible. This can be understood in two ways.

One way is according as "indivisible" refers to some minimal natural body that cannot be further divided without being destroyed, and then absorbed into the surrounding body. Thus the meaning will be that an indivisible body is sensible in itself, although the sense-power cannot see an indivisible object of this kind.

In the other way, "indivisible" can be understood as what is not divided off in actuality, for example a part of a continuum. The sense power does not see this kind of indivisible object in actuality.

What he adds fits either explanation: that the cause of this has been stated

above, that is, in the determination of the first question. But the second explanation seems to be better, because by means of it the abovementioned objection is resolved, because any part whatsoever of a continuous magnitude is indeed sensed within the whole inasmuch as it is in the whole in potentiality, although it is not sensed in actuality as separate.

448b16 Finally he concludes that it is clear from what has been said that no length of time is insensible.

CHAPTER 18

448B 17–449B4

448b17 with respect to the objection stated above, it must be considered whether it is possible or not possible to sense several things simultaneously. By "simultaneously" I mean together in one indivisible moment of time.

448b20 First, then, whether it is possible to sense simultaneously by means of a different part of the soul, which is not indivisible, but is indivisible in the way that something continuous is.

448b22 Or first, the case of objects sensed by one sense. For instance if sight senses different colors with different parts of itself, it will have several parts specifically the same, for what is sensed belongs to the same genus.

448b26 If someone says that, since there are two eyes, nothing prevents it from being like this in the soul as well—it must be said that perhaps out of these some one thing is made, and they have one operation. But in the other case, if some one thing is made out of two, that will be what senses; but if they are separate, it will not be like the other case.

448b29 Moreover, there will also be several senses that are the same, as if someone were to speak of sciences that are not different. For there can be neither an operation without its own power, nor a sense-power without the former.

449a2 But if it senses this by one indivisible part, it is clear that it also senses the others. For it is more possible for several of these to be sensed simultaneously than ones of different genera. If, then, the soul senses sweet by one part but white by another, out of these either some one thing is made or it is not. But it necessarily is, for the sensitive part is some one part. What one object, then, does it have? For there is no one object made out of these objects. Therefore there is necessarily some one part of the soul by which it senses everything, as was said before, but it senses different genera

by means of different parts.

449a10 Accordingly, inasmuch as it is indivisible it is one power in actuality able to sense sweet and white. But when it is made divisible, it is different in actuality.

449a13 Or again, as it is in things themselves, so also in the soul For one and numerically the same thing is white, and sweet, and many other things, if the affections are not separable from one another But the being (*esse*) of each is different. Similarly, then, we should posit that also in the soul the power that is able to sense all things—although these differ in being, some in genus and some in species—is one and numerically the same. Hence it will also perceive by means of what is simultaneously one and the same, but not the same in aspect (*ratio*).

449a20 Now it is clear that everything that is sensible is a magnitude, and what is indivisible is not sensible. For there is an infinite distance from which it will not be able to be seen, but that from which it can be seen is finite. And it is similar with the audible and the odorous, and whatever senses without touching the things themselves. And so there is a limit to the distance from which it cannot be seen, and a point from which it can first be seen. And so there is necessarily something indivisible beyond which there is no sensing, but on this side of which there is necessarily sensing. If, then, something indivisible is sensible, when it is placed at the limit that is the last point from which it is not sensible and the first point from which it is sensible, it will simultaneously be visible and invisible. But this is impossible.

449b1 Something has been said, then about the sensitive parts, and sensible objects, how they are related, both in general and with respect to each sensitive part. Of what remains, the first to be considered are memory and recollection and sleep.

Commentary

448b17 After the Philosopher has eliminated a false solution, here he seeks the true one.

On this point he does three things. First he investigates the truth about the aforementioned question. Second he proves something he presupposed in the foregoing, where he says *Now it is clear*

that everything that

is sensible

(449a20). Third he adds an epilogue to

what was said in his book, where he says *Something*

has been said, then

(449b1).

On the first point he does two things. First he proposes what he intends. Second he carries out the proposal, where he says *First, then, whether it is possible to sense simultaneously* (448b20).

