

**Line by Line Commentary
on Aristotle's *De Anima***

Books I and II

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Introduction

Purpose and Plan:

This commentary is intended as a companion to Aristotle's *De Anima*. I address someone who is reading the text, and is stopped by a puzzling spot. Look that spot up in the Commentary. Or, if you have long had certain puzzles in the *De Anima*, look them up here.

The Commentary is designed for scholars of Aristotle, but I divided it so that it can be useful also to beginning readers. The main part aims at clear assertions that should be helpful to anyone at each line. The endnotes are only for a specialist. They will confuse someone who is just grasping what Aristotle is talking about. But experienced philosophers are also advised not to read the endnotes until they have read my comments on the text. The issues raised in some endnotes presuppose Aristotle's careful development in the whole *De Anima*.

In the main part I simply say what I think Aristotle means. I am aware that straight out statements about what Aristotle means are currently out of style, but I see no reason to force everyone to retrace my long path, just to read Aristotle's page. Some intricate insights can lead to simple clarifications. Passages that seem clear are often contradicted by other passages elsewhere, until at last we find Aristotle making an odd distinction which explains both. But other passages may raise further problems which require finding still another odd distinction. After a long time, when the text has become quite consistent, one can clarify a line without raising erstwhile problems. In the endnotes I explain the basis for my assertions, as well as doubts and alternative readings. There I interrelate many parts of the *De Anima* and other works of Aristotle.

In the endnotes I take up every puzzle I find. I must warn the reader that many of these are quite technical. Only an Aristotelian scholar will find them exciting. Resolving a small puzzle can clarify others and lead to implications one does not see at first. For example, one such small puzzle is the passage (428a11) where Aristotle denies that bees and ants have imagination, whereas everywhere else he affirms explicitly that all animals have it. The puzzle is well known. Before Aquinas, Albert the Great insisted that the translator must have made a mistake. Aquinas interprets the passage in relation to animals that have only one sense, but this does not explain about bees and ants who have all five senses. Some moderns (the O.C.T. and Torstrik) want to remove the trouble by emending the text. Hamlyn thinks it might mean that ants and bees lack the "deliberative" (human) kind of imagination, but according to Aristotle all animals lack that kind. From solving several other puzzles I show where Aristotle says that the kind of imagination he thinks bees and ants don't have, the kind he is discussing here, requires

a sense for time which only the higher animals have. They need to be able to recognize images as being from the past. How Aristotle explains the sense for time does turn out to have broad implications. It is exciting to resolve puzzles that have hung there for centuries, but I want to assure the reader that many parts of the commentary are more immediately useful. Below I discuss some of the uses and powers which a reading of Aristotle provides.

I can give the reader a criterion by which to decide if I am right in any spot. **My assertions are not to be taken in place of Aristotle's assertions. A commentary should never displace the text.** Please do not go out and repeat what Gendlin says and claim that it is what Aristotle says. If you have a puzzle in the text, read what I say and then return immediately to that spot in the text. You may find the text saying what the Commentary promised, or -- something else. **Aristotle's meaning must emerge for you directly from that spot in his text.** Other spots should then corroborate it as well.

Many commentaries I have seen are so poor that even a beginner using my test can find them wanting. Do not believe them, or me. A commentary succeeds at a puzzling spot only if, when you return to the text, AHA! now **the text** plainly says something that makes sense. Later you might interpret it in another way but the passage will never go back to being senseless.

Currently many philosophers emphasize the fact that there is no single right reading of a text. It is true that different concerns can be rolled up to a text, in response to which the text will speak back very differently. But a text must first be recognized as a deliberately and carefully constructed thing with a plan, parts, links, and internal sense-making. The best practitioners of the slogan that "there is no text" analyze a text very carefully and accurately, in order to determine how to "deconstruct" it. That stage has not been reached as long as the text seems to contain a great deal of puzzling nonsense.

There is a reason why one can be so puzzled for so long, and yet later see that the text says what it says quite plainly. To understand the text we must **be able to conceive of** what it says; we have to follow it with steps of our own thought. But our own thought is already structured and directed by many assumptions which we are not aware of making. We cannot imagine other alternatives. Seen through our own thinking, a passage in the text may seem to make an obvious mistake. A person of at least average intelligence such as Aristotle would not make **this** mistake. So we can be sure that **this** cannot be what Aristotle thought he wrote here, but what else could it mean? To save readers my many years of work, I tell them **the unfamiliar way of thinking** which, if it can be considered, lets the text make sense. But this can happen only if they turn back to the text to find out whether it now speaks plainly. Then I examine and defend my reading in the endnotes.

In many passages Aristotle argues explicitly against an assumption we are reading in. But since we **do** read it in here, we don't notice that he is denying it here. We seem to read something else. I have often observed this in retrospect. Later I wonder: How could I have missed his explicit denial? One can never be sure of having recognized all such places.

THE KIND OF COMMENTARY IT IS

In the Middle Ages a long line of scholars established a deep-going reading of Aristotle. In that tradition a beginner learned many reliable statements about Aristotle's views, which function at first like mysterious formulae. One could repeat them but one came to understand them only gradually. For example, from the start one learned that for Aristotle "matter is not bodies or particles; matter is potentiality." Some years later perhaps one became able to tell oneself exactly how matter can be thought of as just potentiality, not as identifiable basic particles or bodies. One understood this only together with understanding other terms and assertions. With such gradually emerging understandings, scholars knew that Aristotle's characteristic mode of thinking is very different from more familiar kinds of thought.

The tradition had many drawbacks. Aristotle was discussed in Latin terms which distort his concepts. Each commentator asserted "the correct" reading without alluding to other readings. They seem to understand everything Aristotle says. When they cannot enter into the internal sense of his statement, they may repeat an old formula, still in an assertive tone. It can seem that only you, the reader, do not grasp the formula. Many Aristotelian formulae remain internally dark.

In reaction, Analytical philosophers (especially scholars and translators in Oxford) have simply set the whole tradition aside, and have begun afresh. In accord with their general approach, the Analytic Philosophers strive for clarity. They accept only what they clearly understand. They often admit to being puzzled. Even when they feel sure, they still leave room for other readings. In contrast to the tone of "I am always right," it is far more realistic and pleasant when scholars write: "If I am right, Aristotle means ..." or "How are we to understand this?" "How can we make this intelligible to ourselves?" "I will argue" and, "An objector might now question whether ..."

These commentators have also provided invaluable clarifications of many ambiguities in the grammar of Aristotle's compressed text. In some stretches of major works his often ambiguous referents have been carefully examined. There is now a whole literature of this kind,

which we will never want to do without. A new level of philological care has opened many passages.

But the new way also has certain pitfalls. There are some commentators who don't attempt to understand Aristotle's genuinely different way of thinking. For example, Williams criticizes Aristotle's ubiquitous concept of "potentiality:" Williams writes: "What is actually nothing is nothing. ... What there is, is a confusion in Aristotle's thinking." (*Aristotle's De Gen and Cor, Translated with Notes*, Clarendon, Oxford: 1982, p. 219). We would not want to be satisfied with the usual formulae, and Aristotle was certainly wrong and confused about many things. But his concept of "potentiality" requires a broader effort.

To begin afresh, and to accept only what one really understands is an excellent idea, and can lead to new clarity. But if one refuses even to entertain what one cannot yet understand, one can fail to recognize major points to which the older tradition pointed from the start.

For example, some commentators do not recognize how greatly Aristotle's concept of "matter" differs from that of classical western physics. His often reiterated statement that "matter is potentiality" seems inadmissible. Instead of leaving open what it might mean, some commentators present an Aristotle who doesn't have that concept of matter.

To read a foreign text one must allow the main words to have unfamiliar meanings. They reveal their meanings only from their use in many contexts. One can learn them only gradually. If one insists on understanding immediately, then the good question: "How can we make this intelligible to ourselves?" turns into the quite different question: "How can this be understood in terms of the assumptions implicit in our own mode of thought?" Often, it cannot.

A different philosophy cannot be understood right off. A philosophy changes the meanings of its major terms. If one doesn't allow for this fact, the text will seem full of senseless statements.

Some commentators find throughout, that Aristotle "vacillates," "never resolves the difficulty," and "remains extremely obscure." They soon conclude that "the text of this passage is probably corrupt," or that "this chapter is a collection of fragments," or that "this passage has little to do with the one that precedes it." They often find that "the whole thing becomes unintelligible."

To find Aristotle confused and mistaken is not the worst pitfall. If Aristotle were simply left with the rejection he has largely received since the Renaissance, this would present no problem. But some commentators "save" him from being "illogical" by isolating, reinterpreting,

and then quoting his statements in evidence of a version that doesn't violate the assumptions of modern logic. One denies that he needed some of his "illogical" concepts. An Aristotle without his main approaches is put forward as a defense of Aristotle.

I agree with Helen Lang who writes: "Translating Aristotle's physics into modern terms, e.g., those of Newtonian physics, at once falsifies his position ..." Lang eliminates the problem by simply granting from the start that (in terms of Newtonian physics) Aristotle's project is "wrong about everything." Then there is nothing left to do in each spot, but to try to understand Aristotle in context, and in his own terms. I think that this is the only way to understand any philosophy. Once this has been achieved, one can freely deny, apply, reinterpret, use, or change anything from the philosophy in one's own work.

When we understand some of the ways of a foreign country, we come to notice peculiarities of our own country which we never noticed as such before. Seen from the foreign point of view, our familiar ways can become puzzling. How could they have seemed so natural before? Similarly, understanding a foreign text requires becoming aware of assumptions of our own, which did not seem to be assumptions before. If this does not happen, we cannot grasp the arguments in the text. I therefore sometimes ask the reader to consider the usual modern view from Aristotle's vantage point. Then our own assumptions become puzzling, and we won't read them into Aristotle's passages.

The possibility of understanding an unfamiliar philosophy involves the possibility that sense can be made in genuinely different ways. One can discover the thrill of pursuing a mode of thinking which is altogether different from one's own.

Let us pinpoint the difficulties in the text. Let us not be content with dark formulae. Let us struggle to spell out their internal reasoning. Let us collect and relate Aristotle's seemingly contradictory passages and their possible readings, rather than jumping to committed conclusions. But let us keep Aristotle's concepts and his odd distinctions as he defines them, and play the concepts on each other until we discover their internal connections. We can recognize when this has happened, because then each clarification also clarifies other passages. Mine aspires to be a commentary along these lines.

DOUBLE PURPOSE OF READING ARISTOTLE

Of course you want to understand Aristotle's *De Anima* for its own sake. It is one of the great works of all time, and functions implicitly in much of philosophy from then on. It also helps greatly with Aristotle's other works. The *De Anima* and the *Metaphysics* have to be read

together because he shows and does here what he says there only in general. But there is a much larger “by- product.” Once you have followed his thinking with your own, you will have created pathways in your understanding which will serve you even if you no longer remember what Aristotle said. Whatever pathways you may pursue, you will be implicitly protected from many unconscious assumptions, errors and oversimplifications by the fact that you have once thought along with him. His **kind** of thinking, his powerful strategies, the type of concept-making that you find here, will always be implicitly available to you, made richer by everything else you know.

The experience-near **type of concept** which Aristotle creates is incapable of achieving the reductive (technological) success which our Western, abstract, mathematical type of concept provides. On the other hand, there is much that must inherently elude the mathematical type of concept, perhaps especially the chief characteristics of living things and people. The *De Anima* may contribute some conceptual strategies for the eventual development of an additional kind of modern science of living things and humans, which we need.

Different modes of thinking are each capable of opening great reaches that would otherwise stay closed. Therefore every powerful philosophy is of interest not only in itself, but because it adds immensely to what we become capable of thinking in our own contexts in the present.

A philosopher stands at the edge of thought where the familiar meanings open into unseen possibilities, where words can combine in odd sentences to say what those words have never said before. In reading any philosophy, if we gradually grasp how the words are used in the sentences, if we struggle to stand where that philosopher stands, if we attempt to see from there what that philosopher sees from there, and if we then pursue how that philosopher proceeds from there, we are never again limited just to already existing concepts. Once we can think at that edge, we cannot help but develop our own thinking further and further. Then we can open any topic in many ways that were not part of that philosophy.

Aristotle is surely wrong about hundreds of things and right about hundreds of other things, but his mode of thought and conceptual strategies are neither right nor wrong. They are uniquely valuable in any period including the present for anyone who tries to think freshly. Modes of thought are not right or wrong, just valuable.

ABOUT TRANSLATIONS

If you do not know Greek well, you need to own at least two (preferably more) different translations. In my class we read only one of them together, but students are required to have at least one other. **Read only one**, but when you don't understand something, go to the other. It will surprise you how often the puzzle disappears. The totally different English phrases in the second translation can eliminate the problem you had in the first one, if it was due to the English version. There is no way to avoid such effects of translation, but across two or three versions you can sense what comes from Aristotle and what does not.

The translation I cite is mostly Hamlyn's, slightly corrected. My main corrections are:

His "in general" should be "universal" or "according to the whole."

His "simultaneously" should be "together."

His "contemplation" in II-1 (412a10) should be "contemplating."

"activity" cannot be interchanged with:

"actuality" (completeness).

Translation is inevitably a painstaking compromise between faithfulness and readability, but some translations deprive Aristotle of some of his characteristic mode of thought. Philosophical terms that he carefully distinguishes have been treated as equivalent and substituted for each other. Concepts that he explicitly rejects with long arguments have been reimposed by the English words and phrases. Newtonian time and space have been **assumed** in words that hide Aristotle's **derivation** of time and place. Some of Aristotle's major concepts which are strange to us have been eliminated from view altogether, by translating the same word with **different** comfortable English words in **different** places. The English reader can never notice the existence of such concepts, let alone acquire their unfamiliar meaning, since this can be done only from seeing that the same word is used also in surprising sentences.

Hamlyn usually translates a Greek word consistently with the same English word. He also manages ingeniously to retain the order of Aristotle's words and clauses, which enables beginners in the Greek language to follow along in Greek.

For a few Greek terms I use English letters so that the beginner can learn to think with these words "in Greek."

The English words that are usually used for Aristotle's main concepts come from the Latin commentaries in the late Middle Ages. "Activity," "actuality," "substance," "matter," and the names of the four "causes" all come into English from the Latin words. Latin adds a layer of

distortion to the Greek concepts. For example, for “actuality” it would be better to use “completion,” but by now a change would bring even more confusion. Translations already vary a lot.

Because of the varying translations, I use the following English words interchangeably:

ὄρεξις	the appetitive, desire
αἴσθησις	sensation, perception
πάσχειν	being affected, being changed, suffering effects
συμβεβηκός	accidental, incidental

ACKNOWLEDGMENTS:

I have read many commentaries and compendia of commentaries. I would highly recommend Themistius, Verdenius, Inciarte, and Lang. For students the only one I found useful is the one by Aquinas. While I disagree with him about some vital issues, I find him somewhat helpful to first readers at every point. He stretches out what Aristotle compresses, giving a paragraph to every sentence. He is extremely helpful at the first few readings of the *De Anima*. Thereafter one finds many problems that he does not deal with.

While I differ in many ways from my old teacher, Richard McKeon . I now know better than ever how fortunate I was to encounter the history of philosophy through him.

I am grateful for many helpful telephone conversations with my recently rediscovered friend Kenneth Telford. We almost always argue, but I have sometimes learned from him, and always from the thinking stimulated by our talks. We have not exchanged our written work.

I thank Rob Parker for the many technical aspects of assembling the manuscript and turning it into a book.

FOUR COMMON WESTERN ASSUMPTIONS THAT ARISTOTLE DOES NOT SHARE:

I would like to mark four common Western assumptions. For the purpose of reading Aristotle it does not matter whether we ourselves retain or reject them as such. Their explicit rejection does not undo their implicit role, since they are built into the very structure of most of our common concepts. We need to notice when we are assuming them.

1. **Space and time** can be variously understood. With a Western outlook one assumes that anything real must appear in the empty kind of space that seems to spread out before us, and in the kind of time that consists of determined moments and would move on even if everything else stood still. But for Aristotle, empty space and absolute time do not exist.

Some commentators say that Aristotle didn't "yet" have our concept of "space." The concept of space preceded Aristotle and was well known in his time. Aristotle argues explicitly against it. The Greek "Atomists" with whom Aristotle contends, assumed the existence of empty space (the "void" in which the atoms move).

We also have to recognize that Aristotle is not assuming determined moments, but rather **deriving** how a determined moment of time comes about.

2. **Relativism** is fashionable today. The alternative is presumed to be naive realism, the assumption that sensations and concepts are copies of things. Since Aristotle is not a relativist, one easily assumes that his assertions are those of a **naive** realist. But he was quite familiar with relativism. In his Athens many approaches competed. The Sophists taught that one could argue equally well for or against anything. Aristotle wrote a collection of ways to undercut **any** definition (*Topics*). We have to see why (he thinks) his own approach goes beyond both naive realism and relativism.

3 **The familiar philosophical positions** are not exhaustive. We tend to assume that an intelligible view must fall on one side or the other of the familiar philosophical issues. Even when we appreciate both sides, we usually assume that we must choose between the familiar alternatives, when we try to define something. Either view would make sense, but not both. Aristotle typically doesn't choose. He goes further into each and finds new distinctions that are more precise. Then he often concludes: "In a certain specific sense this and this, but in a different equally specific sense not this and this, but rather that and that." He spells out each of the two senses, but the single result can be odd and more complex than any familiar concept. We must often let him take us to an unfamiliar position.

4. **Matter**: We tend to assume -- but Aristotle denies -- that living things have the same kind of matter as inanimate things. We divide matter down into its ultimate particles, and these can be the same in living and inanimate bodies. Aristotle denies any particles that are not further divisible. Matter does not exist alone, just either in this form or in that form. Only living activity makes the kind of matter that is alive. The *De Anima* defines the concepts and strategies for Aristotle's science of living things.

Book I

I-1

At the start of each science Aristotle poses some of the main problems. Then he discusses the philosophers who came before him. After our chapter, he will do that in the remainder of Book I. In this kind of discussion the premises and definitions of our science are not yet fixed. Aristotle establishes them at the start of Book II and at the start of each new section in Books II and III.

I give a few main words in Greek and also in our own letters so that the beginning reader can become familiar with them without much effort. Translators vary and mix the main terms so it is necessary to look in the Greek text to see which word Aristotle has used.

I-1 OVERALL

It helps to read a chapter through a few times just to see what is there, before trying to understand each part.

Aristotle begins with “everything” and divides until he reaches the topic of the *De Anima*.

From 402a11 - 403a2 Aristotle poses a list of problems.

In 403a3 - 403a24 he determines what belongs to the soul itself in contrast to what belongs to soul-and-body as a whole. He presents a list of “affections,” then a difficult argument about “straightness,” and then he presents a changed list of affections.

From 403a24 to the end he talks about how the natural scientist (sometimes translated “physicist” or “natural philosopher”) should proceed, in contrast to mathematicians and metaphysicians.

This first chapter is often cited and widely discussed, because it says a great deal about Aristotle’s scientific method.

TEXT

402a1-4

Insight (εἶδησις, seeing, understanding) we take as a fine and worth-while thing,

and one kind as more so than another

either in virtue of its **accuracy** or in virtue of its being concerned with superior and more remarkable **things**.

On both these grounds we should with good reason place the study of the soul in the first rank.

Aristotle lauds the science he is beginning, but thereby also divides the sciences both by their method (i.e., their accuracy) and by their content (the things it studies). In every philosophy one important question is the unity or divisions of the sciences. Aristotle will return to the difference in method at the end of the chapter. Here he will divide and subdivides all possible content down to the science on which we are about to embark. He states a widely held opinion (*dokei*). He begins with “everything.”

402a4-10 It is thought (*dokei*) also, that an acquaintance (*γνώσις*) with it [the soul] makes a great contribution to the truth of **everything**,

and especially to the study of **nature**, for

the soul is, as it were, the first principle (*arche, ἀρχη*) of **living things**.

We seek to consider and ascertain (*θεωρήσαι καὶ γινώσκειν*)

both its **nature and its substance** (*οὐσία, ousia*)

and after that all the **attributes** (*συμβέβηκε*) belonging to it;

of these some are thought to be (*dokei*)

affections (*πάθη*) **peculiar** to the soul,

while **others** are thought to belong

because of it (the soul) to living **things**.

Within the truth of everything, Aristotle divides first between **nature** and everything else. (What is other than nature? The timeless universe, also mathematics as well as the things we make, like furniture, machines, and poems.)

Then, within nature, one subdivision consists of the **living things**. It is of those that the **soul** is the first principle (*arche, ἀρχη*, starting point, source, premise). The soul is what constitutes the living in them. We can use the English word “living” or “animation” for what he refers to. Aristotle uses the word “soul” to name whatever it is that makes all agree that plants

and animals are alive, whereas rocks are “inanimate.” By the word “soul” he means whatever living is.

Every philosophy changes what the main words mean. Therefore one must grasp the meaning of the words from how they are used in their contexts. We can see here that the word “soul” (*psyche*) has a much broader and different meaning for Aristotle, than it has in English. In modern usage “the soul” is considered to be something that might or might not exist. For Aristotle there is no doubt **that** there are living things; the question is **what** living is. The project is to understand what this is.

To understand Aristotle we must always notice where his way of thinking differs from our usual view. Modern science does not find a **special kind** of concept to study living things. We are accustomed to think that living things are defined in terms of chemicals and molecules which are not alive. Therefore we are unfamiliar with the strategy with which Aristotle begins. Although his information is primitive, his conceptual strategies are sophisticated. We need to notice where his method and approach are different from ours. Our botany, zoology, and medicine are highly developed, but they are not used as a source of basic conceptual models to explain nature and the universe. We do not look to our life sciences for basic understandings of what nature is. **From the start** Aristotle divides **nature** off from artificially-made things, and then **living** things from other nature. He expects to generate basic concepts for all existence by studying what life is.

Then, within “soul” or “living” Aristotle divides between the **basic** understanding he is looking for, and all the traits he hopes to explain from the basic understanding. What he calls the **“substance** (*ousia, οὐσία*) **and nature”** of the soul (or living) should explain its **attributes** (*συμβέβηκε*), if we get the basic concept right. So this is one meaning of his word “substance:” what defines something so that one can explain its attributes.

Within attributes (*συμβέβηκε*) Aristotle makes a distinction (unfamiliar to most of us) between **active** and **passive** attributes. He poses a problem about passive attributes of the soul. Passive attributes are “affections,” (*pathe, πάθη*), traits which make a thing affectable (changeable or movable) in some way. For example, I can consider it an active attribute of cloth that it can keep heat in. That is something cloth **does without being itself changed** thereby. But it is an **affection** of cloth that its color is changeable in boiling dye. A university, for example, does not have this affection, but it has other active traits (it educates people) and also passive traits that make it capable of being affected and changed.

Within affections, Aristotle further divides between what seem to be affections **peculiar to the soul itself**, in contrast to those that belong to **the soul-and-body**. He will clarify this a

few lines down.

Aristotle says that there are “**thought to be**” (*dokei*, general opinion) affections peculiar to the soul. He is saying that most previous thinkers held that the soul is affectable and movable in various ways. For example, the soul is said to be “moved” by emotions. (Aristotle will deny that the soul is moved.)

At the end of the passage, let us notice the phrase “**because of it.**” What is “peculiar to the soul as such” has just been distinguished from what “belongs to the whole living thing,” soul-and-body. Now Aristotle adds that **both** are due to the fact that the thing is alive, i.e., has soul. The living bodies and their organs are the way they are **because they are living**. For Aristotle the concepts that explain living activity must also explain the processes of physiology. Whatever “living” (soul) will turn out to mean, it determines every part of the body. He denies from the start that the living body can be understood just as body apart from its living. Let us notice: **Aristotle does not make the familiar distinction between soul and body.** His distinction is rather between **the soul** on the one hand, and **soul-and-body** on the other hand. The basic concept of “soul” will explain not only the soul’s own attributes, but also those of the whole living thing. That is what the little phrase “**because of it**” says here. Aristotle will make his distinction (soul // soul-and-body) clear shortly (at 403a6).

SEE ENDNOTE 1 ON THE TERMS IN 402a1-10

Now he poses his first and foremost methodological question:

402a10-22

But in every respect and in every way it is most difficult to attain any conviction about this . . . It might be perhaps held (*dokei*) that there is one procedure in the case of all those things **of which we wish to ascertain (*γινῶναι*) the substance (*οὐσία*)** just as there is, **demonstration**, for the peculiar attributes
 . . . But if there is not one common procedure **for what a thing is** (*περὶ τὸ τί ἐστίν*). . . **we shall have to establish** what is the way to proceed in each case. And. . . what **starting-points** (*arche, ἀρχή*) we must use in our inquiry;
 for, different subjects, e.g., numbers and planes have different **starting points** (*arche, ἀρχή*) [than living things have].

Demonstration is the familiar method of logical argument **from** premises to conclusions. This is the same in all of Aristotle's sciences. He is asking whether there is also some single method for **determining** what the basic premises are. Before we discuss this passage please notice that from here Aristotle goes on immediately to outline how he will establish the starting point.

Let us look at the terms he uses here. Aristotle's word "substance" (ousia, οὐσία) has very different meanings than it has in English. It doesn't mean some material, like salt or heroin. "Substance" is a Latin word. So far we see from the way he uses the word here, that it means the defining concept of something. If one **knows the "substance" (ousia) of** something, one has a **"starting point"** (arche, ἀρχη) in accordance with which all the attributes of **"what the thing is"** can be organized so that they become logically deduceable. We can notice that Aristotle substitutes "what a thing is" (τὸ τί ἐστὶ) for what he just spoke of as "substance" and also as "starting point," although the three words do not have quite the same meaning. Noticing such substitutions is a way to learn how Aristotle uses the terms. For the moment you can follow the text if you take the words to mean:

τὸ τί ἐστὶ (to ti esti, the what it is): A general inclusive term for what something is.

οὐσία (ousia, substance): The what-it-is of an independently existing thing. My ENDNOTE on substance comes after Aristotle's next passage.

ἀρχη (arche, source): The first principle, premise, starting point for deducing (he calls it "demonstrating") everything else.

Of course there are major philosophical issues about starting points, since so much depends on them and since they cannot be deduced from anything else. We need to wonder how Aristotle arrives at "starting" points. (For his discussion of first premises, see the beginning and end of his *Posterior Analytics*.) Logical argument ("demonstration") reasons **from** premises; therefore it cannot provide or establish the premises. In philosophy premises are always an issue, and in Aristotle's Athens just about everything was controversial among philosophers. For both reasons he expects us to question his every move, and especially how he establishes the basic premises. Of course it is the first and foremost methodological question.

Is there a single procedure in all sciences for arriving at premises? Aristotle answers this in our chapter at 403a25 below, where he argues that the kind of starting points one needs

in the science of nature (which includes the *De Anima*) **differ** from the kind of starting points needed in mathematics and in metaphysics. There he will say how they differ.

In the first five chapters of Book II and again at the start of each new section we will see how Aristotle actually establishes premises in the *De Anima*. Right here he only outlines his procedure as a list of problems he will take up in order.

402a10-23 The problems Aristotle raises are much easier to understand in Book II where he actually deals with them, so we will discuss them specifically there (and in ENDNOTES 2 and 3). Here I will only outline the procedure just as Aristotle does, but I will point out exactly where he takes up each of these problems.

402a23 First surely we must determine in which of the genera the soul is and what it is; I mean whether it is **a particular thing** (tode ti) and **substance** or [whether it is] quality quantity or some other of the **categories** which have been distinguished.

Aristotle's procedure begins with his most general divisions from his book, *Categories*, the most general divisions of "what is." In contrast to categories like quantity and quality which exist only because something else happens to have that size or that quality, Aristotle categorizes as "a substance" anything that ***exists "independently" and acts from itself***. Aristotle will indeed begin his formal presentation in II-1 with this question, and will show that living things are substances.

SEE ENDNOTE 2 ON SUBSTANCE 402a10-23

"And secondly we must determine whether it is one of those things which are in **potentiality** (dynamai, δυνάμει) or whether it is rather a kind of **actuality** (entelecheia, ἐντελέχεια), for this makes no small difference.

Next in his procedure Aristotle applies his basic distinction between potentiality and actuality. He distinguishes between these two ways of "being" in order to be able to think about

a world of change which nevertheless has a high degree of order: We will come to know his concept of “potentiality” which means at least that only certain things can change into certain other things. “Not just anything can change into just anything,” he often says. This will become clear as he proceeds.

Early in II-1 Aristotle will establish whether the soul is a potentiality for certain changes, or an actuality, or in some complex way both.

“And we must inquire also if it is divisible or indivisible . . . “

Aristotle asks and answers this in II-2 with different kinds of distinctions and separations. At 413b16 where he speaks of cutting an insect in half, he finds that each half can sense and move. So there is one whole soul in each cut part. A living thing is in some important way always one and indivisible, in spite of the distinctions between its potentialities for activities such as reproduction, sensation, locomotion, and thinking.

402b1-6

“and whether every soul is of like kind or not;

and if not of like kind whether differing in **species or genus**.

For as things are, people who speak and inquire about the soul seem to study the human soul only.

But we must take care not to overlook the question **whether there is one definition** (*logos*, λόγος) of the soul,

as of living thing,

or whether there is a different one for each, as of horse, dog, man, and god.

The universal “living thing” is either nothing or secondary. And it would be similar for any other common predicate.

In II-1 Aristotle gives a single definition applicable to every kind of soul, but in II-2 and II-3 he shows why **different** definitions are necessary for different kinds of living things.

402b9.

Furthermore, if there are not many souls but only parts [of always one soul], should we inquire into the whole soul or its parts? It is

difficult too to decide which of these [parts] are really different from each other.

By the different “parts” of the soul Aristotle means its potentialities for different life-activities. Plants have only one but animals have several.

402b14 “and whether we must inquire into the parts first, or their works (ἔργα, erga, functions). [For example, shall we first inquire into:] **thinking** (noein, νοεῖν) or the **nous** (νοῦς, νοῦν, νοῦ) the thinking activity or that which can think), or **perceiving** or **that which can perceive**; and similarly with the rest also.?

And if the functions come first, the question might be raised whether to inquire into the corresponding objects before these, e.g., **the perceptibles** before **that which can perceive**, and the **objects of thought** before the **nous**.

Here Aristotle relates the soul’s **potentialities** and **activities** to the things, the **objects**, i.e., what we sense and understand. In which order shall we consider these three? Shall we begin with the activities, or with the potentialities (the capacities) which enact the activities? For example, “noein” (νοεῖν, thinking) is the ongoing activity of “nous;” nous is the soul’s capacity for thinking and understanding, (noein, νοεῖν). Which should be considered first? Aristotle takes this question up at the start of II-4.

402b16 “It seems that not only is ascertaining **what a thing is** (to ti esti) useful for a consideration of **the causes of the attributes which follow from substances** (as in mathematics ascertaining what straight and curved or line and plane are is useful for seeing to how many right angles the angles of a triangle are equal), but also conversely **the attributes** contribute a great part to insight (eidenai) of what a thing is.

For when we are able to give an account of either all or most of

At the start of each science Aristotle always sharply distinguishes what belongs in that science from what does not. Here he has distinguished the subject matter down as far as attributes of the soul as such. He has left open whether any of these are affections (ways in which something can be passively affected). He will now show exactly what will be included in the *De Anima*, and what he will treat in other sciences.

It is always a crucial philosophical question how one divides and organizes the sciences, but Aristotle has another reason for dividing them **very** sharply. When one writes a lot, it becomes crucial to know where to put a given point. We write something and then, later on, we have another thought, -- where does it go? Or, if we discover a new piece of information, -- where shall we add it? If we have written a lot, we need to be able to find exactly where we have already written on that topic, so that we can add or change something, rather than writing some of it anew in some other place. Only if we have a very sharp organization can we **define one and only one spot** where a given topic or point can possibly be placed and found. If we need to correct something, we can correct it in its one spot, not in six places. This becomes overwhelmingly necessary, if one happens to deal with many topics. Imagine the intensity of this need for Aristotle who wrote about everything!

For this and other reasons Aristotle made extremely sharp cuts between different books and parts of books. He always has a clear answer to the question, just why is this placed here?

So we have to grant him this way of doing things. Without this he could not possibly have achieved what he did. We have to adjust to it, which often means that we must do without certain very necessary points, or look for them in the other books.

Let us attend closely as he derives his sharp distinction between attributes of the soul which will be covered in the *De Anima*, and attributes which will not be included. Aristotle returns to the distinction he made at the bottom of his subdivisions, where affections generally held to be **of the soul as such** were distinguished from affections of **the whole soul-and-body animal**. He had left open:

403a3-7

There is also the problem of whether the **affections** (πάθη) **of the soul** are **all** common also to **that which has it**

“That which has soul” is the soul-body combination. He asks whether **all** the ways in which the soul can be affected are really affections of the soul-**and**-body,

- 403a10-11 1) If then there is any of the **functions** (ἔργων, active works) or **passivities** (παθημάτων) of the soul which is peculiar to it, it can be **separated** from the body.

Type 1, the soul **without** the body, is what he just ruled out, except perhaps for noein (νοεῖν).

- 403a12 2) But if there is nothing peculiar to it, it cannot be separated, but it will be **like the straight**, to which, **qua straight, many attributes belong, e. g. it will touch a bronze sphere at a point**, although the straight if separated will not so touch. For it is inseparable, if it is always found with some body.

In mathematics the formal attributes of straight lines can be studied separately although they don't exist separately. In our science we will study the functions of the soul separately although they don't exist separately. This will be like studying the kind of "straight" that can touch a bronze sphere. We still study the straight "qua straight," for example that a line touches a circle only at one point, but it will be a material "straight" thing that touches a bronze sphere.

We can separately study **the active functions** that belong to the soul even though they are not separable from the body.

But the affections now fall into a third grouping:

- 403a16-19 3) It seems that **all the affections** (πάθη) of the soul happen along with the body (εἶναι μετὰ σώματος) – **passion, gentleness, fear, pity, courage, and further, joy and both loving and hating;** for, together (hama, ἅμα) with these, the body is affected in a certain way.

The third kind, "the affections of the soul" are **not** affections of the soul alone. They all belong to soul-and-body. The soul can be affected only by affecting the body.

Please note that in this third list there is no mention of perceiving. With this new three-way distinction perceiving falls into the middle group. The emotions are affections which are now listed as a third group.

SEE ENDNOTE 4 ON WHY PERCEIVING IS NOT AN AFFECTION OF THE SOUL

The three-way distinction:

1 separable, without the body	//	inseparable	
possibly noein	/		\
	2		\
	active powers		\
	of soul as such		\
	(like sticks and		\
	bronze spheres)		\
			3
			affections of soul-and-body

There are no affections of the soul as such. (I-4 will show this more explicitly.) The third kind of attributes happen only to the soul-body combination, only because the body is being affected.

With this three-way distinction, Aristotle has defined and delimited the content of the De Anima. The book will include 1) and 2) but not 3).

He has now shown in detail what he mentioned at the start of the book, the division between what belongs to the soul as against what belongs to the soul-and-body. All affections belong to the soul-and-body. What belongs peculiarly to the soul includes (1) what might be separate from the body, and (2) the active functions which can be studied separately (in the De Anima) but always as embodied, like a mathematics of bronze spheres and wooden rods. The formal properties of the active functions will be studied together with how they determine and generate the material.

On the other hand, (3) the affections of soul-and-body will fall into other life-science

books about what is true of living bodies because of being alive, i.e. because of having a soul (as he said at the start).

Throughout the remaining chapters of Book I Aristotle will insist that the soul cannot be moved or affected. Only the soul and body can be affected. He argues against the prevailing view which was that the soul is moved by emotions. He first builds this continuing argument right here.

Where we left his text, he was saying: “together (hama, ἅμα) with these [fear, pity, courage] the body is affected in a certain way.

403a19-24 This is shown by the fact that **sometimes when severe and manifest sufferings** (παθημάτων) befall us **we are not provoked to exasperation or fear**, while at other times we are moved by small and imperceptible sufferings **when the body is aroused and is as it is when it is in anger**. There is even more obvious evidence: for one may come to have the affections of someone who is frightened, although nothing frightening is taking place.

Although he doesn't say so, Aristotle has explained why the emotions will not be studied in the *De Anima*. They belong to group 3). He thinks that they are not active functions. He argues that the emotions are results of preceding states of the body which **interfere** with what would otherwise be valid perceptions of events.

SEE ENDNOTE 5 ON THE EMOTIONS

403a24-25 If this is so, it is clear that **the affections** are principles (*logos*, λόγος) involving matter. (εἰ δ' οὕτως ἔχει, δῆλον ὅτι τὰ πάθη λόγοι ἐνυλοὶ εἰσιν·)

The soul is affectable only through its matter which is the ensouled body. He will say more about this in I-4, to show that (contrary to prevailing opinion) the soul **as such** is never

affected or moved.

SEE ENDNOTE 6 ON WHY THERE ARE NO PARTS OF THE SOUL AS SUCH

The requirement for both material and functional kinds of explanations, which he has just shown (except for nous), will now enable him to do what he promised earlier (402a10-22), to characterize the kind of premises which are required for the larger **science of nature**, of which the De Anima is only one subdivision. Other subdivisions include the *Physics*, *De Gen and Cor*, *De Caelo*, as well as the books about living things, including *De Sensu*, many short pieces and all his very long books on the parts, motions, and reproduction of living bodies for which the soul (the De Anima, the active functions of the soul) gives the basic concepts, sources and principles, determining what living bodies have to be, to perform these functions.

The inseparability from the body enables him to state exactly in what way the whole inclusive science of nature differs from mathematics and metaphysics. For Aristotle these are his **three kinds of theoretical sciences**. In contrast to mathematics and metaphysics, the science of nature requires premises that involve both form and matter, i.e., changeability.

He continues about the emotions, now as an example of the method of the overall science of nature.

403a25-27

Hence **their definitions** (ὁρισμός) are such as:

Here he states a definition:

'Being angry is a particular movement of a **body of such and such a kind**, or a part or potentiality of it, **as a result of** this and **for the sake of** that'.

While his emphasis here is just on two, the inclusion of **matter** as well as **form**, his definition of anger involves Aristotle's famous **four causes**. (Four "causes" means four kinds of explanations Aristotle uses throughout his works.) If you don't know them, this example can let you become familiar with them.

"as a result of"

Moving cause (in Latin: "efficient cause")

"body (or part . . . of a body)"

material cause

“such and such kind	formal cause
and for the sake of”	final cause

These traditional terms are Latin, not Aristotle’s words. They have long been used in traditional Aristotle studies. But Aristotle, like many philosophers, coins his own terms directly from the language. He calls them: the

“**by which**” (by means of which, or source of its motion)

the “**out of what**” (the ingredients, the material)

the “**what it is**” (Its form)

the “**that for the sake of which**”

403a27-28 And for these reasons an inquiry concerning the soul,
(either every soul or this kind of soul,)
is at once the province of the **scientist of nature**

The study of the soul is part of the wider science of nature which considers **matter** as well as form, since most of the soul-functions, including perception, are not possible without the body, and since the soul is affectable through the soul-and-body. (The parenthesis concerns the possible exception of one kind of soul-power which might be separable from the body). All or most of the *De Anima* does not abstract from matter. As in all the rest of the science of nature, the definitions of our premises will always include both the form and the matter. Aristotle now criticizes those who included only one or the other.

403a29 But the [earlier kind of] **natural philosopher**

The early physical-reductive thinkers called ‘physicists, for example Democritus

403a29-30 and the **dialectician** would define (ὀρίζεσθαι) each of these differently, e.g., what anger **is**.

For example Plato and the earlier dialecticians.

403a30-403b3 For the latter would define it as a desire for retaliation or something of the sort, the former as the boiling of the blood and heat around the heart. Of these, the one gives the matter, the other the form and principle (*logos*, λόγος). For this is the principle (*logos*) of the thing, but it must be in a **matter of such and such a kind** if it is to be.

Aristotle criticizes Plato for dealing only with form and function, and the earlier physicists for dealing only with matter and motion. We can see that both kinds of explanation were familiar in Aristotle's time. Aristotle always intends to take what he can from every viewpoint. Here he demands both kinds of explanation.

Now he offers another example of form and matter:

403b3-7 Thus the principle (*logos*, λόγος) of a house is, say, that it is **a covering to prevent destruction** by winds, rain, and heat, but someone else will say that a house is **stones, bricks, and timber**, and another again that it is **the form in them** [in the stones, bricks and timber] **for the sake of** these other things.

The last-mentioned does as Aristotle wants.

"The form" (a covering) and the function (to prevent ...) stand in contrast to "the matter" which consists of the materials (made of ...).

SEE ENDNOTE 7 ON THE CHOICE OF ARISTOTLE'S EXAMPLES

403b7-9 Which of these, then, is the student of nature? Is it the one who is concerned with the matter, but is ignorant of the principle (*logos*, λόγος) or the one who is concerned with the principle only? Or is it rather the one who is concerned with the product of **both**?

Only the last is a proper scientist of nature for Aristotle.

403b9-12 Who then is each of the others? Or is there no particular person who is concerned with the affections of matter which are not separable **nor treated as separable**,

A little further below he tells whom he means

while the student of nature is concerned with everything which is **a function or affection of such and such a body and such and such a matter?**

Here active functions and passive affections (*pathe*, πάθη) are again both mentioned. Aristotle's natural philosopher (*phusikos*, φυσικός) is concerned with both.

The *phusikos* is concerned with matter but not with any particular piece of matter, rather only with the **kind of matter**.

403b12-14 Anything other than this is the concern of someone else, and in some cases of a craftsman perhaps, e.g. a carpenter or doctor.

Treating not just the **kind** of matter, but this **particular** body is what the doctor does in trying to cure these particular patients, or the carpenter in making this particular table.

Now he will define the two other theoretical sciences:

403b14-15 What is **not separable**, and not treated as affections of such and such a body but **in abstraction**, is the concern of the **mathematician**.

Mathematics is not concerned with what kind of body something is, whether living or

inanimate, drawn in the sand or on the blackboard, although what it studies does not exist apart.

403b15-16 Those which **are separable** are the concern of the '**First Philosopher**' [i.e., metaphysician].

What we call the *Metaphysics*, Aristotle called "first philosophy." (The work was named "Metaphysics" later by others.) That is where what exists apart from matter (apart from changeability) is considered.

403b16-19 Let us return to the point from which our discussion (logos, λόγος) began. We were saying that the affections of the soul are, at any rate, **in so far as they are such [as] passion and fear**, inseparable in this way from the natural matter of the animals in which they occur, and not in the same way as a line or surface.

----- END OF I-1 -----

I-2

One cannot skip Book I after the first chapter. Although most of the rest seems to deal just with Aristotle's predecessors, he achieves quite a lot more. I will take up only parts that are quite crucial for later. Then, in Books II and III I will comment on every line.

OVERALL

In this chapter Aristotle begins his discussion of the views of earlier philosophers. We will encounter the ancient view that the soul (psyche) is the cause of everything. We will also see how the word "**nous**" (closely connected to psyche) was used in Greek philosophy before Aristotle. We need to see this because Aristotle retains its ancient meaning, although he gives it many differentiations. Nous is usually translated "mind" or "intellect," but no English word can translate it. You will grasp it best from its contexts.

Aristotle is near the beginning of **our** history of philosophy but he comes at the end of a long line of Greek philosophers. He likes to save, modify, and adopt as much as he can from all of them. In I-1 he combined the way the dialecticians and the physical reductionists define things. In this chapter we will hear especially about one more philosopher, Anaxagoras, from whom Aristotle takes some major strands.

TEXT

403b20-22 For our study of soul it is necessary . . . to call into council the views (δόξας) of . . . our predecessors . . .

403b25-27 Two characteristic marks above all others have been held (*dokei*) to distinguish that which has soul from that which has not: **movement and sensation** . . .