Accordingly, on the basis of the fact that what some have said has been eliminated—namely that several things are sensed simultaneously not in a moment of time that is indivisible according to the truth of the matter, but in a length of time that is imperceptible because of brevity—we must consider, with respect to the objection raised above, whether it is or is not possible to sense several things simultaneously, taking “simultaneously” to mean in an indivisible moment of time.

448b20 Then when he says *First, then, whether it is possible to sense*

simultaneously, presupposing that an animal does sense different sensible objects simultaneously—for we obviously have experience of this—he investigates how this is possible.

On this point he does three things. First he presents a false way. Second he disproves it, where he says *Or first, the case of objects sensed*

by one sense (448b22). Third he presents the true way,

where he says *Accordingly, inasmuch as it is indivisible*

(449a10).

Accordingly he first says that it must first be considered whether it is possible simultaneously to sense different sensible objects by means of a different part of the soul, the sensitive part of the soul being, as it were, not indivisible—that is, not incapable of being divided—although it is indivisible in the sense that it is not divided in actuality, being like a continuous whole. For if we understand the sensitive part of the soul to be like a continuum, the arguments presented above are dissolved, because nothing will prevent different and contrary things from being in the sensitive power of the soul with respect to its different parts, in the way we see that one body is white in one part and black in another.

448b22 Then when he says *Or first, the case of objects sensed by one sense*

, he disproves the way just mentioned.

On this point he does three things. First he shows that it will follow that even one sense, for instance sight, is divisible into several parts. Second he shows that this is impossible, where he says *If someone says*

(448b26). Third he shows that it is also not possible with respect to different

senses, where he says *But if it senses this by one indivisible part* (449a2).

Accordingly he first says that since one can simultaneously sense several objects by the same sense, as when sight distinguishes between whit and black, according to the foregoing argument one will have to say that it senses the different colors by different parts of itself, and so it will follow that the same sense will have several parts specifically the same. For it cannot be said that parts of the sense of sight differ specifically, because everything sensed by sight belongs to the same genus, and there is specific difference among sensitive powers only because of different genera sensible objects.

448b26 Then when he says *If someone says* , he disproves what was said by two arguments.

The first is that if someone says that, just as there are two organs of sight—that is, two eyes—nothing prevents there being two senses of sight in the sensitive soul as well, in response to this it must be said that out of the two eyes some one thing is made, and that there is one operation of both eyes—that is, inasmuch as the seeings of the two eyes concur, by way of certain nerves, at an inner organ of sight that is near the brain, as was said above. But if, likewise, in the soul some one thing is made out of two powers of sight by the two powers concurring in some one principle, it is to that one principle that the operation of sensing will be attributed. But if the two powers of sight are altogether separate in the soul because they do not concur in some one principle, the relation of powers of sight in the soul will not be like that of eyes in the body, and so the comparison was not suitable for showing what was proposed. Therefore, it does not seem reasonable to say that there are two powers of sight in the soul.

448b29 He presents the second argument where he says *Moreover, there will also be several senses* .

He says that according to the position stated above there will be several senses that are specifically the same, for instance several senses of sight or several senses of hearing. it would be as if someone said that there are, in the same human being, several sciences that are not specifically different, for instance several grammars or several geometries. It is certainly possible for there to be numerically several grammars or several powers of sight in different human beings, but not in one and the same human beings, just as it is impossible for there to be numerically several whitenesses in one and the same subject. To show that there cannot be several senses specifically the same in the same human being, he adds that sensitive power and operation follow from one another in such a way that neither can there be a power without its proper and per se operation, nor an operation without its proper power. But sensitive

operation is distinguished according to sensible objects, and so where sensible objects are completely the same, there are not different sensitive powers causing different operations. The habits of the sciences are similar: their acts are distinguished according to their objects.

449a2 Then when he says *But if it senses this by one indivisible part*

, he shows that this is impossible for objects of different senses, that is, that it is impossible for them to be sensed by different parts of the soul.

He says that if sensible objects belonging to different genera are perceived by some one and the same indivisible part of the soul, it is clear that much more so are the others, that is, those belonging to one genus. For it was proved above that it is more possible for objects belonging to one genus to be sensed simultaneously than objects belonging to different genera, and this is especially true with respect to the identity of the one perceiving.