Aristotle devotes distinct parts of the *De Anima* to movement (III-9-11), and to the senses (II-5 - III-2). He retains these two characteristics of the soul, but adds nutrition and nous.

403b29-31 . . . believing that what is not itself moved cannot originate

movement in another, **they arrived at the view that soul belongs to the class of things that move.**

Aristotle will argue that the soul cannot be moved at all. It moves the animal and other things, but it does not move and cannot be moved. Here he points out that most people think that something must itself be moving in order to impart motion to anything else. Aristotle denies this.

403b31-404a5

This is what led Democritus to say that soul is a sort of **fire** and hot; his forms (σχῆμα) and atoms are infinite in number; those which are **spherical** he calls fire and soul, and compares them to the motes in the air which we see in shafts of light coming through windows; together, these seeds of all sorts he calls the **elements** of the whole of nature. . .

One major philosophy in Aristotle's time was this early version of the atomist reductionism which has been so successful in our recent centuries (and then left behind by the further development of modern physics). Like our Newtonian classical physics, Democritus proposed rendering everything in the universe as combinations of inanimate **atoms in motion**, and **elements** with certain **geometric** characteristics. But don't take sides. Methods and approaches are not true or false. Each can open a whole realm of avenues that otherwise stay hidden. Aristotle is arguing that something need not move in order to cause motion. He has another way of thinking.

In the next passage notice the word "**nous**" and try to say what it means here.

404a25-27

Similarly also **Anaxagoras** (and whoever agrees with him in saying that **nous set the whole in movement**) declares the moving cause of things to be soul.

Nous was held to impart motion to the universe. So the word "nous" cannot quite mean what the English words "intellect" or "mind" mean, since those words connote a process that happens only **in us**. For Anaxagoras (and for Aristotle) "nous" is not only in us. It is not even

primarily in us. Nous originates and is the order of the universe, and exists **also** in a certain way in us. Aristotle will later give the word “nous” his special, well differentiated meaning, but he will not change the meaning which this ancient word long had in Greek philosophy: something that exists in the whole universe and also in the human soul.

404b1-6 Anaxagoras . . . in many places he tells us that the cause of beauty and order is **nous**, elsewhere that it is **soul**; it is found, he says, in all living things, great and small, high and low,

but **nous as when we speak of prudence (*phronesis*, φρόνησις)** appears not to belong alike to all living things,

and indeed not even to all human beings. . . .

Aristotle does not disagree with Anaxagoras that nous is in the universe and not just in us. He does not argue against the view that “**nous**” moves and orders **everything**. We see that nous in some way includes, controls, overarches **both** our own processes of understanding and also the order of the universe and what got it moving.

Aristotle now turns to the second mark of the soul: sense perception.

404b8-10 All . . . who looked to the fact that what has soul knows or **perceives** what is, placed the soul among the first principles.

A little later in the chapter Aristotle says:

405a13-19 **Anaxagoras**, as we said above, only **seems** to distinguish between them, **but in practice he treats soul and nous as a single nature**,
except that it is **nous** that he specially posits as the first principle of all things:
At any rate what he says is that nous alone of all that is, is **simple, unmixed, and pure**. He assigns **both characteristics, knowing**

and origination of **movement, to the same first principle, when he says that it was nous that set the whole in movement.**

Note “simple, unmixed, and pure;” Aristotle will later say something very much like this about the nous part of the soul (III-5).

If there is any doubt, we can see here that “nous” was always taken to include something like knowing (understanding, mind, intellect), since Aristotle assumes this, concluding that Anaxagoras attributes motion **and knowing** to the same principle “when he says that nous set the whole in motion.”

Aristotle cites another ancient philosopher, one who is widely discussed again today.

405a25-26 Heraclitus too says that **the first principle**, . . . of which, according to him, **everything** else is composed, **is soul** . . .

The philosophers who held this view were not in the majority. Aristotle says elsewhere that most people are inclined to think that the Universe consists of soulless bodies. (*De Caelo* 292a20). Nevertheless, it was an ancient and wide spread philosophical view that the universe is animated by psyche or soul, or by something which is not sharply distinct from soul or nous.

A little later in the chapter Aristotle discusses the physical reductionists again:

405b15 The language they all use is similar; **like**, they say, **is known by like**;

This is a simpler version of a theory with which we moderns are familiar. Vision and touching are explained in terms of the same chemical elements and processes that also explain the objects that are seen and touched. That which does the perceiving consists of the same elements as what it perceives. This was expressed as “like (is known or perceived) by like”

405b15-17 as the soul knows everything,
they construct it out of **all** the first principles.

The soul must be made of all the elements, since if it were made of only one kind of thing it couldn't perceive or know the other things by its likeness to them. It was an ancient view that the soul in some way is or can be all things. (Aristotle gives his version of this view in III-8.)

405b17-23

Hence those who admit but one cause or element, make the soul also one (e. g. fire or air), while those who admit a multiplicity of first principles make the soul also multiple.

The exception is **Anaxagoras**; he alone says that **nous** is **unaffected** (*ἀπαθῆ*, *apathe*) and has **nothing in common** with anything else. But, if this is so, **how or in virtue of what cause can it know**? That Anaxagoras has not explained, nor can any answer be inferred from this.

Let us notice that Aristotle doesn't disagree that nous cannot be affected and has nothing in common with anything else. He only says that this poses a puzzle how nous can know. Aristotle gives his own answer in III-4.

----- END OF I-2 -----

I-3

405b31- 406a4

We must begin our examination with movement; for, doubtless, not only is it false that **the substance of** soul is . . . what moves . . . but it is impossible for movement to belong (*ὑπάρχειν*) to it.

We have already pointed out that there is no necessity that what originates movement should itself be moved.

Aristotle will now show why the soul qua soul cannot be moved and does not move. Of course it can be in motion **indirectly** when the body moves.

406a4-6

There are two senses: . . . (a) indirectly . . . e.g., sailors in a ship, . . . are . . . 'indirectly moved', because they are in a moving vessel. . .

406a11-13

what we have to consider now is whether the soul is (b) directly moved

There are **four species of movement:**

locomotion, alteration, diminution, growth

Aristotle uses the word “motion” to include changes of every kind (but not generation or destruction). Here he has “qualitative motion” (what we call “change”), quantitative motion (growth and diminution), motion in respect of place (locomotion). Sometimes he lists generation and destruction as a special case, not exactly a change or motion. I don’t know why diminution is listed separately since he usually lists it just as quantitative change, the contrary of growth. Aristotle wants to be dialectical in Book I rather than stating settled views, but even so there is a reason when he deviates from his usual classifications.

Aristotle argues against those who held that the soul consists of rapidly moving atoms which move the body by their motion.

SOME TEXT OMITTED HERE

406b17-22

An example of this is Democritus, who uses language like that of the comic dramatist Philippus, who accounts for the movements that Daedalus imparted to his wooden Aphrodite by saying that he poured quicksilver into it;

Similarly Democritus says that **the spherical atoms** (ἀδιαιρετός, indivisibles) which according to him constitute soul, owing to **their own ceaseless movements** draw the whole body after them and so **produce its movements.**

Here we can recognize an early version of the classical Western belief that everything is reducible to the activity of atoms (electrons, protons etc., indivisible bodies). Aristotle disagrees. Without having yet said much about living things, how can he show that this is not the kind of locomotion that characterizes “living?”

406b22-23

We must urge the question whether it is these very same atoms which produce **rest also**. How they can do so is difficult .. to say. Universally the living thing does not appear to be moved by the soul in this way, but by some act of choice and thought.

(ἀλλὰ διὰ προαιρέσεως τινος καὶ νοήσεως).

Aristotle argues that the motions of atoms cannot explain how animals not only act but also rest and then resume their life-activities. According to his *Physics* every inanimate natural body also has an internal principle which determines how it moves **and rests**, but inanimate natural things **always** do whatever they do. The stone will always fall if not stopped; it will never rest of its own accord in mid-air. Of its own accord it would rest only at the center of the earth. The fire will burn as long as there is fuel. The rusting of iron will not stop as long as any iron is left. Only living things act, rest, and resume their activities. In our Western science, as with Democritus, life and perception are explained as far as they can be explained by processes that happen just like fire burns and iron rusts. Aristotle is also concerned with the material side, but he wants to grasp the more complex kind of order which he finds in how a living thing functions, how it organizes its own motions, rests, and resumptions from itself, not just by the motions of inanimate bodies.

Aristotle now turns to a different theory about how the soul moves. In this view motions

of the soul were supposed to be similar to the motions of the heavenly bodies.

406b26-407a-5

. . in [Plato's] *Timaeus* [36c-d] . . .

the demiurge (the creator, *ho demiourgos*)

bent a straight line into a circle;

this single circle he divided into two circles, united at two common points; one of these he subdivided into seven circles [sun, moon and five planets]. All this implies that **the movements of the soul** are identified with the movements of the heavens. . . It is evident that Plato means the soul of the whole to be like the sort of soul which is called **nous**, not like the sensitive. . .

Later we will remember that Plato's Demiurge **began with a straight line** as the timeless beginning. Plato derives the visible perceivable universe **by bending** the straight line. The curved is the rotating world we perceive. Aristotle will later allude to Plato's theory. Aristotle will move from perception to understanding by **pulling the curved line out straight again!** (III-4, 429b17).

A little later Aristotle has this to say. I think it applies to any view that would explain the thinking activity in terms of spatial structures.

Now *nous* is one and continuous in the activity of thinking, and thinking is identical with the thoughts which are its parts; these have a serial unity like that of number, not a unity like that of a spatial magnitude. Hence nous . . . is either without parts or is continuous in some other way than that which characterizes a spatial magnitude. How, indeed, if it were a spatial magnitude, could *nous* possibly think? Will it think indifferently with any one of its parts? 407a7-12

We see that Aristotle is going to require an understandable tie-in to explain why certain

structures of the body are required by certain soul activities.

At the end of the chapter he states this requirement more generally:

The view we have just been examining, in company with most theories about the soul, involves the following absurdity: they all join the soul to a body, or place it in a body, without adding any specification of the reason of their union, or of **the bodily conditions required for it**. Yet such explanation can scarcely be omitted; for some community of nature is presupposed by the fact that the one acts and the other is acted upon, the one moves and the other is moved; interaction always implies a *special* nature in the two interagents. 407b14-21

Let us look for and expect Aristotle's own account of what it is about each living body which enables it to be **the body of** a soul with the given activities and functions.

He continues this line of argument. At the start of the next chapter.

----- END OF I-3 -----

I-4

Aristotle argues that the soul cannot be the balances, compositions, or ratio of ingredients of the body.

There is yet another theory . . . Its supporters say that the soul is a kind of harmony, for (a) harmony is a blend or composition of contraries, and the body is compounded out of contraries

Aristotle means the elements of bodies which are defined by the contraries: hot/cold, fluid/dry, soft/hard, etc..

Harmony, however, is a certain proportion or composition of the constituents blended, and soul can be neither the one nor the other of these. Further, the power of originating movement cannot belong to a harmony, while almost all concur in regarding this as a principal attribute of soul. It is more appropriate to call health...

That soul is a harmony in the sense of the mode of composition of the parts of the body is a view easily refutable; for there are many composite parts and those various compounded...

the mixture which makes flesh has a different ratio between the elements from that which makes bone...

So we will be interested in just what kind of precise link Aristotle will find between soul and body such that only this soul and this body fit together, and yet the soul is not just the parts or proportions of the body.

Aristotle continues to argue that the soul itself cannot be affected or moved. The soul is the power for active functioning. What can be affected or moved is the whole soul-and-body animal. SEE ENDNOTE 6 TO CHAPTER I-1 ON WHY THERE ARE NO PATHS PECULIAR TO THE SOUL.

We need to notice that Aristotle will introduce a distinction between two different kinds of thinking with two different Greek names, both translated as "thinking." The first kind appears here:

408a34-408b5 More legitimate doubts might remain as to its movement in view of the following facts. We speak of the soul as being pained or pleased, being bold or fearful, being angry, perceiving, **thinking (*dianoesthai*, διανοεῖσθαι)**. All these are held to be (*dokei*) [by earlier philosophers and most people] modes of movement, and hence it might be supposed that the soul is moved. This, however, does not necessarily follow.

This list includes sensation and thinking (*dianoesthai*) along with the emotions. But one needs to take note of the fact that Aristotle uses a different Greek word "**dianoesthai**" for **this** thinking. This is another of the few Greek words the reader needs to learn. We have seen "**nous**" (and its verb form "**noein**") in context. Now this word "**dianoesthai**" is a form of **dianoia**, engaging in dianoia. It means something like "throughnoein" or "by means of noein," not possible without noein, but a less basic kind of thinking. Dianoia happens ***only inside us***, and differs from **nous which happens between us and the things** in the universe. As we saw earlier, "nous" is the also ordering of the universe in which we somehow partake. Aristotle takes up our nous in III-4, III-5, and III-6, but in our chapter he will now mark the difference between dianoia and nous. **Dianoia is performed not by the soul as such, but rather by soul-and-body.**

408b5-9 We may admit to the full that being **pained or pleased, or thinking (*dianoesthai*)**, are movements, and each of them is a 'being moved', and that the movement is **originated by the soul**. For example we may regard anger or fear as such and such **movements of the heart**, and **thinking (*dianoesthai*)** as such and such another movement **of that organ**, or of some other; . . .

This thinking (*dianoesthai*) involves movement in some bodily organ. Even if it is originated by the soul, it is not the soul that is moved (or affected). Aristotle is not committing himself on which organ this is. Since an organ is a bodily part, this passage says that **dianoia** involves both soul and body. Therefore:

408b11-15 To say that it is **the soul** which is angry is as inexact

as it would be to say that it is the soul that weaves webs or builds houses.

It is doubtless better to avoid saying that the soul **pities or learns or thinks (dianoeisthai)**.

It is better to say that it is the human who does this with the soul.

So dianoeisthai is an activity of the whole person (soul and body) by means of the soul. The soul-and-body person engages in weaving and in this kind of thinking (dianoeisthai).

But didn't Aristotle say in I-1 that noein might be separate from the body? That possibly immaterial process is not dianoia but noein which is a form of **nous**. He will differentiate nous and dianoia below.

As we see here, dianoia (dianoeisthai) is **correctly** translated as "thinking," since it is rather like our Western notion of "thinking" as a process inside us. We need to remember that dianoia involves not only the soul but also the body, just like weaving and pitying. We can expect to hear shortly about the other kind (nous). "Nous" shouldn't really be translated "thinking." I will often translate it as "understanding" but since no English word fits, I will sometimes use "thinking" as well. I will carry the Greek word along in parentheses so that we can know which of these two very different things Aristotle is talking about.

Aristotle is concerned here to show that the soul itself (the animation as such) is never moved or changed by any movement of any kind.

408b15-18

What we mean is not that the movement is in the soul, but that **sometimes it terminates in** the soul and **sometimes starts from** it, e.g., sensation coming from without inwards, and recollection starting from the soul and terminating with the movements, actual or residual, in the sense organs.

According to Aristotle, sensations and memory images **do** involve movements, but they don't move the soul. **From the sensed thing** a motion moves the bodily organ, but this motion is not yet the sensation. The sensation is the sense-form actively proportioned by the sensing, as we will see in Book II.

Aristotle says when we try to recall something, "a motion" originates **from the soul to the memory-organ** (which is the "common" organ and also the touch organ). Then the sought-

for memory-image moves from the organ in response. He discusses this motion in a separate book, *Memory and Recollection*. Memory is mentioned again at 408b27-29 where I comment on it further.

408b18-22

But **nous** is **probably** (ἔοικεν) an independent **substance** implanted within the soul, **incapable of being destroyed**.

If it could be destroyed at all, it would be under the blunting influence of old age. What really happens in respect of **nous** in old age **is, however, exactly parallel to what happens in the case of the sense organs**; if the old person could recover the proper kind of eye, he would see just as well as a youth.

Aristotle is distinguishing the bodily part from the capacity to function. For example, a dancer's artistic ability to dance would remain even if her legs were damaged. Modern technology has since borne out his example: In the eyes of old people we replace the cloudy natural lense with a plastic one, and find that, indeed, the seeing **function** has not aged. It isn't the **soul-function** which decays but the bodily instrument. **So, if seeing could happen without eyes, or walking without feet, these functions would be eternal.** But they are **activities of** body parts, so they could survive in old age only if one acquired a new pair of eyes or a new body.

According to Aristotle, nous is an activity that occurs without any bodily instrument. Here he asserts this only as "probable," but in III-4 he will argue that nous has no bodily part.

But if it has no bodily part, how can it be that many aged people become senile and lose their capacity for nous as well as for seeing and hearing?

408b22-25

The incapacity of old age is **due to an affection not of the soul but of its vehicle**, as occurs in drunkenness or disease.

Thus it is that in old age

THINKING (noein) and contemplating (theorein) decline **only** through the decay of some other inward part;

itself it is unaffectable (ἀπαθής).

καὶ τὸ νοεῖν δὴ καὶ τὸ θεωρεῖν μαραίνεται ἄλλου τινὸς ἕσω φθειρομένου, αὐτὸ δὲ ἀπαθές ἐστιν.

So senility does not indicate that nous and theorein involve a bodily part which wears out, but rather of being affected **through** the body as in drunkenness or illness. In those states one's capacities for understanding and contemplating are not lost, only temporarily obscured by a bodily condition. Aristotle uses this comparison also in Phys VII-3, (247b15) where he says that nous is always complete. When the bodily effect of drunkenness wears off, nous is immediately fully active again.

The function of seeing **would be** eternal and could be only temporarily disrupted by bodily conditions, if seeing did not require eyes. The understanding (nous) function **is** (probably) eternal, and only temporarily disrupted by the body's affectability, **if** (as he argues in III-4) nous is not the function of any bodily part.

For Aristotle "matter" (the body) **means** "affectable." The "affections" of a thing are the ways in which it can be affected, i.e. the ways in which it has matter. The affectability of the body&soul animal **is** the body. What is not the body is not affectable. Here "unaffected" (ἀπαθής, apathes, often translated "impassible") means that **noein and theorein** are not affections.

Please note that "contemplating" (theorein) is added to noein here. "Noein" is the verb for "nous." Although the word "theorein" has many uses, we want to remember that one kind of theorein is eternal.

In contrast:

408b25-27

THINKING (dianoeisthai), loving, and hating **are affections (pathe)** not of it [the soul], but **of that which has it.**

τὸ δὲ **διανοεῖσθαι** καὶ φιλεῖν ἢ μισεῖν οὐκ ἔστιν ἐκείνου **πάθη**, ἀλλὰ τοῦδὲ τοῦ ἔχοντος ἐκεῖνο, ἧ ἐκεῖνο ἔχει (408b.24-27).

This "thinking" (dianoeisthai) **is** an affection just like loving and hating. Some translations have Aristotle say that "thinking" does not decay and is not an affection (ἀπαθές, apathes), but in the next sentence they have him say that "thinking" does decay, and that it is one of the affections (πάθη, pathe) just like loving and hating. We have no two English words to

correspond, so one must always find out which word Aristotle is using. Obviously one cannot translate these two Greek words both as “thinking” and miss Aristotle’s distinction. (I will always indicate in parentheses which word it is.)

Aristotle is contrasting two kinds of thinking. The distinction could not be sharper. **One kind perishes; the other does not.** He uses different words for them in Greek: The thinking that perishes is **dianoia (dianoeisthai)** (not noein, but only derivative from noein), whereas what does not perish is **nous** (or its verb form “**noein**”) and also **contemplating (theorein)** which Aristotle often pairs along with nous. In III-4-8 he will explain what he means by “nous.”

SEE ENDNOTE 8 ON THE DIFFERENCE BETWEEN DIANOIA AND NOUS

408b27-29

That is why, when this vehicle decays, **memory** (μνημονεύει) and love cease; **they were not of it [the soul] but of what is common** [to soul and body, the *koine* organ] which has perished. **Nous** is, no doubt, something more divine and **unaffected**.

διὸ καὶ τούτου φθειρομένου οὔτε μνημονεύει οὔτε φιλεῖ· οὐ γὰρ ἐκείνου ἦν, ἀλλὰ τοῦ κοινού, ὃ ἀπόλωλεν· ὁ δὲ νοῦς ἴσως θειότερόν τι καὶ ἀπαθές ἐστίν.

Both here and earlier (408b25) Aristotle characterizes nous with the same word (ἀπαθη, apathe) which he quoted from Anaxagoras (I-2, 405b19). In III-4, 5 and 6 Aristotle will derive the unaffectedness of nous.

Memories are affections (pathe) of the common (koine) organ, he says at the start of *Mem.* There he shows why memory is not within the scope of the *De Anima*. Memory is not a power or activity of the soul qua soul, because it consists of motions from the imprints on the physical organ. (

See ENDNOTE 98 in III-3 ON WHY MEMORY IS NOT INCLUDED IN THE *DE ANIMA*

----- END OF TEXT -----

I-5

411a5-7

By means of the straight line we know both itself and the curved. The carpenter's rule enables us to test both, but what is curved does not enable us to distinguish either itself or the straight.

Between two points there are endlessly many curved lines but only one straight one. The many degrees of curvatures are "measured" or proportioned by their deviation from the straight line. When we come to III-4 we will recall what Aristotle says here.

In the next spot we want to look at, Aristotle thinks of "soul" as both what it **does** and as the form and shape of the body-part it "holds together."

411b14-19

The question might also be raised about

the parts of the soul: What is the separate role of each in relation to the body?

For, if the whole soul holds together the whole body, **we should expect each part of the soul to hold together a part of the body. But this seems (ἐούκειν) an impossibility;**

it is difficult even to imagine what sort of bodily part **nous** will hold together, or how it will do this.

Aristotle said earlier that **nous** is without any bodily part. But this spot is also an argument for this. If there were such a body-part, what part would it be? Aristotle is always concerned with the bodily side, and most of the soul's functions are not conceivable without the bodily parts which their activity involves. But for Aristotle the function determines the needed characteristics of the body-part. Therefore Aristotle sees no reason why every function has to involve bodily parts. It would depend on the function.