He proves as follows that the soul does perceive sensible objects of different genera by the same indivisible part. If the soul senses sweet by one part of itself and white by another, out of these two parts either some one thing will be made or it will not. But one must necessarily say that there is some one thing to which all these parts—that is, the different senses—are referred, because the sensitive part is some one part of the soul. But it cannot be said that the sensitive part of the soul has some one genus of sensible objects—unless, perhaps, it were said that out of all objects of particular senses—for instance color, sound, and other such objects—is made one sensible object that would correspond to the one part of the sensitive part that is common to all proper senses. But this is impossible. Therefore there is necessarily some one part of the soul by which an animal senses everything, but it senses different genera by means of different parts, for instance color by sight, and sound by hearing, and so on.

Now here it must be considered that wherever there are different ordered powers, a lower power is related to a higher one as an instrument, because the higher moves the lower, and action is attributed to the principal agent acting by means of an instrument, as we say that a builder cuts by means of a saw. It is in this way that the Philosopher says here that the common sense perceives by means of sight, and by means hearing, and by means of other proper senses, which are different potential parts of the soul, and not, as was claimed above, like different parts of a continuum.

449a10 Then, when he says *Accordingly, inasmuch as it is indivisible*

, he shows how the same indivisible part of the soul can simultaneously perceive different things. He presents two ways.

He presents the first briefly and obscurely, because it has been presented more

fully in *On the Soul*



For evidence on this point, then, it must be considered that, since the operations of the proper senses are referred to the common sense as their first and common principle, the common sense is related to the proper senses and their operations in the way that one point is related to different lines that meet in it. Now a point that is the terminus of different lines is, considered in itself, one and indivisible, and in this way the common sense, inasmuch as it is in itself indivisible, is one power in actuality, able to sense sweet and white, sweet by means of taste, and white by means of sight. But if the point is considered separately insofar as it is the terminus of this line, and separately again insofar as it is the terminus of another line, it is thus in a way divisible, because we take the one point as two. Likewise the common sense, when it is taken as something divisible—for instance when it separately judges of white, and separately again of sweet—is different in actuality. But inasmuch as it is one, it judges differences among sensible objects. By this the arguments introduced above are dissolved, inasmuch as what senses different sensible objects is in a way one, and in a way not one.

449a13 He presents the second way where he says *Or again, as it is in things themselves*

He says that as it is in external things, so, it can be said, it is in the soul. For we see that one and numerically the same body is white, and sweet, and many other such things that are predicated of it as accidents—that is, if such affections are not separated from one another, as happens when a body keeps its whiteness and loses its sweetness. But as long as the affections are not thus separated, the white thing and the sweet thing remain the same in subject, but differ in being. Likewise, it can be posited of the soul that the power able to sense all sensible objects—both those that differ in genus, such as white and sweet, and those that differ in species, such as white and black—is one and the same in subject. And according to this, it will have to be said that the soul senses different sensible objects by means of what in a way is one and the same, that is, one and the same in subject, but in a way is not the same, inasmuch as it differs in aspect.

Difficulties

I

Now an objection to this might be raised. For in what is outside the soul, although the same thing could be sweet and white, nevertheless the same thing cannot be white and black. Thus it would seem that the soul cannot simultaneously sense sensible objects of one genus when they are contraries. Aristotle raises this objection in *On the Soul* when he says, “And it is impossible for white and black to be simultaneous: therefore, neither can their species be experienced simultaneously.”

He suggests the solution by what he adds: "if sense and intellect are similar." By this he gives us to understand that the situation in sense and intellect is not completely similar to that in natural bodies. For a natural body receives forms according to their natural and material being, according to which they have contrariety, which is why the same body cannot simultaneously receive whiteness and blackness. But sense and intellect receive the forms of things spiritually and immaterially according to an intentional being, in such a way that they have no contrariety. Hence sense and intellect can simultaneously receive species of contrary sensible objects. Something like this can be seen in the transparent, which in one and the same part of itself can be altered by white and by black, because the alteration is not material or according to natural being, as was said above.

There is also something else to be considered: that sense and intellect not only receive the forms of things, but also make a judgment about them. Now judgment about contraries is not itself contrary, but something one and the same, because by one of the contraries a judgment is taken about the other. To this extent, what was said above is true, that sensible objects belonging to one genus, where judgment about one of the objects is made by means of the other, can more readily be sensed simultaneously than objects of different senses.

II

But there is also another difficulty on this point, because the Philosopher's words presented above (449a13-20) seem to confirm an opinion of the Stoics, who held that color and odor and other sensible objects are not sensed by different powers; and that there are not different sense-powers; but that the soul itself, of itself, knows all sensible objects, and in doing so differs only in aspect.

To this it must be said that the solution of this second difficulty presupposes the first solution. Thus it must be understood that the soul—that is, the common sense, existing as numerically one, and differing only in aspect—knows different genera of sensible objects, which, however, are referred to it by the different powers of the proper senses.

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449a20 Then, when he says *Now it is clear that everything that is sensible*

, he proves something he presupposed above, namely that nothing is perceived unless it is of some size.

He says that it is clear that everything that is sensible is a magnitude, and nothing indivisible is sensible. To prove this, he introduces the consideration that there is a distance from which a thing cannot be seen; he says that this distance is "infinite, " because if the distance is extended to infinity, nothing is seen from there. And there is a distance from which a thing can be seen, and this is "finite," because a thing begins to be seen from a finite distance. It is similar with the

other senses, namely hearing and smell, that sense from some distance through an external medium without touching the sensible things themselves. Therefore, since the distance from which a thing cannot be seen is infinite in the direction away from sight, but finite in the direction towards sight, it follows that it is possible to identify a limit from which nothing is seen. But the distance from which a thing can be seen is finite in both directions. Therefore it is possible to identify a terminus from which a thing can first be seen. But anything intermediate between two quantities continuous with one another is indivisible. Therefore there is necessarily some indivisible point beyond which nothing can be sensed, and on this side of which a thing necessarily can be sensed. Therefore, if something indivisible is sensible, and it is placed at that indivisible boundary, it will follow that it is simultaneously visible and invisible: invisible inasmuch as it is at the boundary of the distance of the invisible, but visible inasmuch as it is at the boundary of the visible. But this is impossible. Therefore the first premise, that something indivisible is sensible, is also impossible. For if something indivisible is placed at the above-mentioned terminus, it will be partly seen and partly not seen, which cannot be said of the indivisible.

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Now this proof might seem to fail, because it is not possible to identify a boundary from which all visible things begin to be seen: rather, bigger things are seen from a bigger distance, and smaller ones from a smaller distance.

To this it must be said that every sensible object is visible from some determinate distance. Therefore if the indivisible thing that is held to be sensible is seen from some determinate distance, like a divisible thing, then Aristotle's argument will be conclusive. But if it is not possible to determine a distance from which it begins to be seen at the same time as a divisible thing is, it will again follow that in no way can it be seen. For one must take the proportion of the distance from which divisible things can be seen according to the proportion of the magnitudes that are seen. But there is no proportion of indivisible to divisible magnitude, for instance of a point to a line. Thus it will follow that what is indivisible cannot be seen from any distance, because any distance has a proportion to any other distance. Therefore it will follow that, if the indivisible thing is seen, it is seen by union with sight, which is contrary to the nature of sight and of the other senses that sense without touching. Therefore, an indivisible thing cannot be sensed—except, perhaps, inasmuch as it is the limit of a continuum, for other accidents of continua are also perceived in this way.

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449b1 Then, when he says *Something has been said, then* , he makes an epilogue to what was said in this book and establishes continuity with what follows.

He says that something has been said about the sensitive parts—that is, the

organs of sensing—and about sensible objects, and how they are related to the senses, both in general and with respect to each organ of sense, partly in this book, partly in the book *On the Soul*. Of what remains, the first to be considered are memory and recollection and sleep, because as present things are known by the sense-power, so past things are known by memory, and there is a certain fore-knowledge of future things in sleep.