Aristotle now continues the discussion of parts of the soul and how they relate to parts of the body. He will mention the following experiment in II-2 and II-3, but he explains his conclusion from it more elaborately here. If you cut an insect in half

411b19-24

It is a fact of observation that plants and certain insects go on living **when divided into segments**; this means that each of the segments has a soul in it identical in species, though not numerically, for both of the segments **for a time** possess the power of sensation and local movement. That this does not last is not surprising, for they no longer possess the organs [mouth or stomach etc] necessary for self-maintenance.

Self-maintenance is the nutritive activity. Since only the one half has a mouth, and the other a stomach, the two halves cannot long continue to enact the nutritive soul, and must therefore soon die. Since each half senses, moves, and lives, each half has a whole soul. So we see that there is not a part of the body corresponding to each “part” of the soul.

411b24-27

But, all the same, **in each (divided) part** (μορίων) **there are present all the parts of soul** (τὰ μέρη τῆς ψυχῆς), the same in species in each part as in the whole; **this means that the several parts of the soul are not separable from one another**, although the whole soul is divisible.

The experiment shows that the whole soul is divisible – – but into two whole souls. On the other hand, the “parts” (the functions) of the soul are not divisible from each other. They cannot be separated as if they were bodily parts. The soul is always one.

In the Oxford manuscript the last line has “although the whole soul is **not** divisible.” Either version is possible, since Aristotle has shown in what sense the soul is divisible and in what sense not. Whereas the parts are inseparable, the whole soul **is** divisible into two actual souls. But since each is again a whole soul, not half a soul, he could also have said that a whole soul is not divisible.

Now that he has shown that sense and locomotion are in one unity with the nutritive soul-power, he is in a stronger position to say:

Book II

II-1

Overview:

Starting with Book II, Aristotle now presents everything in the proper order. In writing this he is at the end of his scientific labors, having investigated many kinds of animals and specimens, and having organized his data in the ways he describes in the *Posterior Analytics*. He is now able to arrange his information so that the causes and classifications enable him to demonstrate from them. In the *De Anima* he will at times present demonstrations, at times also retrace the path of discovery. His new “start” here is not the start of an inquiry, but the start of an organized presentation.

Aristotle begins with “substance” (οὐσία) which he subdivides into matter, form, or matter-and-form. Then form is subdivided into two kinds.

At 412a11 Aristotle classifies **bodies** under matter-and-form substance, and subdivides bodies into natural and artificial ones. Then he subdivides the natural bodies into inanimate and animate ones. This enables him at 12a20 to give the first statement of the definition of the soul.

He expands this definition (through four versions) up to 412b12. If you look back from a later versions of the definition to see what Aristotle has substituted for the words in an earlier version, you can see what the earlier words involved.

A second part of the chapter begins at 412b10. It explains what “first actuality” means. A living (= ensouled) body is organized into parts that have specific functions. But artificial bodies (the things we make) also have distinct parts for different functions. (For example an axe has a handle and a head with a sharp edge that cuts.) The difference between a living body and an axe leads to a fifth (412b11) and sixth (412b15) version of the definition. In living things the defining form also enacts their activities. Such a defining form is a first actuality.

NOW LET US FOLLOW THE TEXT:

412a3 Enough has been said of . . . our predecessors. Let us start again as it were from the beginning, and try **to determine what the soul is** and what would be **its most comprehensive definition** (logos, λόγος)

Aristotle begins anew, after the review of other philosophers in Book I. He is seeking a definition (a defining account, logos) of “soul” (or “living”) which will apply to **all** living things.

412a6-9 Now we speak of **one kind of existent things** (γένος ἕν τι τῶν ὄντων) as **substance** (οὐσία)

Aristotle begins again with everything that exists, and divides and subdivides. He refers to his book *Categories* 4 and 5 where he presents the most general classifications of what exists, one subdivision of which is substance. Substances are independently existing things that act from themselves. For Aristotle anything else (such as quantities, qualities, relations) exist only as quantities, qualities or relations **of that about which** we say them (that of which we predicate) i.e., some substance.

and under this heading **we so speak** of it as **matter, which in itself is not a particular “this,”**
or as shape and **form**, in virtue of which something is **spoken of as a “this,”**
and thirdly as **the product of these two** (τὸ ἐκ τούτων).

He divides substance into matter, form, and matter-and-form. Each of the three is in a way **that of which** we predicate everything else. “Matter” is what Aristotle calls “the substrate” or “subject” (τὸ ὑποκείμενον), “what underlies” all attributions. (Here the Latin word “subject” means “what underlies,” not the grammatical “subject” of a sentence.) If you take away everything we can possibly say about something, then what is left is a featureless substrate which Aristotle calls “matter.”

The “**form**” is what first makes a particular thing. To exist, a thing has to be in some

form. Then, from both, a form-and-matter thing is the third kind of substance.

412a9 And matter is **potentiality**,

Why does Aristotle say “matter is potentiality?” The meanings of Aristotle's terms have to become clear from seeing them used in many contexts. Since what he says here about **matter** presupposes some of his other works, I must introduce “matter” to the reader.

Matter for Aristotle is that, in a thing, which is changeable. For example, the wood is the matter of a bed. The form (what it is to be a bed) cannot be broken; only these wooden pieces can be broken. Then they are not a bed anymore, although still wood. But wood is not only matter; it is also matter **and form**. The form (wood) doesn't burn, Only this wood can burn. Anything that **exists** has some form just now, but if it is changeable there is something in it which has the potentiality (δύναμις) to be **either** as now, **or** to be changed into something else. What can be either way is what Aristotle calls its “matter.”

In classical Western physics the atoms, electrons, and other particles are called "matter," but in Aristotle's terms they have a form as well as a matter. Anything you can identify has some form as well as the possibility of changing. So the smallest particles we can identify still have some form and can also change. If you go down far enough in Aristotle's way you end up with a “matter” that doesn't exist at all by itself, rather only in this or that form. Matter by itself would be just a “could be,” just potentiality.

The matter is “what underlies”(τὸ ὑποκείμενον). But this exists only in **some** form. In Aristotle's terms it has to be some degree of hot or cold, and fluid or dry. For Aristotle, **just** matter cannot exist alone (*De Generatione* II-1, 329a24ff). Alone it would be **only** potentiality, nothing actual. Why would it be only potentiality? Because it would be in no **actual** way. There cannot be just a “can-change” without anything actual that can change. Pure potentiality cannot exist.

“Matter by itself,” he said just above, “is not a particular this.” For Aristotle, any existing thing, anything to which you could point, **any “this”** has some **actual** characteristics, which is to say it exists in some form; it is not just matter but some **kind** of matter. Matter alone is not anything actual.

SEE ENDNOTE 9 ON “MATTER” AND “SUBSTANCE”

412a10-11 while **form is actuality** (literally completeness, *entelecheia*) -- and that **in two ways**, on the one hand as knowledge is, and on the other hand as **contemplating** (*theorein*) is.

Form is actuality (completeness) as when a living thing has achieved its complete mature form.

But actuality (completeness) comes in two kinds:

a) like having achieved actual knowledge, or

b) like **not only a) but also** actively contemplating (understanding or considering).

Aristotle will make this distinction clear below (412a22-25) where it comes up again. I will comment on it there and in ENDNOTE 13.

Hamlyn's translation ("contemplation") should have said "contemplating (theorein)," ongoing activity. The achievement of knowledge is one kind of completion, but the higher kind of completion is thinking in act.

Several times in this chapter Aristotle first deals with form, then turns to the matter of which it is the form. He does this now:

412a11-12 It is **bodies** especially which are **held to be (*dokousi*) substances**,

Up to now he has only offered the empty divisions:

substance // quantity quality;

form // matter // form-and-matter compound,

form = actuality,

two kinds of actuality: like knowledge // like considering.

He had not yet placed anything into them. Now he has placed **bodies** into the slot of substances, but with the "held to be" (*dokousi*, by common opinion). That leaves it probable but open.

412a12-13 and of these especially **natural bodies**;
for these are sources of **the others**.

He is distinguishing **within** bodies. Of bodies some are **natural**, (for example stones, plants, people) and these are the sources (*archai*, ἀρχαί) of the others. Which are “the others?” Artificial bodies, the ones we make, axes, walls, thresholds

, houses, furniture, machines, works of art, and other things.

Why are the natural bodies the “sources” (principles, starting points) of the artificial ones? It is because the implements are made out of natural bodies (e.g., out of wood, or metal), designed and made by us (we are natural bodies), and used for our purposes.

412a13-15 Of natural bodies, **some have life** and **some do not**;
and it is **self-nourishment**, growth, and decay that we speak of
as life.

He subdivides: Within **natural** bodies there are **two kinds**: some are **alive** (animated), and some are **inanimate**. He also told us the defining characteristic, the reason why a body goes into the “alive” slot: it goes there if it has **self-nutrition**. Later he will explain that this is the cause of being alive.

We need to notice where Aristotle's kind of science differs greatly from ours. His concepts of "natural bodies" may seem quaint to us at first, but do not take sides. No sensible person could denigrate modern science and its immense contributions, but to understand Aristotle we cannot remain just within the usual assumptions. We must often compare and see the differences, so that we can notice and understand his unfamiliar way of thinking.

In our Western science the exclusion of internally-arising functions is a consequence of the essential method. Methods are neither true nor false. They open fields of study which would remain closed otherwise. Aristotle is opening a science of internally-arising ("natural") activities. Later in the chapter we will see exactly how Aristotle's two starting distinctions make his science very different from ours. For now we hold on to his division: Bodies are either artificial or natural, and the natural ones are either inanimate or alive.

412a15-17 **Hence** every **natural** body which partakes of **life** will be a substance, and **substance of a composite kind**.
Since it is indeed a body of such **a kind**
for it is one having life,

When Aristotle says: "hence," or "it follows", "so," "necessarily," "it must," "since," "because," or "for," he thinks he is proving something. He is demonstrating, or at least pursuing some chain of argument. So we always want to check whether we follow his chain of reasoning. Right here, what is the argument in which he uses the words "hence," "since" and "for..."? Can we follow it?

Earlier Aristotle said merely that bodies are generally held to be substances (dokousi), but now he has just **shown** that living bodies are substances of the composite matter-and-form kind, **since** the two predicates "natural" and "living" are two kinds, i.e., two forms.

We saw that bodies come in two **kinds**, natural and artificial, and the natural ones again in two kinds, inanimate and living. The "kind" of body is its "**form**," and the individual bodies are the **matter of** that kind or form. So it **follows** that a **natural living** (kind = form of) **body** is substance in the sense of a composite, i.e., form and matter.

Aristotle now goes on with the argument:

412a18 **the soul** will not be body;

for the body is not something predicated of a subject (ὑποκειμένον), but exists rather as subject and matter.

This is the first time the soul is mentioned since the first sentence of the chapter. Everything since then has led up to it. The question Aristotle is now answering is: Within this matter-and-form compound, which is the soul? Is it the body, or the form “natural living?”

In Book I at the start of the *De Anima* Aristotle says that “the soul is as it were the principle (or source) of living things.” Since the soul is the “having life,” it is the kind (of body), and kind = form. From this he concludes that the soul must, then, be the form.

“Living” and “natural” are two predicates or forms which are attributed to the matter of a body of that kind. Therefore the subject, what underlies, the ὑποκειμένον is the body of which we say that it is of this or that kind.

412a19-20

The soul must, then, be substance qua form of a natural body which has life potentially.

This is the first statement of the definition of the soul

The soul is the form (or living kind) of a form-and-matter substance.

SEE ENDNOTE 10 ON THE “PROOF” AT 12a16.

Why does he say a “body which has life potentially”? Doesn’t it actually have life? The answer is that if we say “a body which has life,” we are already saying both body and soul. If we want to speak of the body aside from the form which makes it something actual, we have to speak of it (in Aristotle’s terms) as “potentially” that form. So we speak of the kind of body which can be alive and can have that form. Speaking just on the body side, a living body is one that can have that form. What disturbs us is that Aristotle seems to say that the soul is the form of a body that is only potentially alive. But he does not say “only.” Potentially alive means “can be alive” and of course the actually alive body can be alive.

SEE ENDNOTE 12 ON POTENTIALITY IS PRESERVED IN ACTUALITY

412a21-22

And substance (οὐσία) as form is actuality (completeness,

entelecheia).

The soul, therefore, will be the actuality (entelecheia, completion)

of a body of this kind. [i.e., of a natural body having life potentially]

This is the second statement of the definition of the soul.

He has rephrased the first definition by substituting “actuality” for “form.”

412a22-23

But “**actuality**” is so spoken of in two ways, on the one hand **as knowledge is**, and on the other **as contemplating (theorein) is**.

It is clear then that **the soul is** actuality as knowledge is;

“Actuality” is a Latin word. Entelecheia means complete existence. When knowledge has been acquired, it exists. It is one kind of “actuality” or completeness. Then, employing it in ongoing contemplating (considering) is a further stage of completeness, the highest kind (*energeia*).

Aristotle distinguished these two classes of “actuality” earlier (412a10-11), when he was not yet placing anything in them. Now he has placed the soul into one class. Immediately he gives the reason (what is often called the “middle term”) for putting the soul into that division rather than the other:

412a23-26

for both sleep and waking depend on the existence of soul, and **waking is** analogous **to contemplating (theorein, θεωρεῖν)** and **sleep to the possession but not the exercise** (activity; *energein*) of knowledge.

Once we have acquired knowledge, we **can** either actively think something just now, or not. We possess the knowledge also when we are eating or sleeping. **Just as** we have the knowledge **both** when we are actively contemplating, and when are not, **so** the living thing has

ROB

This is the third statement of the definition.

“First actuality” has been substituted for just “actuality” before.

Now Aristotle turns to the bodily side again:

412a28-412b4

Whatever **has organs** [tools] will be **a body of this kind**.

ROB

Even the parts of plants are organs . . . the leaf is a covering for the pod and the pod for the fruit;
while **roots are analogous to the mouth**,
for both take in food.

The living body has characteristics of its own. Up to now Aristotle has always described the body merely as the kind of body that can have a soul, i.e. “potentially alive.” But what marks it as that kind of body can be described on the bodily side. It has **differentiated (tool-like) parts** that have different shapes and different roles, i.e. **perform different functions**. This is what enables the body to engage in the life activities.

Aristotle makes the concept of a functional definition by comparing the roots to a mouth; they look very different but they are analogous in function.

Take for example an artificial tool. Say you see a thing in a drawer that looks somewhat like pliers but with a wheel with little teeth. You ask about it. The answer will be: “This is a can opener. The wheel is to grip and move along the edge of the can, and, see, this sharp-edged wheel cuts into the can.” A body that does not have different parts could not be a can opener, but a totally different-looking tool could be. Perhaps it has a cutting edge you push in, and a notch to hold the edge of the can. All tools have differentiated parts. You might use a stone as a threshold, but you would first polish the top and shape the rest, so it could fit under the door and **function** as a threshold.

Now take living things. When you notice some little odd-shaped part of a plant, you ask: “What is this?” The answer will be its function. The pod is a hard covering to protect the fruit. The roots are analogous to our mouth. Why do they have fine little hair-shaped extensions? For more surface, to absorb more. If the body were a single uniform piece, it could not perform its

functions such as digesting and reproducing.

Notice that the reason these are “parts” is not because someone divided them in space; they are parts because they function differently. You could cut the pod in half and say it has two “parts,” but those would not be parts in this functional sense. Nor would breaking the living thing down into atoms give you its functional parts.

We want to recall Aristotle’s arguments in Book I (the end of I-3 and the start of I-4) that each type of soul and its type of body have to be inherently related. He has now given his own version of the soul/body relationship. (He will be more specific in II-2.) It is the organs of the body which relate that body specifically to the activities of that soul.

Aristotle said earlier that form is (actuality which is) either ongoing activity or the power for an activity. But how is activity a form? Now we see that a body’s organs for the activities are the form of that body.

Now we can describe a body that can be alive: It has differentiated, functional parts called “organs.”

412b4-6

If then we are to speak of something common to every **soul, it is the first actuality of a natural body which has organs.**

This is the fourth statement of the definition.

Aristotle has substituted “has organs” for “has life potentially.” His definition is becoming more specific. We can always look back to the earlier ones and notice what is being expanded. When one phrase can be substituted for another we thereby learn some of what the earlier phrase involved. A body that “has life potentially” (can live) is a body that has organs.

But be on guard. A body that “has life potentially” does always have organs, but a body (e.g., my can opener) can have “organs” and yet not be able to live. What makes the difference will soon be shown in this chapter.

Is the soul (or living) simply the body’s organ-organization, its organ-patterning? The relation is very close. But no, the definition says **”the first actuality of “** a body which has organs. What does “first actuality of a body with organs” say, that “having organs” does not say? He will soon show what more it means. Let us leave the difference till then.

For now let us examine in what way soul and body are **two** different interlocking strands of **one** same thing: If someone **can dance**, this “can” must include healthy leg muscles and

as he will say later on, nous in act is not the actuality-of, rather just actuality.

SECOND PART OF THE CHAPTER

412b10-11 It has then been stated **universally** (καθόλου) **what the soul is** (ἵπ' ἐστι); for **it is substance** (οὐσία), that corresponding to the proper account (κατά τὸν λόγον). And this is the **what it is for it to be what it was** of a body **of such a kind**.

This is the fifth statement of the definition.

For “first actuality” he has now substituted “substance” which we had in the first version, but where he had said “in the sense of form,” he now substitutes this long set of phrases which are much more specific, but are the form. Logos means not just a verbal “definition” but **in the thing**, what it is.

SEE ENDNOTE 15 (12b10) ON LOGOS AND “WHAT IT IS FOR IT TO BE WHAT IT WAS.”

This version is again circular like the early ones. The soul is the defining “what it is” of a certain kind of body. What kind of body? Well the kind that has a soul as its defining essence. Other than this we have seen only that it is a body that has differentiated functional parts (“organs”). But at the next line this circularity will open.

Now at last he will show how “first actuality” (or first completion) is more than just the organ-organization. Artificially-made bodies can also have an organ-organization, but they have no first actuality. He will show how first actuality (the soul) is more than the organ-organization by comparing the soul to the form of an artificial tool, e.g., an axe.

The wood and metal of an axe are natural bodies, but what makes an axe an axe (the organization of its “organs”) is artificial. Aristotle phrases his point as a supposition: If an axe were a natural body. It is not! But, if it were ...

- 412b11-15 Compare the following: **if** a tool, e.g. an axe, **were** a natural body, then **its substance would be** what it is to be an axe, and this would be its soul;
if this were removed it would no longer be an axe, except in name only.
But as it is, it **is** an axe
- 412b15-17 **for** it is not of this [axe] kind of body, that **the soul is** the 'what it is for it to be what it was' and **the definition (*logos*)**, but of a **certain kind of natural body having within itself a source** (*arche, ἀρχή*) **of movement and rest.**

Here now is the sixth statement of the definition.

“The soul is . . . what defines . . . **a certain kind of natural** body whose defining form or substance is also its internal source (*arche, ἀρχή*) of movement and rest.”

The sharp-edged head and the handle of an axe are differentiated functional parts (“tools,” the Greek word for tools” is organs”), but its substance is not being-an-axe. If its substance were its being-an-axe, then it **would** contain within itself the source of its essential defining axe-motion, i.e., cutting. **If** an axe **were** a body that has that kind of “what-it-is,” then it **would** initiate cutting and resting from inside itself. Then the axe we have in our tool chest **would be** a dead axe, or only the facsimile of an axe. But the one we have **is** in fact a real axe, because **what it is to be** an axe is not the kind body whose substance-form is also a can-move and can-rest from inside itself.

So here we can tell the difference between an organ-organization and a soul. An organ-organization is what a made thing **does** have, but a **first actuality** is what only living things have. The axe-body’s **form** has differentiated organs but is not **also** an internal **can-move and can-rest**.

Now what is new here? We always knew that axes don’t cut unless we move them. An artificial organ-body is being contrasted with a natural organ-body, so that we can understand **the natural functional organization of the living body**, i.e., what the soul is. It is the source

of the living body's motion(s) and rest(s) which defines what living is.

We have to know that for Aristotle **all** natural bodies (including inanimate ones like raindrops and stones) have within themselves a source of movement and rest. All natural bodies have their own characteristic motions if they are not impeded or forced. Earthen bodies are moved down, fiery ones are moved up. (See De Moto 700a16 on their being moved, although in accord with their internal nature.) In modern times the theory has changed, but of course these things still move as they did in Aristotle's time.

An axe is made of wood and metal which fall down. If we think of it as an axe-thing, we can see that its functional organization is separate from its wood and metal. The shapes of its parts do not enact their functions. A living body enacts the functions which its organ-parts are shaped.

Aristotle defines **living** things by combining two contrasts: The **artificial** things have a functional organization but it does not originate functional motions. The **inanimate natural** things determine their moves but have no functional differentiation. Only living things have both.

The wood of the handle and the steel of the head **are** natural bodies and **do** have their own **internal** source of motion, but **only downward**. If you pull the shelf out from under the axe, the wood and metal will only fall down. Of course we prefer the axe to chop wood rather than to fall down, but in the modern view there is no basic difference between these two kinds of motion. For Aristotle falling down is different from cutting. **Falling down does not employ the differentiated parts. Falling is not the activity in which head and handle have different roles.** Being an axe **is** having the form of the organ-structure for cutting (412b27), but unlike a living body what it does **from itself** is a different kind of motion unrelated to its organ-structure.

SEE ENDNOTE 16 (12b6) ON A METADEFINITION AND A SCIENCE OF LIVING THINGS

Now he will show what it means **on the body's side** to have the source of its functional activities within itself. It means that **each of the organs** moves and functions from itself.

412b17-22

We must consider (*theorein*, θεωρεῖν) what has been said in relation to the **parts** of the body also. For if the eye were an animal, sight would be its soul. . . and if this fails it is no longer an eye except in name just like. . . a painted eye.

What sounded so twisted when supposed of the axe, does fit the eye. If it loses its own inner source of action, it is no longer a real eye. The capacity to enact its own seeing defines what an eye is.

412b23-25

. . . **for as** the part **is to** the part,

so analogously **is** perception as a whole **to** **the whole sentient body as such**.

(οὕτως ἡ ὅλη αἴσθησις πρὸς τὸ ὅλον σῶμα τὸ αἰσθητικόν, ἢ τοιοῦτον)

Aristotle is saying that an animal's **whole body** has the sensation power. I need to alert the reader. Please remember that for Aristotle **sensation is an activity of the whole animal body**. Of course we see with eyes, not with the whole body, but **we are sentient (touch-sensitive) all over our bodies**. This is obvious, but for Aristotle it has a vital implication which runs through the book: He says that the touch-sensation **organizes the whole animal**. In animals sensation is not just added to plants; sensation **reorganizes** the whole body. **One** soul is the one form of a living thing's body. In II-3 he will discuss this.

I must insure that the reader will not forget this easily overlooked spot where Aristotle says of animals, (in distinction from plants,) that touch organizes their **whole bodies**, just as seeing organizes the eye.

He concludes this from one of his characteristic proportionings. He has compressed it. "**Just as**" the part-activity is to the bodily part that can do it, **so** is sensing to the whole body that **can-sense**.

We easily grasp that a part can have a function -- we mean that it has a role in some wider activity. It is more difficult for us to grasp that the **whole** ongoing activity **is** a functioning. The whole life process is not less organized than the activity of a part. For example, the function of the eyes is to see, but can we understand human life as human functioning? For Aristotle living is a functioning. An animal's functioning includes sensing, as well as desiring, going after some of the things it senses, and sometimes finding food. A human being has more functions.

412b25-26

It is not that which has lost its soul which is potentially such as to live, but that which possesses it.

A hamster that has just died may seem to have all its organs and look no different than a sleeping one, but its body is not potentially alive. From death it is no longer the case that it **can** live.

Here he states explicitly (as I said earlier) that a “potentially alive” body is always also an actually alive one. But could there be a body that is **only** potentially alive?

412b26-27 Seeds and fruits **are potentially** of this kind.

Their can-live is doubly potential. Of course the seeds do not nutrizize, which was our defining characteristic (middle term) for “living,” They do not engage in any of the activities of living. That is why they can still sprout after thousands of years. A seed is **only** potentially “potentially alive.” Seeds saved in a bowl cannot act. But they have a can-act once removed. If they fall on moist ground, then they can-act.

So here we have what we couldn’t find at first, a potentially-alive body that isn’t actually alive, but it is doubly potential, while a dead one is not potentially alive at all.

412b27-413a2 **Just**, then, **as** the **cutting** and **the seeing** (*horasis*, ὄρασις),
so too is the waking state [full] actuality (*entelecheia*, ἐντελέχεια),
while **the soul** is like [the capacity for] sight (*opsis*, ὄψις)
and the potentiality of the instrument.
The body is that which has this potentiality.

Summing up: Here are three: a) full actuality, b) first actuality, 3) the body. The first actuality (the soul) is **in between**. It is the potentiality for the full action, but it is the actual (complete, mature) form of the living body. The soul is the “middle term” between activity and body.

413a2-3 But **just as** the pupil and [the capacity for] sight (*opsis*, ο)/yij)
make up an eye,
so in this case the soul and body make up an animal.

It is the **capacity** for sight which is analogous to the soul of the whole animal.

SEE ENDNOTE 18 (13a2) ON THE PROPORTION FROM THE EYE TO THE WHOLE SENSITIVE ANIMAL.

413a3-5 That therefore the soul (or certain parts of the soul, if it is divisible,) **cannot be separated from the body** is quite clear; for **in some cases** the actuality (*entelecheia*) **is of** the parts themselves.

The soul and the body are not two things but two aspects of a single thing, in as much as the soul **is** the actuality (*entelecheia*, the completion or form) of the matured body, or of some part of the body (for example the form-of the eye, as he argued just above.) Aristotle finds it obvious that the form or completeness of the body cannot be separated from it.

413a3-6 Not that anything prevents at any rate *some* parts from being separable, **because of their being actualities of no body**.

He adds that the soul might exist separately just as soul **only if** some part of the soul turns out **not** to be the form-of (a part of) the body. He does not commit himself here as to whether this is so or not.

413a8-9 Furthermore, it is not clear whether **the soul** is the actuality (*entelecheia*) of **the body** in the way that **the sailor** is of **the ship**.

The question about the sailor (recalling Plato) is: As the source of locomotion, can the soul exist separately? The sailor is the moving cause, the source of the motion of the ship because he moves the ship by rowing and steering. Can the soul as the source of motion “get off the ship?” Of course not, insofar as what moves the living body is also the first completion or mature form **of** the body (or its parts).

In asking about the sailor, Aristotle poses the question of separability together with the

discussion of the soul as moving cause which follows immediately in chapter 2. Aristotle did not make the chapter divisions. They were made closer to our time, and in an excellent way. But Aristotle writes without chapter breaks. Therefore it often helps to look at the continuity from the last part of a chapter to the first part of the next chapter. The question in what sense the moving cause might be separable comes with us into the next chapter. In II-2 Aristotle will distinguish different sorts of "separability. "

II-2

OVERVIEW

Beginning from easily observed motions, the chapter proceeds to the (also observable) soul-parts, the moving (“efficient”) causes of these activities.

The geometric analogy fits what this chapter will provide. A good definition must say how what it defines is generated.

At the end of II-1 Aristotle asked in what sense the moving cause might be separable. Is it like a sailor who powers the oars and steers the boat, and can also step off the ship? Is the soul separable from the body, and are the parts of the soul separable from each other? Aristotle answers this throughout the chapter. But he would not answer such a question by saying "yes" or "no." As is his usual way, he distinguishes (separates) various kinds of separation. Some are merely theoretical distinctions; others divide between separately existing things.

Only one kind of separability **classifies** the living things. We will want to understand why that one does, and the others do not.

In the first part of the chapter Aristotle may seem repetitious but he is not. When he seems to repeat we have to ask ourselves what new point he is making. Then we will see it. There is first a list of activities and motions (413a24). Later there is a differently ordered list of parts of the soul (413b13). After that he gives no third list, but he tells a way which **does** classify the living things (413b32-a3). We will want to see why this way does it.

The next section (414a4-18) is a proof. We will examine it.

From the proof Aristotle leads upward to the top category with which he began II-1. The order of this chapter is the reverse of II-1. We will see why.

TEXT

4I3a

Since it is **from** things which are obscure but more obvious
that we arrive at that which is clear and more intelligible

according to its proper account (logos)
 we must try again in this way to treat of the soul;
 for a statement (logos) that defines should
 not only make clear **the fact**, as the majority of definitions do,
 but it should also contain and reveal **the cause** for it.

Aristotle is announcing a new order different than II-1. Now we begin from the obscure but more obvious, i.e., what is not well understood but easily observed. From this we will move to what is more understandable, the proper account.

**SEE ENDNOTE 19 IN WHAT WAY IS CHAPTER 2 ANOTHER FRESH START IN
 RELATION TO II-1?**

413a16-20

As things are, the statements (logos) of the definitions are like conclusions. For example, what is squaring? The construction of an equilateral rectangle [a square] equal in area to [a given] one which is not equilateral.

But such a definition is a statement (logos, λόγοι) of the conclusion; whereas one who says that squaring is the **discovery of the mean proportional** states the cause.

In what was called “squaring” you were given a rectangle and the problem was to make a square equal to the rectangle in area. But Aristotle says that the definition of “squaring” which I just gave is not a good one. A good definition will say how we can **make** that square. To make it, we need to be told how to **find the line** that will be the side of the square, so that we can **generate (moving cause)** that square. Squaring is finding a square equal in area to a given rectangle **by finding the line “x”** that is the mean proportional between the longer (a) and the shorter (b) sides of the rectangle, either by means of the proportion:

$$\frac{a}{x} = \frac{x}{b}$$

i.e., by multiplying the rectangle’s sides (a times b) and then taking the square root of that,

but since that doesn't usually come out to a finite number, the geometric way (which was well known) is better: The mean proportional line can be found by making a circle whose diameter consists of the two sides laid end to end ($a+b$). The mean proportional line is the perpendicular from the circumference to the point where the two sides join.

SEE ENDNOTE 20 ON THE ANALOGY IS ITSELF AN EXAMPLE

413a20-25

We say, then, making a beginning of our inquiry, that that which has soul is distinguished from that which has not by life. But life is so spoken of in many ways, and we say that a thing lives if but one of the following is present:
 nous,
 perception,
movement and rest in respect of place,
 and furthermore the movement according to nutrition, i.e., both decay and growth.

We begin with what is most observable -- the activities and motions: What seems most obvious about living things is (in people) that we think, and in other living things that they perceive, move, and grow. For Aristotle the word "motion" includes change, for example growth. These observable marks are not the causes, rather only why we ordinarily say that some thing is "alive."

Aristotle lists these motions/activities from the top down, in the order of nature, the highest one first.

413a25-26

For this reason all plants too are held (*dokei*) to live, . . .

This follows since growth was one of the observable marks for the general opinion (*dokei*) of attributing "living" to plants, but now before he gets to the word "grow" (below), Aristotle puts something new in between:

413a26-29

for they evidently have in them such a potentiality and first

principle, (ἔχοντα δύναμιν καὶ ἀρχὴν) **through which** they come to **grow** and decay in opposite directions.

For they do not grow upwards without growing downwards,

Now, for the first time, we hear of a potentiality, i.e. a power (*dunamis*) and internal “principle” (arche), the starting point or origin, the source of the motion (in Latin the “efficient cause”).

413a29-31

but they grow in both directions alike and in every direction . . . and **continue to live, as long as** they are able to receive nourishment.

That they grow is observable. We also easily observe that they grow in all directions, i.e., not like stones that only fall down or fire and smoke that move only up. A child can observe this.

But **the cause** of growth is also observable, although this requires **relating** some observations and arriving at an understanding. Usually the child has to be shown: See, they grow only **“as long as they are able to receive nourishment”**. They die if they don’t get water or the soil gets exhausted. That is a more refined observation and an understanding (nous).

Aristotle is often misunderstood as if his “internal principles of motion” were unobservable and unnecessary. In one famous misunderstanding, Aristotle’s internal principles were ridiculed as if they were like saying that we sleep because there is in us a “dormitive principle.” The point was that “dormitive principle” would add nothing to what we know about sleep. But notice that absorption of food adds the cause to what we know from observing growth. And while the “dormitive principle” added nothing observable in addition to sleep, food-absorption is observable apart from growth. (In II-4 he will say more about it.) In Aristotle’s example, the mean proportional line, once found, is **just as observable as any other line**. But it has to be found **through a relation** between the lines that were there. Similarly, to observe food-absorption as the cause, one has to notice **the relation**: It grows only **as long as** it absorbs water and food. It withers when it doesn’t.

However, once we grasp the cause, the terms are no longer separate. We have **grasped** the “what it is” of a single form, the nutritive soul.

SEE ENDNOTE 8

A cause like this nutritive soul-power is what is called a “middle term;” it has the role which he demanded in the opening analogy. We don't define plants as alive only because they grow. “ Rather, we say that they are “alive” because they take in food and water, and taking in food and water **causes** them to grow.

413a31-32 This can **exist apart from** the others,
but **the others cannot exist apart from it**
in mortal beings.

SEE ENDNOTE 21 ON “MORTAL BEINGS”

413a32-413b2 This is obvious in the case of plants; for they have no other
potentiality of soul.

This kind of “existing apart from” is the first kind of “separate”: In this way we can say that the soul has “parts.” Nutrition can **exist apart from** other soul-parts because we observe that plants have nutrition without (*χωρίζεσθαι*, occur separately from) the other powers for the life-activities on our list. But the other soul-powers are not found separately from this one.

413b2-4 It is, then, because of this first principle that living things have life.
But it is **first because of sensing** that they are animal,
for even those things which do not move and change their place,
but which do have sense-perception, we speak of as animals
and not merely as living.

Animals that sense but don't have locomotion are important to Aristotle throughout. Here they show that sense can exist without locomotion. These animals (for example sponges) remain always in one spot, but draw back if touched.

We classify them as animal “first” (*πρώτως*) because of sensing. Here we see what he is doing: giving the proximate or first middle-term or cause for each new ascription. Of course a

creature that senses may **also** have locomotion, but locomotion is not the **immediate** cause for attributing “animal. “**For**” we speak of some who stay in one place also as “animals,” if they have sensation. So sensation is the first attribute that makes a living thing an animal.

413b4-7

First of all in perception all animals have touch.

Just as the nutritive faculty (*threptikon*) can exist apart from touch and from all sense-perception, **so** touch can exist apart from the other senses.

He does **within** sensation exactly what he just did to living: One sense can be found without the other four. So this is the one because of which we **first and proximately** say something has sensation and is therefore an animal.

As so often, he does it by a proportion, “just as . . . , so . . . “:

Aristotle has a new word here for “nutritive **faculty**,” i.e., **soul-power** (*threptikon*, θρεπτικόν). **This is a new term, first mentioned here.** By adding “kon” or “ko” the word comes to mean an active-agent. In English we might say the “nutrizer.”

Now he explains his new term: it is a soul-part:

413b7-9

We speak of as the nutrizer that **part of the soul** in which even plants share;

all animals clearly have the toucher (*haptikon*, ἅπτικον, the faculty of touch).

These are powers, parts of the soul. He explains his new term , the nutrizer, which he derived above) and now also the same kind of term for touch, *the toucher*, that which does it. He derived it from the proportion (“just as”) in the previous line.

413b9-10

The reason for this we shall state later.

He means the reason why animals have sensation and why some animals have only touch and lack the other senses. He gives these reasons at the end of the book in III-12 and III-13.

413b11-13 For the present let it be enough to say only that
the soul is the source (*arche*) of those mentioned above,
 and is defined by them -
the nutrizer, perceiver, thinker, and by movement.
 θρεπτικῷ, αἰσθητικῷ, διανοητικῷ, **κινήσει**

“Thinker” here is dianoetikon, the mortal part of the nous soul. Later and also in II-3 Aristotle several times mentions and distinguishes the eternal direct-grasp part of nous. In ENDNOTE 33 I comment on dianoetikon.

We notice that he did not give locomotion (*kinesis*) the form of “mover” (“κῶ”). In ENDNOTE 32 I explain why.

The order of this list of soul-powers is also the order of the sections of the *De Anima*. (We can look back to his earlier list at 13a23. It consisted of activities or motions, not soul parts, and it had a different order.)

The soul-powers are usually translated as “faculties.” Students rightly ask: “What does *Aristotle* mean by ‘faculties?’” We can use “the faculty of,” if we know that Aristotle uses a single-word expression (nutrizer, toucher) and how he developed these terms. They are soul-parts, powers, capacities, explanations of how it is done, moving causes.

413b13-16 Whether each of these is a soul or whether they are a part of one soul,
 and if a part, whether it is such as to be **separate only in definition** (*logos*) **or also in place**,
 are questions . . . which . . . in some cases . . . present difficulty.

This question is about **two other kinds of separability/inseparability** different from the

one we had above. For example, I can run and I can jump, but these two powers cannot be separated in me spatially, although they are very different in definition. But my students and I are separable both in definition and **in space**.

He answers again with a proportion:

413b16-19 **For, just as** in the case of plants some clearly live when divided and separated from each other, the soul in them being **one in actuality** (*entelecheia*) **in each plant**, though **potentially many**,

The plant can be cut into two spatially separate things, but then the soul is whole in each half, since each half-plant continues to absorb food and water and to grow. So the nutritive soul-power is "**always actually one, and "potentially many"**" which means it **can** be divided. If you divide, you get two whole souls, never actually half a soul.

413b19-22 **so** we see this happening also in other varieties of soul in the case of insects when they are cut in two; for **each of the parts has sense-perception and locomotion**

As in plants, **so** the soul of each insect-half is always one, since each has sense-perception **and** locomotion. You can observe each half being sensitive to your touch and moving away.

As he said in I-5 (411b19-24), the halves cannot live long because he does not assume that each part can grow the parts it misses (as plant-sections grow roots). Also elsewhere (On Longevity, 467a22) he says "For this reason it lives on only for a short time" ... "because the cut parts don't have the necessary organs" (for example, the mouth is only in one of the halves).

The animal is sentient all over, just like the plant is nutrient all over (can grow roots.). Sentience works for animals as nutrizing does for the plant. We see this via Aristotle's proportioning: "as .. so.."

This was still another kind of separability: **can** be divided, but each side is not half a soul but actually one whole soul. The soul has parts but these are not separable within a soul. Sense-perception and locomotion are not separable in each cut half. They are inseparable in

one soul, if the animal has both.

413b22-23 and if sense-perception, then also imagination and desire.

If a living thing has sensing, then it also has imagination and desire (*orexis*) but now he will give the middle terms for this assertion. Notice that Aristotle begins this passage with the word “For...”

413b23-24 **For**, where there is sense-perception, there is also **both pain and pleasure**, and if these, there is of necessity also wanting.

Implicit in this proof is: “And wanting is a kind of desire,” as he says in II-3 (414b5) and III-10 (433a25).

Pleasure and pain constitute a middle term: If sensation then pleasure and pain, and if pleasure and pain, then desire. This is a proof because a sensation **is** inherently pleasant or painful, and a pleasure or a pain **is** inherently a desiring (desiring more, or desiring not to have). This sense-pain-desire-it-to-be-gone is also imagination. Pleasure and pain are the middle terms also for why sense-perception inherently involves imagination, the implied condition of having more of the pleasant sensation or not having the painful one. Imagination is the role of a potentially sensed condition which does not obtain. These are all implied in the single act of moving away from the painful cut.

Here we see **why** although they are not the same, sense, pleasure and pain, desire, and imagination never **exist** one without the others; they are one thing **separable only in function, i.e., in definition**. They are not different soul parts; they are performed by the sensing soul part.

413b24-27 Concerning **nous and the soul-potentiality for contemplation** (θεωρητικῆ) the situation is not so far clear, but it seems to be a different kind of soul, and this alone can **exist separately**, (χωρίζεσθαι), **as** the everlasting can from the perishable.

This is still another kind of separate -- Aristotle's **main** sense of "separate," by which he means separate from matter (i.e., from changeability). Notice the word "as." To derive this kind of "separate," Aristotle proportions it to the way the eternal is separate from the perishable.

413b27-32

But it is clear from these things that the other parts of the soul are not separable, as some say;

although that they are **different in definition** (*logos*) is clear.

For being **able to** perceive and being **able to** opine (δοξαστικῶ) are different, since perceiving too is different from opining and likewise with each of the other parts which have been mentioned.

Sensing always makes for an opinion about what is sensed (but in animals not the kind of opinion that is based on reasoning, as he says in III-11, 434a10).

Aristotle has already shown that some soul parts never exist apart from each other but differ **only** in definition, i.e., in what they are (sense, pleasure and pain, and desire). Now he adds other powers that are separate in definition, for example the activities of sensing and opining (forming opinions). So, the soul-part that does it (one might call this one the "opiner") differs only in definition from the perceiver. Aristotle claims here that he has succeeded in listing all soul-powers that are separable either from the body, like nous, or by existing in living things that do not have any further powers. He argues that any divisions which have been proposed by others are separable merely in definition.

SEE ENDNOTE 22 ON KINDS OF "SEPARATE" AND "INSEPARABLE"

So far we have separated only motions and soul-parts. **Now at last he uses these to separate and classify the species of the living things:**

413b32-414a3

Moreover, some living things have all these, others only some of them, and others again one alone, and

this will furnish distinctions between the living things.

What is the reason for this we must consider later.

Very much the same is the case with the senses, for some living things have them all, others only some, and others again one only, the most necessary one, touch.

This kind of classification is so familiar and obvious to us today, that we may miss the point. Aristotle is showing how one must arrange one's data. This part of his method has been adopted by Western science. If the properties are classified and arranged in a certain order, then from a single bone found somewhere a scientist can conclude all about the animal. This kind of bone **cannot exist without** such and such a type of legs which are used **only on** hard ground, and can occur only in animals that feed on such and such a kind of vegetation. Take Aristotle's method of classifying here as an example of how to organize observations so as to become able to say "A **can be found without** B, and B without C, but C is not found without A and B."

SEE ENDNOTE 23 ON THE ORDER IN THE LISTS

SEE ENDNOTE 24 ON WHY THE MOVING CAUSE DIFFERENTIATES THE SPECIES.

THE SECTION ON THE PROOF:

Let me first comment on the main premises and the conclusion; I comment on the parts in small print later.

414a4-14 is a proof. The phrase "that whereby" names the source of the activity, the moving cause. The proof has two premises and a conclusion.

Premise 1

That whereby (ἐπεὶ δὲ ᾧ) **we live and perceive**

is spoken of in two ways,

As is that by means of which we know

(we so speak in the one case of knowledge,

in the other of soul,

for by means of each of these we say we know).

Similarly, we are healthy

in the first place (τὸ μὲν) by means of health (ὑγιεία)
and **in the second**, (τὸ δὲ) by means of a part of the body
or even the whole.

Now, of these knowledge and health are

- 1) shape and a kind of **form** and *proportion (logos)*, the activity (*energeia*) of
- 2) the **recipient**,

in the one case [the recipient is] that which is capable of knowing,
in the other [the recipient is] that which is capable of health
(for the activity (*energeia*) of the agent (maker, *poietikon*, ποιητικὸν) is held (*dokei*) to take place **in** that which is affected and disposed).

Premise 2

Now the soul is **primarily** (*protos*) **that by means of which** we live, perceive, **and think** (*dianoieisthai*)

Conclusion:

Hence the soul will be a kind of logos and **form**,
and not matter or subject.

You can see that the conclusion follows provided we can take “in the first place” as meaning “primarily.” Abbreviated, the proof is:

“That whereby” is primarily a form, and secondarily the matter or recipient (of that form).

The soul is **primarily “that whereby.”**

Therefore the soul is a form.

Now I comment on the part I put in small print:

UNDER PREMISE 1 he shows two ways of speaking of “that whereby” (the moving

cause) **of living and perceiving**. The two ways of speaking are a) **just the form**, in contrast to b) **the whole formed thing**. The first example is: “**as** we can say that ‘we know’ either a) just by means of knowledge, or b) by means of the soul.” (This part of the soul is formed by knowledge-forms.)

The second example is “**as** we can say we are healthy a) by means of the health-form, or b) by means of the healthy body.”

Knowledge and health are **forms and activities**. Soul and body are **the recipients** which **can** receive those forms. The form is **active in** what has the form, since in living things the form is **form-and-internal-source of motion**.

The duality (two ways of speaking): either 1) the form alone, or 2) the matter-as-having-that-form (never the matter alone). As usual with Aristotle, the distinction is **not** between soul and body, rather the soul alone is distinguished from the combination of soul-and-body.

SEE ENDNOTES ON:

25 QUESTIONS ON THE PROOF

26 KNOWLEDGE IN THE SOUL

27 IS THE ACTIVE *NOUS* PART OF THE SOUL IN THE EXAMPLE IN THE FIRST PREMISE?

28 HEALTH AND THE PROPORTION OF SOUL AND BODY

29 PROOF IN II-1 COMPARED TO PROOF IN II-2

Also (above in small print) Aristotle said about activity:

414a11-12 “**for the activity (*energeia*) of the agent (maker, *poietikon*) is held (dokei) to take place in that which is affected and disposed.**” Aristotle has explained this in earlier works. For example, our hammering (a nail in) is the same single activity as the nail going in (being hammered in). It’s one action; where does it happen? For Aristotle it happens in the nail going in. If the nail bends and doesn’t go in, that wasn’t hammering-in in the strict sense. Or, for example, teaching happens in the students. If they don’t learn, perhaps the teacher was speaking, gesturing, working, but not teaching, and perhaps the students were struggling and thinking, but not learning. Teaching and learning are two words for a single activity, the teaching-happening-in-the-students. **The agent’s activity is always actualized in**

the patient. (*Physics* III-3, 202b20).

Crucial here is to grasp that there are not two activities; there is only a single ongoing activity which happens **in** the recipient.

Aristotle is saying that the cause by means of which we live and perceive is the form which is also the moving cause of the internal forming-activity of growing, and of our activity of perceiving. We can say that we live and perceive by means of this form-moving cause, or by means of the form-and-body.

SEE ENDNOTE 30 ON THE SELF-ORGANIZING OF GROWING AND PERCEIVING

414a14-19

Substance is so spoken of in three ways, as we have said,
and of these cases one is form,
another is matter,
and the third the product of the two; and
of these matter is potentiality and form actuality (*entelecheia*).
And **since the product of the two is an ensouled thing,**
the body is not the actuality (*entelecheia*) of soul, but
the latter is the actuality of a certain kind of body.

We recall that he defined “form” as “actuality” of two kinds, either the power for an activity or the ongoing activity. The life-activities determine what the body and its organs have to be. The body is generated by the nutritive / reproductive soul-power which begins as the living in the embryo. This is how activities can be the form of a form-and-matter substance.

In this chapter the order is the reverse of II-1, so where II-1 began is where we have just arrived. Having begun with observation, and having defined the different kinds of soul, we are now again speaking of form and actuality.

So we should now be able to tell ourselves more fully what “actuality” (*entelecheia*, completeness) means, more than just “form.” When he says “form is actuality,” what does this add?

The answer is that a living thing’s completeness or actuality is its power for the ongoing functioning, its various life-activities. In contrast to II-1, here in II-2 each life-activity was separately mentioned. And as we saw in II-1, what Aristotle calls “first-step actuality,” i.e., the soul, is the completeness-form of the body and also the potentiality or power for the activity.

414a19-28

And for this reason those have the right conception who hold (dokei) that the soul does not exist without a body and yet is not itself a kind of body.

For it . . . exists in a . . . body **of such and such a kind**.

Not as our predecessors supposed, when they fitted it to . . . (just any kind of) body . . .

it is clear that one chance thing does not **receive** another.

Those who thought that any kind of soul could be in any kind of body or any kind of matter didn't understand that the soul is the form-and-moving cause of the body, i.e., of the matter.

In our way it happens in accord with reason (*logos*)

For the actuality (*entelecheia*) of each thing **comes about** naturally

in that which is already such potentially and in its proper matter (*τῆ οἰκείᾳ ὕλῃ*).

The phrase “comes about” now states in terms of the generative moving-cause what he said in II-1 in terms of the form alone, that the actuality is one with that of which it is the actuality (completion). So, of course the soul couldn't be in any other kind of body than the kind of which it is the generating and the actuality (the completeness).

Aristotle concludes from the argument that the whole living (formed) body comes about together with the activities it can enact. Each living creature's functional activities create or determine the matter of their bodies. It is an error to translate this as “appropriate matter” where I have “proper” above. “Appropriate matter” sounds as though the bones could be made of any hard matter, and the skin of any pliable matter. **“Any appropriate matter” can be used in artificial things, but to say this about living things would be like saying that H2O can be the formula of any appropriate matter.** It is precisely Aristotle's argument here and throughout, that the soul is the formal and moving cause of (and in) its kind of body. Right here he is pointing out the inherent connection which he has defined. The body of each living thing is its own (as it were “home-made”) matter, the matter of which the soul **is** the completion and

formula.

So he concludes:

From all this it is clear that the soul **is** a kind of **actuality** (*entelecheia*) and principle (*logos*) **of that which has the potentiality to be such.**

The last part of the last sentence is already continuous with the next chapter, III-3, which is about "**that which**" has the potentiality to be such, i.e. matter, the body.

II-3

OVERVIEW:

After II-1 on the formal cause and II-2 on the efficient cause, this is the chapter on the material cause.

The chapter has two parts:

Up to 414b20:

Desire (appetitive, orexis) was not listed before because each soul-power in II-2 could be found in some living things without the rest of the soul-powers on the list. Here in II-3 desire is listed. In this list the soul-powers need not occur separately.

The next on the list **may reorganize the previous**. In animals sensation is not just added to the way nutrition exists in plants. Rather, in animals nutrition is re-organized by sensation. Aristotle says exactly how animal nutrition works partly by means of sensation.

From 414b20:

In the second part of the chapter Aristotle draws an analogy between the series of soul parts and the series of figures (triangle, quadrilateral, pentagon) to show why there has to be a different account of the soul (the kind of body) when another soul-part is added.

TEXT

Aristotle continues from the last sentence of II-2 about these powers.

414a29-414b1

Of the potentialities which have been mentioned, some living things have them all, as we have said, others some of them, and some only one. The potentialities which we mentioned are **nutrizer, desirer, perceiver, mover, and thinker** (θρεπτικόν, ὀρεκτικόν, αἰσθητικόν, κινητικόν κατὰ τόπον, διανοητικόν). Plants have the nutrizer only;
others have both this and the perceiver.

Desire was **mentioned** in II-2 (413b22), but it was not in the lists of soul-powers,

pleasure and pain

and both **that which is pleasant** and **that which is painful**: (ἡδονή τε καὶ λύπη καὶ τὸ ἡδύ τε καὶ λυπηρόν.)

and where there are these, there is also **wanting** (ἐπιθυμία) **for** this is a desire for **that which is pleasant**.

Assure yourself of following the logical steps of this proof. Simplified, they are:

If sense then pleasure and pain and pleasant and painful things

and **if** pleasure and pain and pleasant and painful things, **then** *epithumia*

which is a kind of **desire** for pleasant things.

Therefore: If sense, then desire.

The conclusion follows logically from the premises. Let us digress for a moment to see whether we can agree with the premises. Why would sense involve pleasure and pain? When there is pleasure or pain, isn't it the sensation itself which is pleasant or painful? So pleasure or pain is not something different from sensation. The pleasure or pain is not another thing; rather it is the sensation itself. So if you have sensations, **the sensations themselves are pleasant or painful**. (Aristotle considers middle-range ones pleasant; extreme ones are painful.) So we can agree or at least understand the first premise "If sensation then pleasure and pain."

Now the second premise: If pleasure and pain then desire. Again we have to ask: Is desire something added to pleasure, or is it already part of pleasure? Isn't the very sensation of pleasure already also a wanting to have it, to keep it, to have it more? And pain already also the desire not to have it? Again those aren't two different things. You don't have what you call pain and then think a while about it and judge that you don't want it. Rather, pain **is** inherently a sensation that has in it the wish not to have it. That's what "pain" is. There need not be any image of a different condition, just the inherent desirable or aversive quality of the present sensation.

Now please notice that sense presupposes not only pleasure and pain but also "**that which is** pleasant or painful, i.e., pleasant or painful **things**. *Epithumia is* (defined as) a desire for the pleasant **things**, not just for the pleasure. For Aristotle sensing is an interaction between the living thing and the real world. He doesn't assume that we are always right about the thing we are sensing, (it might smell sweet, yet be poison), but when we sense something,

and the fluid/dry food. In Greek science two of these four qualities defined each of the four elements. So the things that are food are made of just what the sense of touch senses. (He will explain this in II-11, and did so in *De Gen & Cor.*) Touch is **also** (but not essentially) the sense for other hot and cold things and for rough and smooth, hard and soft things. We have now seen that the sense for food (its role in nutrition) **is** touch, so in terms of formal and final causes, **nutrition is prior to touch and defines touch** (and sensation, since the other senses presuppose touch). Now he will add middle terms to link the sense for food to desire.

414b11-16 Hunger and thirst are forms of wanting (*epithumia*),
 hunger is wanting the dry and hot,
 thirst wanting the liquid and cold; . . .
 for now let us say this much, that
 those living things which have touch **also have desire.**

Hunger and thirst are desires (“wanting,” *epithumia*) for these **tangible** things which are food. Sensation **always involves** touch which **is** the sense for the hot-cold-fluid-dry which **are** food for which hunger and thirst **are** a kind of desire. Therefore sensation always involves desire. Aristotle links his demonstrations through what each linking middle thing **is**.

Another point here is important for the second half of the chapter: In contrast to plants, an animal’s nutrition happens **within sensation.** Animal nutrition works through touch. Animals have to find, sense, select, and contact their food. **Let us remember for the discussion which now follows, that we have seen how animal nutrition no longer works alone as such. Rather, it is now organized partly by the function of the touch sensation.**

SEE ENDNOTE 31 ON THE DESIRE FOR FOOD PRESUPPOSED IN TOUCH

414b16-19 The situation with regard to imagination is obscure and must be considered later.
 Some animals have in addition the faculty of movement in respect of place, and others, e.g. humans and any that are **similar or superior to humans,** have that of **thought (*dianoetikon*, διανοητικόν) and nous.**

He postpones imagination until III-3. It is presupposed (always present with) sense as he said in II-2 (413b22-24), but there are different kinds as III-3 and III-11 will show.

414b20-21 It is clear, then, that one account (*logos*) of soul is like one account of figure

He will show below why a single definition or account covering all “figures” (triangles, squares, pentagons, etc.) is like a single definition of all kinds of soul. Such a definition is possible but not be very satisfactory. They are similar, because:

414b21-22 **for** in the former case there is **no figure over and above** the triangle and the others which follow it in order, nor in the latter case is there **soul over and above** those mentioned.

There is no figure in common to figures, only the triangle and quadrilateral themselves. What all figures share is not again a figure. Each is a different pattern, so they have no pattern in common.

414b2-25 Even in the case of figures there could be produced a common account (*logos*) which will fit all of them but which will not be peculiar to any one.

Similarly too with the kinds of soul mentioned.

A common geometric definition of them all would not tell us any of what we know about triangles, squares, or pentagons, etc. So also: From what all types of soul have in common we cannot infer the properties of any soul (or any kind of body).

414b25-28 For this reason **it is foolish** to seek both in these cases and in others for **a common account** (*logos*) which will be a proper account (*logos*) of no actually existing thing and

will not correspond to the proper indivisible species,
to the neglect of one which will.

Aristotle does not mean that a common **definition** would be foolish. He gave an overall definition in II-1. He would surely go back and cross it out, if he thought that it was foolish. Rather, what is foolish is to neglect seeking the specific definitions for each.

414b28-32 . . . souls [are]. . . similar to . . . figures;
for in the case both of figures and of things which have soul
that which is prior always exists potentially in
what follows in order,
 e.g. the triangle in the quadrilateral on the one hand, and
the nutritive faculty in that of perception on the other.

What does “exists potentially in” mean? He says this is how the nutritive power is “**in**” the power of perception, but what does “in” mean here? We saw above that the nutritive power in animals happens only through sensation (touch). (Taste is a kind of touch as he said above (414b8) and later explains (422a8-10). Animals do of course have the nutritive faculty, but how it acts is now part of the sensing activity (touch).

This is like the order of figures in that when a side is added to the triangle, this is **a new shape, not a triangle with a fourth line sticking out.** But then, “in” the quadrilateral, where is the triangle? The quadrilateral does have the three sides we would need to make a triangle, but it doesn't have an **actual** triangle. There can be triangles, **if** we draw a diagonal. Then we see two triangles which are “**potentially**” in that same space which is **actually** patterned by the quadrilateral.

Now we need to recall that the soul is the active organization or patterning of the body. So there is no single pattern of living bodies.

Notice that he is now speaking of the living **bodies**, not just the soul-powers. He says (414b30) “... figures and **things which have** soul ...”

In animals the lower-order power is still there, but not as it was when it was alone. When nutrition was alone in plants, it patterned the whole plant-body. **Now sensation (the next-higher one) patterns the whole body** (II-1, 412b23-25), and nutritioin (the lower one) is

only potentially there; it is changed. Now it does not **actually** pattern the animal body.

The sensing-soul is not merely added to nutrition; rather it reorganizes nutrition and the whole body. An animal is a different kind-of-body. The sensitive function as form-of the body differs from the plants, **so that different properties follow** from their definitions, just as different properties follow from the definition of three-sided and four-sided figures.

You can see it by this error: Suppose we say: “Professors are human, humans think, and this presupposes sensation. Since all living things that have sensation are animals, therefore professors are animals. That would be right. But suppose we continue in the very same way: “Any being that has sensation must also have nutrition, and what has nutrition is a plant, therefore professors are plants.” Why is this wrong?

There is still the nutritive activity; food is absorbed and turned into the body’s form, but that which can do it (the nutritive soul-power) is **not** the form-of the animal body. From plant to animal the body-organization changes. Instead of roots there is a mouth with taste buds, and there is touch-sensation all over. There are also sexual organs for reproducing. But from animal to human this doesn’t change.

Quadrilaterals have totally different laws than triangles. Their angles don't add up to 180. Their area can be computed by multiplying two sides. The properties of triangles do not apply to them. So the two potential triangles are not the quadrilateral, except materially, in the same space.

Figures have no useful common set of properties; neither do souls. The commonalities would not be the forms of any body. Rather, **all the properties** we learn in geometry are **peculiar either** to triangles **or** to four-sided figures, and the properties we want to derive of soul are peculiar **either** to plants **or** to animals.

We recall that he said in advance (Book I-1, 403a1) that a single treatment covering all the kinds of soul in one definition will be “dialectical and to no purpose **if** the properties of living things are not demonstrable from it.” We need definitions from which the properties follow. We need to define each kind of soul (i.e. form-of-body) just as we define each figure by its new pattern. Plants and animals are each one organization -- one unity, **one body-organization, which means it has only one soul.**

Hence we must inquire in each case what is **the soul** of each thing, what is that of a plant, and what is that of a human or a beast.

Here he speaks of **the soul of** specifically a plant, a human, or an animal. **One soul organizes one body-organization.** A soul may have several activities and powers, i.e. “parts,” but only one of them organizes the whole body.

NUMBERS:

Let us see which numbers apply to the different items we had:

1 **There is one soul in each living thing** = one function is the one that organizes the body. A figure is organized **either** as a triangle **or** as a quadrilateral, never both. The soul is a unity in any living thing in an analogous way. The body of a living thing must be either a plant body organized all over by nutrition, or an animal body organized all over by sensation.

2 **Two kinds of body-organization** exist, plants patterned by nutrition, and animals patterned by sensation.

The reorganization does not happen when touch has other senses added to it, nor between animals and humans. Why understanding is not a form-of-body is taken up later.

3 **Three objects** (three kinds of “form”): a) the body’s form into which nutrition turns the food; b) the sense-forms (colors, smells, etc.) and c) the thought-forms.

Locomotion aims at an object from sense and/or from thought. It has no other object of its own. There are only three kinds of objects.

4 **Four soul-powers-for-activities:** nutrizing, sensing, understanding, and locomotion. (Nutrizing is really two works, as we will see.) The four sections of the De Anima concern the four soul-powers-for-activities.

5 **Five soul-powers** are listed in II-3, desire (the appetitive) being the one added. Later he says that one can define and add many such powers. Desire is always only potential, as he will explain later. See endnote 145.

SEE ENDNOTE 32 ON NUMBERS

415a1-7 For without the nutrizer there does not exist the perceiver; but the nutrizer is found apart from the perceiver in plants. Again, without the toucher none of the other senses exists, but touch exists without the others; for many animals have neither sight nor hearing nor sense of smell.

And of those which have the perceiver, some have the mover (κινητικόν) in respect of place while others have not. Finally and most rarely, they have **reason** (*logismos*) and **thought** (*dianoia*)

Now he puts II-2 and II-3 together. He uses both "this can exist without that" and "if that, then this" (is presupposed).

415a7-12 for those perishable [mortal] living things which have reason (*logismos*) have all the rest, but not all those which have each of the others have reason. **But** some do not even have imagination, while others live by this alone.

The contemplative nous (νοῦς θεωρητικός) **requires a separate discussion** (*logos*).

He says again that nous requires an entirely different discussion than *logismos* and *dianoia*. We saw this difference in Book I, chapter 4, and we will be noting it right through the *De Anima*.

SEE ENDNOTE 33 ON DIANOETIKON

415a12-13 That the account (*logos*) therefore, appropriate for each of these is most appropriate for the soul also is clear.

The last sentence's conclusion holds for the whole *De Anima*: from now on. We do not

hear anything further about defining "the soul", rather each of the various soul-powers is defined in turn.

II-4

OVERVIEW:

The chapter can be divided into two sections:

Up to 415b28:

In the first paragraph Aristotle says that powers (faculties, i.e., capacities, i.e., soul-parts each a “ko”) are defined by the activities, and he says that activities are defined by their objects. Aristotle begins with the power of nutrizing. Later in the chapter he explains nutrizing and reproducing, and then discusses its object.

This is the chapter on the final cause (after II-1 formal, II-2 efficient, II-3 material cause). The final cause organizes the other three.

Aristotle says that there are two kinds of final cause. Eternity is one kind of final cause of all of nature including the soul, while the soul is itself the other kind of final cause. The soul is the cause (or explanation) of the living thing in three ways: final, formal, and efficient.

As the efficient cause the soul is the source of three types of motion or change: The third kind is growth.

FROM 425b28

Growth is then the topic for a long while. Aristotle shows what is lacking in the physical reductionist explanations which omit the self-organizing of living things (the soul), thereby showing more precisely what the soul does. He distinguishes the living kind of growth from how a pile of elements can “grow,” and how fire “feeds” and “grows.” Only after that does he actually discuss the object: food. The food is different from the living body before digestion, but after digestion the food has the same form as the body.

TEXT

Aristotle continues from the end of II-3:

415a14. Anyone who is going to engage in inquiry about these [soul-powers]. . . . [TEXT SHORTENED AT THE DOTS]

415a16-20 . . . But if we must say **what each of them is, e.g.**, what is the

faculty of understanding (*noetikon*) or of perception or of nutrition, we must again first say what **thinking** and **perceiving** are;

(πρότερον ἔτι λεκτέον τί τὸ νοεῖν καὶ τί τὸ αἰσθάνεσθαι)

for activities (*energeia*, ἐνέργεια) and actions (πραξις) are, in respect of an account (*logos*, λόγος), prior to their potentialities.

A capacity (power, potentiality, soul-part) is always the capacity for some activity. As I said earlier, if you claim to have a special capacity, we would ask you “a capacity for doing what?” Capacities are defined by activities.

415a20-22

And . . . prior to [the activities] we should have considered first their correlative objects (αντικειμενα). . .

e.g. about **food** and the **objects of perception** and **thought**

(περὶ τροφῆς καὶ αἰσθητοῦ καὶ νοητοῦ).

Activities are defined by their objects. For example, if you claim that you are engaged in sensing, we would ask you **what** you are sensing. If nothing, then you aren't really sensing. If the “object” you are sensing is sound, then you are hearing. If the object is color, you are seeing. For Aristotle **the form of the object is also the defining form of the activity**. In what Aristotle calls “the order of nature” the object we eat, sense, or think determines what the activity is. But when we first study something, we come to know things in the opposite order, “the order of discovery.” In our passage here Aristotle presents both orders at once. He tells us **both** that objects define activities which define powers, and also that **we** are now going to move **from** the discussion of powers **to** the discussion of activity, and will later in the chapter consider its object (food). He tells us from the start that food is the object, but we really discuss it only in the second half of the chapter (from 416a19 on). Later in the book when he discusses sensing, he will again begin from power and move to activity in II-5, and then the sense-objects in II-6.

Now let us look over this first paragraph, and notice: There are three powers (soul-parts, kos), and **three** objects as we would expect. (For why three, see my commentary on II-3 under “NUMBERS”). But why are only **two** activities (thinking and perceiving) mentioned? The nutrizer is mentioned as one of three **powers**, why not three activities? He tells us why immediately:

415a22

Hence, we must first speak about nourishment and reproduction; **for** the nutritive soul (*threptike psuche*, θεραπετικὴ ψυχή) belongs also to the other living things and is . . .

the power (*dunamis*) of the soul in virtue of which they all have life.

Its functions (works; *erga*) are

reproduction and the **use of food**.

The nutritive power, instead of enacting one activity (*energeia*) enacts **two** “works” (or functions, *erga*), reproduction and the absorption of food.

ENDNOTE 34-35 AT 415a24 NEITHER ONE ACTIVITY NOR TWO

Now that he has mentioned (not yet discussed) the reproductive function of the nutritive soul, he can explain the first kind of final cause.

415a26-415b2

for it is the most natural work in living things . . .

to produce another thing like themselves . . .

in order that they may partake (*μετέχειν*) of the everlasting and divine in so far as they can;

for all **desire** that,

and **for the sake of that they do whatever they do**

in **accordance with nature**.

Even plants “desire” (*oregetai*) in this respect, and for the sake of this they do everything natural that they do.

ENDNOTE 36 ON 15b1 ON WHETHER PLANTS DESIRE

415b2-3

(But that for the sake of which is twofold -

the **for which** (τὸ τε οὐδ'), and the **by which** (τὸ ὅ).

In Greek he names the two kinds of final cause only by these two prepositions, so we must let him show us what he means. I will compare them at 415b19 where he repeats them. Here let us examine just the first kind.

Please notice that it is the living things themselves which do all they do for the sake of this. They **arrange themselves** in relation to eternity; they are not arranged by it.

I can provide an analogy: We can say that fairness (or justice) "causes" much of our behavior, although fairness itself does not do anything. It is rather **we** who try to be fair. The judge works to devise a fair judgment in a unique situation. Justice doesn't already contain a just way to deal with the contested property in a given court case. Rather, justice is what the judge **aims at**. Justice is the final cause in this **first sense of "final cause."** It does not move, yet causes other things to move in certain ways. But this is only **my** example, although one well known in ancient Greece.

Aristotle usually interrelates final and efficient causes in this way. The final cause moves things by being desired, while the efficient cause (the source of the motion) is **in the things that move**. Here he says about the living things in nature that **they** move toward eternity, just as we move toward an object of desire. The desired thing need not move. Our desire provides the motion. Nature aims **at** eternity. This is the first of the two kinds of final cause.

415b3-7

Since, then, they cannot share (κοινωνεῖν) in the **everlasting** and **divine** by continuous existence, because no perishable thing can persist numerically one and the same,

they share (metechein, μετέχειν) in them in so far as each can, some more and some less;

and **what persists is** not the thing itself but **something like itself**, not one in number but one in species.

What persists is not the species but always again another individual. Aristotle says that the species-form does not exist as such; it exists only in the mind of someone or in the particular things, i.e. in the successive individuals. The living things do partake (metexein, μετέχειν) of eternity - to the extent they can.

THE PROOFS

415b8-12

The soul is the **cause** and **source** of the living body.
 But these [cause and source] are so spoken of in many ways, and
 similarly **the soul is cause in the three ways** distinguished;
for the soul is **itself** the cause
 as **that from which the movement** is derived,
 as **that for the sake of which** it occurs, and
 as the **substance** (ousia) of bodies which are ensouled.

The soul is **the cause of the ensouled body** in three ways. This will now be shown. Aristotle's four "causes" are four kinds of explanations, four kinds of answers to the question "why?" (See I-1 for a discussion of them.) The soul is the cause of the body in all ways except for the material cause.

FORMAL:

415 b 1 2.

That it is so as substance is clear;
 for substance is **the cause of being** in all things,
 and for living things it is **living** that is being (*εἶναι*),
 and the cause and source of this [living] is the soul.
 Furthermore, the actuality (entelecheia) is the principle (*logos*)
 of that which is such potentially.

Here is a simplified version of the proof:

substance is **the cause of being** in all things

in living things their **being is living**

soul is cause of living

Therefore soul is the substance (formal cause) of living things.

Both “being” and “living” serve as middles.

FINAL:

415b15-18

And it is clear that

the soul is cause also as that for the sake of which.

For just as nous makes (*poiein*) for the sake of something

Nous qua activity makes for the sake of nous qua the good.

SEE THE LAST PART OF ENDNOTE 37 ON THE TWO KINDS OF FINAL CAUSES

in the same way also does nature,

and this something is its end (*telos*) . .

Nous needs to be separated from the rest of the proof because nous is not the form of the living thing. Nous is **not** part of what Aristotle calls “nature” (*Physics* II-1). Nor is nous **a** nature (*phusis*). A nature is the form-and-internal-source of motion in a body. And, nous is not a *telos*, i.e. not the form of a body which growing completes. Therefore nous has to be mentioned separately, and Aristotle says that nature makes **like** nous makes.

Aristotle wrote a long work on the material processes of reproduction and growth (*Generation of Animals*). In the *De Anima* he is concerned with the functioning which determines what those mechanics have to be. He observes a pattern of development from an embryo to a complete form. In the *Physics* (II-8) he says “When a thing is produced by nature, the earlier and successive stages lead up to the finished development in the same way as in art .. for the relation of antecedent to consequent is identical in art and in nature.” (199a10-20). Aristotle’s biological “teleology” has been widely misinterpreted. For Aristotle the *telos* of a living thing is not something mysterious, not something in which we may or may not believe. Rather, we observe that each living thing has its mature form, its natural limit, its “completion.” We know that the child won’t grow a third

set of teeth, nor grow 8 feet high, and so with every other creature. It has its own complete form and its limits from inside itself. This is its completion or “end” which its growth aims at and achieves.

415b17-21 of this sort [an end] is the soul in living things **according to nature**

for, all natural bodies are instruments for the soul . . .

TEXT CUT ...

showing that they [the natural bodies] exist **for the sake of** soul.

But “that for the sake of which” is so spoken of in two ways,

for which and by which.

(διττῶς δὲ τὸ οὐ ἔνεκα, τὸ τε οὐ καὶ τὸ ὅ.)

The soul uses natural bodies (food) for the sake of achieving growth into the complete form of the body, i.e. into the soul-as-form-of the complete body.

SIMPLIFIED:

The **for-the-sake-of-which** is an **end** (*telos*, the matured form)

Natural bodies are tools for the soul, showing that the **soul** is an **end** (completion)

Therefore the soul is the for-the-sake-of-which.

The two kinds of final cause can be distinguished right here. In making the body, the soul’s own activity aims at eternity, the final cause **of** the soul, but since it uses the natural bodies (the elements, food) to make the body, and since the soul also **is** the mature form of the body, the soul **is itself** a final cause of the natural bodies which the soul uses to generate the complete form-of-body. Aristotle called this second kind of final cause the **“by which”** (τὸ ὅ) the work is done. Here we can see how the two kinds of final cause differ: The natural bodies do not act to **aim at** the soul, as the soul acts to aim at eternity. The food doesn’t aim at being eaten; iron and wood do not move themselves into an axe. Earlier we had **“for which,”** (τὸ τε οὐ), the kind of final cause that is aimed at but does not itself move. Now we just saw the kind he calls **“by which,”** the kind which does the work itself.

The soul aims at eternity. But it is itself the maker by which the completion is achieved.

<u>Eternity</u>	Analogously to	<u>soul</u>
soul		natural bodies

In this relationships between the two kinds of final cause, the soul is the middle term.

SEE ENDNOTE 37, 15b19 ON TWO KINDS OF FINAL CAUSE

The efficient cause is the source of **three kinds** of “motion.” Aristotle uses the word “motion” (kinesis) to include “change.” Here he will cite his three kinds of motion: change of place, qualitative change, quantitative change.

- 415b21
- 1 Moreover, the soul is also that from which **change of place** is first derived;
but not all living things have this potentiality.
 - 2 **Alteration and growth** also occur in virtue of soul;
for perception is held to be (dokei) a kind of alteration,
and **nothing perceives which does not partake of soul.**
 - 3 And the situation is similar with growth and decay;
for **nothing decays or grows naturally unless it is nourished,**
and nothing is nourished which does not share in life.

Here is an outline of proofs (2) and (3) on the source of the motion:

sensation is a **change in quality**

sensation **only if** it has soul

Therefore soul is cause of this change in quality

no decay and growth without *being fed (trephomenon)*

and **no food** (*trephetai*) **without** sharing **living**

[soul is the cause of living]

Therefore soul is cause of growth-decay-change

Now we have had these proofs to show that the soul is the cause (or explanation) of the "motions" (changes) of the living thing. Just above (415b12-20) we had the proofs that the soul is the cause as form (substance) and as final cause (that for which).

ENDNOTE 38 ON THE ARGUMENTS FOR THE EFFICIENT CAUSE

Aristotle takes the efficient cause up last, (although in his first listing of the three causes (415b10) he put it first). He takes it up last because he will remain with this cause through the rest of the chapter. It is the cause of growth which he discusses next.

ENDNOTE 39 ON WHY THE EFFICIENT CAUSE COMES LAST HERE.

He just said "for nothing grows or decays without food (415b26)," but he doesn't yet continue with food. We are still discussing growth, not yet food.

415b28 EMPEDOCLES

415 b28.

Empedocles did not speak well when he added this, that growth takes place in plants, when they root themselves downwards because earth naturally moves in this direction, and when they grow upwards because fire moves in that way. For he does not have a good understanding of up and down

(for up and down are not the same for all things as they are for the universe, but the roots of plants are as the head in animals, **if we are to speak of organs as different or the same in virtue of their functions** (ergois)).

The form of the body is determined by its life-activities. We notice that we must redefine **"up" and "down"** functionally for a body of organs. Such a body does not consist just of elements defined by their opposing up-or-down motions. In living things the directions of motions are determined by their function within the body's own organization. The roots feed the body as an animal's head feeds the body. The motion of food and water seems to be up in plants and down in us. As motions they are opposites, but as determined by functional activity they are the same.

416a5 In addition to this, what is it that holds together the fire and the earth, given that they tend in opposite directions? For they will be torn apart, unless something prevents them; but if there is, then this is the soul and the cause of growth and nourishment.

Aristotle defines a motion by its direction and endpoint. Earth and water move toward the center of the earth which is "down." Fire and air move "up." So a plant would come apart if the elements moved in their own different directions. But the matter of the plant has functionally determined motions. Since the elements don't pull apart, there is some further organization (the soul, the power for life activities which is also the kind of matter) which is the internal cause of the motions and changes in the body.

ENDNOTE 40 ON HOLDING THE ELEMENTS TOGETHER

FIRE

416a9-18. Some think that it is the nature of fire which is the cause quite simply of nourishment and growth; for it appears that it alone of bodies [or elements] is nourished and grows. For this reason one might suppose that in both plants and animals it is this which does the work.

It is in a way a contributory cause, but not the cause simply; rather it is the soul which is this. For the growth of fire is unlimited while there is something to be burnt, but in all things which are naturally constituted **there is a limit and a proportion** both for size and for growth; and **these belong to soul, but not to fire**, and to principles rather than to matter.

των ἔστι πέρας καὶ λόγος μεγέθους τε καὶ ἀξίσεως· ταῦταδὲ ψυχῆς, ἀλλ' οὐ πυρός, καὶ λόγου μᾶλλον ἢ ὕλης.

We can see that living things differ from fire because they have certain proportions and limits which fire lacks. Unlike fire, growth stops when the living thing's own proportions are reached. Also at any one time the living thing's feeding stops at a certain point, showing that it has its own organization and limits. In contrast, fire doesn't stop "feeding" as long as there is wood. A merely reductive explanation in terms of chemistry doesn't get at the further organization which every living thing shows.

Aristotle thinks that heat (as in fire) is a contributory cause to digestion. He is always concerned with the motions and chemical processes involved in living activities. His explanation of living processes is **never only** in functional terms. But he wants to show that the motions and chemical changes are further organized by the functional activities of living. This overarching organizing is the topic of the *De Anima*.

416a19-21

Since it is **the same power** of the soul which is nutritive and **reproductive**, we must first determine the facts about **food**; **for** it (the one soul power) is distinguished from the other powers by this work (function, *ergon*, ἔργον).

In act, sex, pregnancy and birth are not the same as the absorption of food. Therefore they are not one activity. In *Generation of Animals* 740b30-38 Aristotle shows in more detail that, although it is the same power, the genesis of the fetus by the parents is a different "**work**" than its own later growth. But then, why does Aristotle say that both are enacted by one and the same **power**?

Aristotle says that the **one** power which has the two works (or functions, *erga*) is the nutrizing soul-power of absorbing food.

Now at last he moves to the object (food). As we will see, the object is also the same for both works. Therefore he will keep the two works together from now on (as 416b11 also shows).

ENDNOTE 41 (416a19-21) ON WHY FOOD IS THE OBJECT OF REPRODUCTION

416a19 - 416a34

It is thought that something is **food** for its contrary, though not in all cases, but wherever contraries receive not only generation from each other but also growth; for many things come to be from each other, but not all are quantities, e.g., the healthy comes to be from the sick.

Not even those which do receive growth from each other seem to constitute **food** for each other in the same way; **but water is food for fire, while fire does not feed water.**

It seems, then, that it is especially in the simple bodies that one thing is food, the other the thing fed.

The element “water” included all liquids. Aristotle is thinking of oil which feeds fire. The “simple bodies” are the four elements, (earth, air, fire, and water). For the moment Aristotle poses this as a problem: Since oil “feeds” fire but not vice versa, this does look like the living kind of feeding. He will differentiate this from the living feeding activity at 416a34 below.

416a29.

But there is a difficulty here; for some say that the **like is fed by like**, as is the case with growth,

while others, as we have said, think the reverse, that one thing is **fed by its contrary**, since the like is unaffected by like

whereas food changes and is digested; and in all cases change is to the opposite or to an intermediate state.

Those who thought that “like is fed by like” were thinking only of quantity. By adding more salt to a pile of salt, the quantity grows. But mere addition does not explain how food turns into flesh. On the other hand, those who said “a thing is ‘fed’ by its contrary” were thinking of cool things becoming hot, and vice versa. When the hot heats what was cool, there is more and more of what is hot. The hot “feeds” on its contrary. They thought the growth of living things must be explainable by such chemical processes.

So fire is fed by water (meaning liquid, that is to say oil) but even this is more complicated and not reversible since oil is not fed (i.e. increased) by fire. So the process of contrary-change (fed by unlike) doesn’t explain even this.

416a34-416b3

Furthermore, **food** is **affected by** that which is fed, but not the latter by the **food, just as the carpenter is not affected by his material**, but the latter by him;
the carpenter changes merely from idleness to activity (*energeia*).

This is a crucial example often used by Aristotle: The carpenter at work is not changed in form, only the wood changes. The food is changed by the living thing which is fed. The food is changed into the form and matter of the living body. But the living body is not changed in its form and kind of matter.

Here we can come to understand Aristotle's concept of "activity" (*energeia*) and of "works" (*erga*). There is no English word for an "activity" that does not change. We need to grasp his concept of activity (*energeia*) to understand the rest of the book.

If you eat something that changes **your form**, for example a poison, Aristotle says that this was **not the activity of nutrition**. If something you swallow eats your stomach, this is not nutrizing either. Only if you are **not** changed, but the food is changed into you, then it is the activity of nutrition.

Anything that changes the pattern of the activity is not part of the activity. In this respect, an ongoing "activity" remains **unchanged** throughout. Of course the muscles of carpenters change when they get up, but that change does not change the activity of carpentry. If a finger gets sawn into so that the carpentry is affected, that sawing was not organized by the activity of carpentry. Carpenters move about, but **these changes are organized by the activity of carpentry**; they do not change the activity.

An ulcer is not one of the changes that are part of digestion. If the digestive chemicals are too strong and begin to 'digest' the stomach so that digestion is changed, that change is not part of "the activity of" digestion. Here we can grasp this concept which is basic for Aristotle: **An "activity" is an active organizing which does not itself change as it organizes motions and changes.**

Aristotle usually reminds us of this by saying that the carpenter doesn't change, only the wood changes.

SEE ENDNOTE 42 ON THE MEANING OF “ACTIVITY” IN CONTRAST TO MOTION AND CHANGE

Now he solves the problem of fed by like and unlike:

416b3. It makes a difference whether the **food** added [to the living thing] is the last thing or the first. If both are **food**, but the one undigested and the other digested, it would be possible to speak of **food** in both ways;

416b6-9 In so far as the **food** is [as yet] **undigested**, the contrary is fed by the contrary, in so far as it is **digested**, the like by like. So that it is clear that in a way both speak rightly and not rightly.

416b9-11 But since nothing is fed which does not partake of life, that which is fed would be the ensouled body, **qua ensouled**, so that **food** too is relative to that which is ensouled, **and this not accidentally**.

Only a living (= having soul) body is fed. It is fed not as having color, or size or any accidental characteristic but **qua ensouled** = living, i.e., qua this kind of body.

So the chemical process of food-absorption would not be enough of an explanation. We need the form of the living body since the food is turned into that form. **The food is turned into a body that can engage in the activity of turning food into that form of body.** Its “form” **is** this activity (more exactly the power for this activity).

416b11-13 But being **food** and being capable of producing growth are different; **for** it is in so far as the ensouled thing is something having quantity that **food is capable of producing growth**, but it is in so far as the ensouled thing is **a particular** and **a substance**, that something **is food**.

To be food means to be capable of being changed into the form or “substance” of a living thing.

Growth as mere quantitative change into a larger size is distinguished from the nutritive work which doesn't just add quantity but turns the food into the animal form. Food does add quantity, but that is not why the food **is** food. It is food because it can be converted into the living thing's form-of-body. Of course, if the potato were added **unchanged** at the top of your head under your scalp, it would increase your quantity, your size and weight, but this would not be nutrition. Food is defined in relation to **the form of the living** thing which the food becomes.

He follows this immediately with the reproductive work of the same power (the power to change food into the animal form).

416b14-17

For the ensouled thing **maintains** its substance and exists **as long as it is fed**;

and it can bring about the **generation**, . . .of something like it;

for its substance is already in existence

(ἤδη γὰρ ἔστιν αὐτοῦ ἡ οὐσία.),

and nothing generates itself, but rather maintains itself.

Hence this first principle (ἀρχὴ) of the soul is a potentiality such as to maintain its possessor as such,

while **food** is the implement (παρασκευάζει) for its activity;

for this reason, if deprived of **food** it cannot exist.

Both in nutrizing and in reproducing the same power changes the same object (food) into same form. Aristotle is discussing both works together.

416b23-25

Since it is right to call all things after their end, and the end is to generate something like oneself, the primary soul will be that which can generate something like itself.

In respect of the final cause, the reproductive work defines the nutritive power.

416b20-23

Since there are three things,

that which is fed,

that by which it is fed, and

that which feeds,

that which **feeds** is the primary soul,

that which is **fed** is the body which has this, and

that **by which** it is fed is the **food**.

τὸ μὲν **τρέφον** ἐστὶν ἡ πρώτη ψυχή,

τὸ δὲ **τρεφόμενον** τὸ ἔχον ταύτην σῶμα,

ᾧ δὲ **τρέφεται**, ἡ τροφή.

Aristotle has a similar trio for locomotion:

433b.13

ἐν μὲν τὸ κινῶν,

δεύτερον δ' ᾧ κινεῖ,

ἔτι τρίτον τὸ κινούμενον,

what does the feeding = soul power

trephon

τρέφον

fed = the body

trephomenon

τρεφόμενον

that by which it is fed = food

trephetai

ᾧ τρέφεται

416b25-29

That by which one feeds is twofold, just as **that by which** one steers is, i.e. both the hand and the rudder,

the one moving **and** being moved, the other being moved **only**.

Now it is necessary that all **food** should be capable of being digested, and it is heat which effects the digestion;

hence every ensouled thing has heat.

The efficient cause or source of the motion is also called "**the means**" or "**that, by**

which” it is done (ὅ). The efficient cause typically involves one original unmoved mover source (in our case the soul) and a chain of moved mover-means (food, heat). For example, in steering a boat, the rower-sailor originates the motion; the hand is moved and also moves. The chain of means extends to the rudder, which is only moved.

The heat aids digestion, he says. For Aristotle the heat is one of the means in the chain.

What nourishment is has now been stated in outline; but we must elucidate it later in the appropriate work

II-5

OVERVIEW

The chapter is about sense-perception. It falls into three sections:

Up to 417a14 he shows that the sensing soul-part in us is only potential. He means that sensing is not an activity inside the body or inside the living thing, but is active only with an external thing that activates the sense.

In the middle section 417a14 - 417b2 he distinguishes **two stages of potentiality**.

In the last part he discusses the **transitions from** first-stage potentiality **to** the second, and then **from** second-stage potentiality **to** full activity.

He gradually shows that these transitions should not be called “changes.”

First he says “Let us speak **as if**” coming into act **were** simply a case of “being affected” (changed, or altered).

After a while he says that these two transitions are either not a being affected, or **a special kind of** “being affected.”

At the very end he concludes that they are not cases of “being affected” **at all**, but since there is no other word, we have to use this word also for coming into act, as if that were a kind of being affected.

He then uses the word in the last sentence.

The chapter is not difficult, except for the difficulty of recognizing at each spot which of the two kinds of potentiality he is discussing, and then which of the two transitions. So it helps to watch for this.

416b32-33

Now that these matters have been determined
let us discuss generally **the whole of perception**.

Here begins the part of the *De Anima* concerned with perception. It continues till the end of III-2. This and the next chapter are about perception as a whole, not yet about each particular sense.

416b33-35

Perception consists in being moved and affected, as has been said; for it is **held to be** (*dokei*) a kind of alteration.

Notice “dokei.” Aristotle will argue that perceiving is either a very special kind of alteration, or really not an alteration (i.e. not a being affected or changed).

416b35

Some say too that [perception is explained by] **like affected by like**.

The atomist philosophers held that “like can sense like;” they meant that perception happens because the chemical elements in us meet **the like elements** in the things we sense. There was an early attempt to explain perception as a physical-chemical process of the atomic elements.

Aristotle argues that their view poses the following two problems (which he wants to raise anyway):

417a2-6

There is a problem why perceptions **of** the senses **themselves** does not occur, and why they do not generate perceptions **without external objects**, although there is in them fire, earth, and the other elements, **of which**, either in themselves or in respect of their accidents, **there is perception**.

Let us see why this is an argument against the physical-chemical explanation of

perception. The Atomists said that sensing comes about when the elements in the sense-organ meet the element outside. Aristotle argues that if this were the explanation of sensing, i.e., if fire and water sensed fire and water, then why don't the elements do this sensing also inside? The sense organs are made out of the elements. So each bit of the organ should sense the other bits in it. Accordingly, the sense-organs ought to perceive themselves. There ought to be sensing going on inside the organs too.

SEE ENDNOTE 43 ON THE SENSES NOT SENSING THEMSELVES

Now let us consider the two questions:

a) Why don't the senses sense themselves? (Why doesn't the eye see itself, or why do parts of the eye not see the other parts of the eye?);

b) Why do the senses not "generate sensations **without an external object?**"

(Why do the senses not turn on of their own accord?)

His answer is:

417a6-9

It is clear, then, that the faculty (soul-part or potentiality) of sense-perception **does not exist as activity (*energeia*) but only as potentiality;**

Of course. Since the senses have to be ready for all colors and all sounds and smells, the senses themselves are potential and need something actual to determine which colors and sounds will be actively sensed.

for this reason the perception does not occur,

just as fuel does not burn **itself of itself** (αὐτὸ καθ' αὐτὸ)

without something that can burn it; otherwise it would burn itself and would need no actually existing fire (**entelecheia**, ἐντελεχεία πυρὸς ὄντος).

When Aristotle says "It is clear, then . . ." he thinks this conclusion follows. What does it follow from? From the fact that no active sensing is happening inside. The sense organs do not

sense themselves; they sense only an external object. The senses do not activate the sensing on their own. They need something other than themselves to activate them. This fact is what he means by saying that they are “only potential.”

Aristotle is freshly generating the concepts of “actuality”/“potentiality,” so we can generate them ourselves if we follow him. Wood burns. It turns into fire and smoke, but wood does not do this on its own. It does not ignite itself. We cannot say that wood does **not** burn. When we say “wood burns,” (iron doesn’t burn) we really mean that it **can** burn. To be fuel is to be **potential** fire.

With his “just as” Aristotle generates the concept of “potentiality” from the analogy. Only an **actually existing** (*entelecheia*) fire can activate the potential fuel into burning **activity** (*energeia*). In the same way, the senses **can** sense, but need an actually existing thing to make them active.

ENDNOTE 44 ON POTENTIAL FIRE AND ENTELECHEIA / ENERGEIA

417a9-12 Since we speak of sensing (*aisthanesthai*, the gerund) in two ways
 (**for** we speak of that which potentially hears and sees as hearing and seeing, even if it happens to be **asleep, as well as when active** (*energein*)
 Sensation (*aisthesis*, the noun) too, will be spoken of in two ways, . . .

We say that animals “hear and see” but plants do not. We mean that animals **can** do so. But we also say “they hear and see” when we mean that they are actively doing so now. In other words, we can mean the potentiality or the activity.

He states the basic distinction:

417a13-14 Similarly sensing (*aisthanesthai*) can be
 potential (*dunamei*) **or activity** (*energeia*).

((In the Oxford manuscript “object” (*αἰσθητόν*) appears where I have “sensing” from the MSS version. Either makes sense, but “object” seems somewhat more likely

not to come until it is discussed near the end of the chapter (418a4) just before chapter 6 on objects.))

Here begins the middle section: the transitions:

417a14-16 First, then, let us speak **as if**
being affected (*paschein*) or being moved (*kineisthai*) and
becoming active (*energein*) **were** the same thing;

Aristotle includes all kinds of being affected under “being moved.” When actual fire ignites wood, this certainly affects the wood and soon consumes it. But when an external thing activates our sensing, is this surely not the same kind of “being affected.” By saying “**as if**” he implies that being activated is not a case of being “affected” (*paschein*).

κινεῖσθαι **kineisthai** = to be moved, i.e. changed (kinein = to move)

πάσχειν **paschein** = to suffer (active infinitive, to be affected)

ἐνεργεῖν **energein** = an active infinitive (to be activated)

((Hamlyn’s translation is confusing here. Aristotle temporarily includes being in activity or becoming active under “being affected [changed], or moved.”))

Here is **the reason why**, for the moment, we speak as if they were the same:

417a16-17 **for** indeed movement is **a kind of** activity (*energeia*), although an incomplete one (*atelos*) as has been said elsewhere. And

Aristotle defines motion as incomplete activity, and so can treat it as “a kind of” activity. Motion is always incomplete, always on the way from ... to, and when it arrives it stops altogether. Activity, for example seeing, is complete at any point.

ON ACTIVITY SEE THE MY ENDNOTE 42 IN II-4.

First he merges complete and incomplete activity in order to say something that is true of them both:

417a17-18 everything is affected and moved **by what can** bring this about (*poietikou* makes this) **and is as activity** (*energeia*).

To be affected or moved requires something **active** (*energeia*). To move, change, or affect something is activity. The activity which does this does not need to move or change itself, or be affected. (Activity is the fullest kind of “actuality,” as we saw in II-1.)

Now this enables him to reinterpret and adopt both the like/unlike and the like/like theory:

417a18-20 **For this reason, in one way**, as we said, a thing is affected by like, and **in another** by unlike;

417a20 for it is **the unlike which is affected**,
although **in undergoing** (*πεπονθός*) **it is like**.

In the case of food we have already seen “the unlike” which is affected so that it changes during digestion from unlike to like. Afterwards the “food” acquires the body’s form and becomes “like” the body. Here, in the case of sensing, Aristotle is saying something similar.

For Aristotle a thing can be **changed** only by something unlike itself. For example, blue cloth cannot be affected by a blue dye of the same shade. Something can’t be heated by something of the same temperature. When you open your eyes or turn to look at a blue thing, it changes what you sense to blue. But as you sense it, the blue of the thing and of your sense are the same sensing of blue. This is obvious, of course, but it means that in the sensing **the sense and the thing are “like” in form**.

The **motion** of light or sound from the thing **affects** your sense organ, and this is a **change**, but it also **activates** your sense (perhaps from sleeping). The shift from potential to active sensing is not an affecting, not a change, as he will now argue. He will discuss at length the shift from potential into act.

First he announces making distinctions:

417a21-22 But we must make **distinctions concerning potentiality and actuality** (*entelecheia*); for at the moment we are speaking, of them in an unqualified way (*haplos*).

Haplos (see also 417b1) means “unconditionally” or “without (or before) qualification.”

Now he will discuss the two kinds of “potentiality,” using knowledge as his example as he did in II-1.

417a22-24 For **there are knowers** in that we should speak of a man as a knower (*ἐπιστήμῳ*) because man is **one of those** who can be knowers and have knowledge;

Any member of the human race can be called a “knower,” a homo sapiens, the **kind** of being that knows, even if this individual is ignorant.

417a24-25 then **there are knowers** in that we speak straightaway of the man who has knowledge of grammar as a knower.

This one has already acquired the knowledge, for example grammar.

Now he states the difference between the two kinds of potentiality.

417a26-28 (**Each of these** has a potentiality, but not in the same way -- the one because his genus (class, or kind), his matter is of this sort,
the other because he **can** if he so wishes **contemplate** (*theorein*) as long as nothing external prevents him.
(ὁ δ' ὅτι βουλευθεὶς δυνατὸς θεωρεῖν, . . .)

Aristotle often calls any broader category or kind the “genus,” and says that it is “matter” in relation to the more specific form which any instance of it will have.

So we now have two kinds of “potentialities:” someone who because of being human **can** learn but has not, and a learned person who is just now eating or sleeping, rather than thinking. And then of course, (as in II-1)

417a28-29

There is **thirdly** the one who is already contemplating (*theorein*), the **knower** who is **in actuality** (*entelecheia*) and in the controlling (κυρίως) sense knowing **this particular A**. (ὁ δ' ἤδη θεωρῶν, ἐντελεχεῖα ὧν καὶ κυρίως ἐπιστάμενος τόδε τὸ Α. (417a.27-29).

The third is the one who, in the controlling i.e., fullest sense of actuality (*entelecheia*, completion), is now knowing some particular existing thing. Both the second and the third are “actual,” i.e., complete, but the third is ongoingly knowing a particular thing and this is the fullest, most “complete” knowing, the controlling sense of being a “knower.”

1. any human **can** come to learn and know (is only a potential knower).
- 2 the grammarian actually knows and **can** contemplate what he knows whenever he wants.
- 3 the grammarian is now actually contemplating this particular letter “A.”

Aristotle has not yet discussed how one gets from 1 to 2, or from 2 to 3. He will now first discuss the transition from 1 to 2, and then from 2 to 3. The transitions begin right after the letter “A.”

Now the transitions:

TRANSITION 1 TO 2:

417a30-31

Thus, both of the first two are potential knowers, but the one becomes altered **through learning** and frequent changes **from an opposite disposition** (*hexis, having, ἕξεως*),
ὁ μὲν διὰ μαθήσεως ἀλλοιωθεὶς καὶ πολλάκις ἐξ ἐναντίας μεταβαλὼν
ἕξεως,

Ignorance and knowledge are not the usual type of contraries because they are one and the same nature, differing only in “**disposition (hexis, having).**” A “hexis” is a kind of nature which may or may not become completed. Later in the chapter (417b15) we will understand this term “hexis” more exactly.

TRANSITION 2 TO 3:

417a31-417b2

The other in another way **from** [already] **having** (*exein*) arithmetic and grammar without activity **to its active exercise**. (*energein*).

ὁ δ' ἐκ τοῦ ἔχειν τὴν ἀριθμητικὴν ἢ τὴν γραμματικὴν, μὴ ἐνεργεῖν δέ, εἰς τὸ ἐνεργεῖν, ἄλλον τρόπον.

(Manuscripts vary in this passage.)

So these are the two transitions, coming from merely potential to first actuality, and coming from first-actuality into full actuality, i.e. activity (*energein*).

Now the question will be: Are these transitions really cases of being affected, i.e. being changed? We have been speaking “as if” they were a being affected, but:

417b2

Being affected (*paschein*) is not a single thing (haplos) either;

Aristotle will make a distinction. Being affected has two senses:

417b2-3

it is **first** a kind of **destruction of something by its contrary**,

When red cloth is died blue, the blue “destroys” the red. The red is not maintained. This is the usual kind of “affected” in contrast to:

417b3-4

and **second** it is rather the **maintaining** of that which is so potentially by that which is so actually (*entelecheia*).

Destruction (*phthora*) is contrasted to being maintained (σωτηρία). In the latter case what it already potentially was is maintained.

(for its development is into itself and actuality (*entelecheia*),
or a different kind of alteration.

(θεωροῦν γὰρ γίνεται τὸ ἔχον τὴν ἐπιστήμην, ὅπερ ἢ οὐκ ἔστιν ἀλλοιοῦσθαι (εἰς αὐτὸ γὰρ ἢ ἐπίδοσις καὶ εἰς ἐντελέχειαν) ἢ ἕτερον γένος ἀλλοιώσεως.

For this reason it is not right to say that someone who is prudent is “altered” when exercising prudence,

διὸ οὐ καλῶς ἔχει λέγειν τὸ φρονοῦν, ὅταν φρονῆ, ἀλλοιοῦσθαι,
any more than a builder [is altered] when he builds.

This is the second transition from already having knowledge to knowing (= theorein, theorizing). It should not be called “change” at all, not becoming different, *alloi*), or we could call it another **kind** of change. It is a “change” **into itself, into its own completion** (*entelecheia*),

just as (*hosper*) a builder is not changed into something else by starting to work.

417b9-12

The shift (ἄγειν ἐκ δυνάμει) of
an [already developed] having of nous and prudence
to [full] actuality (*entelecheia*) should not be called instruction,
but should have another name;

Obviously activating one’s own knowledge does not require a teacher. One employs what one already knows in active understanding.

(Hamlyn shouldn't have said "leads" for ἄγειν ἐκ δυνάμει, since it is done by the individuals themselves, whereas "leads" sounds like being led by someone.)

In contrast, the earlier transition does require a teacher:

transition 1 to 2:

417b12-15

while that which, starting from being potentially such,
learns and acquires knowledge
by the agency of that which is actually (*entelecheia*) such and

changed by actively thinking.

Now he will discuss sense-perception in terms of the distinctions he obtained by means of the examples from knowledge. In the case of sense-perception, what is analogous to the two kinds of potentiality? And, is it again true that their actualization is not really a change?

The transition from 1 to 2 in the case of sense-perception:

417b16-18 The first change in that which can perceive is brought about by the parent, and when it is born it already has sense-perception in the same way as someone who has [already acquired] knowledge.

The capacity for sensing is completely developed at birth. The transition from 1 to 2 has already happened in the embryo as it grew in the womb. The newborn **can** see and hear whenever it wants.

Notice please: **the sense itself is only potential**, like having knowledge. The sense needs an external thing to activate it, as he explains next.

Now the second transition (2 to 3) in the case of sense-perception:

417b19-21 **Active** (*energeia*) sensing is so spoken of in the same way as contemplating (*theorein*), but there is a difference:
in sensing, the things which are able to produce (*poietikon*) the activity (*energeia*) are **external**, i.e. the visible and the audible [things], and similarly for the rest of the objects of perception.

At the start (417a4) Aristotle said that the senses need external objects, but now he can also tell us **why** they have to be external. He explains:

417b22-28 The cause (*aition*) is that
active (*energeia*) **perception is of particulars**,
while knowledge is of universals (*katholou*)
and these are somehow in the soul itself.

For this reason it is open to us to think(*noein*) when we wish, but perceiving is not similarly open to us; for there must be the object of perception.

The situation is similar with the **knowledge** dealing with the perceptible, and for the same reason (*aition*) that the perceptibles are **particular** and external.

The objects of perception are external **because** they are **particular** things. The universals (*katholou*) are concepts, ideas, habits in the soul. **Therefore** we can think the universals whenever we wish, but since sense is of particular things and particulars are always external, the sense cannot make sensations without the things, but must be **activated** by them.

Now Aristotle adds: Neither can there be [active] **knowledge** of sensible things, and for the same reason. Sensible things are particular external things and so we cannot know one merely by knowing universal concepts.

ENDNOTE 46 17b26 46 ON KNOWLEDGE IN ACT IN THE CONTROLLING SENSE

ENDNOTE 47. 417b28 ON KNOWLEDGE-IN-ACT OF SENSIBLE THINGS

ENDNOTE 48/49 COMPARISON WITH KNOWLEDGE

Summing up:

417b30-32

. . . let it be enough to have determined **this much — that**, what is spoken of as potential is not without distinction, one being so spoken of as we should speak of **a boy as a potential general**, another as we should so speak of **an adult**.

In Athens a man could instantly be appointed to lead a military expedition and be its general, if the assembly so voted. He was usually an experienced soldier, but there was no formal requirement; any adult could be voted in as the general of an expedition.

Our two transitions are contrasted. Transition 2 to 3 is illustrated when an adult is

appointed general, the already developed capacity becoming actualized (like the builder getting up to build). On the other hand, it is transition 1 to 2 when a boy becomes a general since he must first develop, only then can he be appointed.

Now, which transition is it, when an object activates our sensing?

417b32-418a1 **As** we should so speak of an adult,
[so] **it is** . . . with that which can perceive.

At birth the senses have the fully developed kind of potentiality which can be immediately activated.

418a1-3 But since the difference between the two has no name, although it has been determined that they are different and how they are so, we must use 'to be affected' and 'to be altered' as though they were the proper (*kurios*) words.

Since there is no other word, we will after all use the word "affected" for the transitions, both of them, although here he is emphasizing the difference between the two transitions.

Aristotle has been talking about two kinds of potentiality. Now he can say exactly what it meant, at the start of the chapter, that the sense is "only potential." The sense is the kind of potentiality which is already fully developed so that it is already potentially like the objects it may sense.

418a3-6 That which can perceive **is**, as we have said, **potentially such as** the object of perception already is actually (*entelecheia*).

It is unlike the object, then, **when it is being affected** by it, but **once it has been affected** it becomes **like** it, and is such as it is.

As we saw (417a20) the sense begins unlike the object but when activated by the object,

the sense has the object's form.

Aristotle has arrived at a statement about the sense-potentiality which he will apply in each of the chapters on the five senses. The power (the can-sense) is potentially as the objects are actually. (Not as the object is "actively," since when the object is not sensed, its sense-form is only potential, although the object is actually red or high-pitched.) When activated by the motion from the object, the sense comes to have the object's (now active) sense form. What this means will be worked out in chapters 7-12.

Here we have arrived at the reason why we must "begin" with the object. As he said and did in II-2 and II-4, in the order of discovery one begins with the soul-power which is the cause, then comes to the activity which defines that power. The sense is only the power (only potential). Aristotle has been showing how the sense is brought into activity by an external object. Now we must discuss the external objects which, in the order of nature are the beginning, since they give form to the sensing.

Within the chapter he has moved **from** power **to** activity and thence **to** object. He has shown that the sense is only potential, and has taken us across the two kinds of transitions, to first actuality (complete at birth), and to activity.

Chapter 6 at last takes up the objects. Afterwards there will be chapters on each sense.

So first he divides: **in themselves** // 3. **incidental**

Then he sub-divides: / \

1. special to each sense, (ideon)
2. common to all five senses (koinon)

Now he will tell us about each kind.

1) The special sense objects

418a11-16

I call special-object what cannot be perceived by another sense, **and about which it is impossible to be deceived**, e.g. sight has color, hearing sound, and taste flavor, while touch has many varieties of object
But at any rate each discriminates (*krinein*, κρινεῖν) these, and is **not deceived as to the fact that there is** color or sound, but rather as to **what or where the colored thing is**, or as to what or where it is that makes the sound.

For example, sight is never deceived that there is white, although we can err about what the white thing is, or where it is. For Aristotle a sensed white never exists alone; there is some thing that affects your organ to make white.

SEE ENDNOTE 51. ON WHY WE CANNOT BE DECEIVED BY A SPECIAL SENSE

2) The common sense objects

418a17-20

. . . while those that are spoken of as **common are movement, rest, number, figure, magnitude** (*megethos*), for such as these are not special to any, but common to all.
For certain movements are perceptible by both touch and sight.

(Hamlyn ought not to translate “megethos” as “size” here and “magnitude” in III-

4. A megethos is a sensed thing.)

Movement (Notice that movement comes first.)

Rest,

Number,

Shape (*schçma*, σχήμα), figure

Magnitude A *megethos* (μέγεθος) is a sizable thing, a thing which has “dimension”
(See *De Caelo* II-1)

These are **not** mathematical abstractions here. They are sensed. Sensibles are always particular existing things.

SEE ENDNOTE 52. SENSING ONGOING MOTION, NOT ATOMIC TIMES

SEE ENDNOTE 53. THE LIST OF COMMON SENSIBLES

3. The “incidentally” sensed objects

418a20-23 An object of perception is spoken of as incidental,
e.g. if **the white thing** were **the son of Diares**;
for you perceive this incidentally, since
this which you perceive is **incidental to the white** thing.

You look over there and see your friend, the son of Diares. What is essential to seeing is seeing the color. The light from the white **directly** affects your eyes. Seeing him comes along with seeing the white. You see him **in**directly. Aristotle says that you do **see** the son of Diares -- but this is an incidental property of seeing. Essential to seeing is seeing color.

Let us remember for later, that the son of Diares is sensed, not something inferred. He is a **sense-object** (*aistheton*), Aristotle’s third kind. Aristotle is **not** saying (as taught in Western philosophy) that you “don’t really” see the son of Diares, only the white. Just the opposite, Aristotle is listing the son of Diares as a kind of **sense-object**.

Sense-objects are what animals can sense. If the son of Diares has a dog, that dog **sees** the son of Diares, not just colors and motions, but seeing him is “incidental” to seeing the white thing directly.

418a23-24

Hence too you are not affected by the [incidental] object of sense as such.

You see him, but only the color affects your sense-organ; That he is the son of Diars does not affect your eyes.

SEE ENDNOTE 54. ON ACCIDENTAL / INCIDENTAL

418a24-25

Of the objects which are perceived in themselves
it is the special-objects which are objects of perception properly
(*kuriōs*, κυρίως), and
it is to these that the essence of each sense is naturally relative.

II-7

OVERVIEW

In modern physics light is found to have properties of both waves and particles. When a wave is considered as a particle, the particle seems to be in many locations at once. Aristotle denies particles but has something like our wave theory according to which light is spread out over a whole field.

Light has been peculiar in every kind of physics. In the modern theory, light vibrations are not vibrations **of** anything (unlike for example sound which consists of vibrations **of** air.) In modern physics it took a long time to accept that light is a wave motion but **not of anything**.

For Aristotle similarly, light is not the activity of something **else** like air. But he has a special kind of concept for this sort of thing. For him there can be an activity whose potentiality is just the on/off potentiality for that activity. Aristotle calls that sort of thing a "hexis." This concept is of special interest to us because the activity of understanding is also a hexis (III-4, 5). I will gradually explain hexis.

Aristotle calls the potentiality for light "the transparent." Since air and water don't change and yet they don't transmit color when they are dark, obviously the transparent is not the air or the water. Aristotle expresses this by saying that the transparent **can** have its natural activity (light) or **can** lack it (darkness). Light is the activity of the transparent.

But what is the transparent? A hexis is "a nature" that can be on/off, active/inactive. The transparent has its complete nature only when it has its activity which is light. So light is **not only the activity** (energeia) **but also the actuality** (entelecheia, complete existence) of the transparent.

"Hexis" is Aristotle's concept for an activity that is not the activity of something else. The active medium of seeing color is light.

The second part of the chapter from the mention of Empedocles (418b20) on, argues that a medium is necessary -- in each of the five senses. The chapter stops with the medium. How the different colors are proportioned in the eyes is discussed only in the next chapter by comparing colors to sound pitches.

TEXT

418a26-27 That of which there is sight, then, is (the) visible (ορατον).
The visible is color

Aristotle begins with what **can** be seen, the **potential** sense-objects, the **visible**. There are two kinds, color and the phosphorescents (such as fish scales) which are a different kind of "visible."

418a27-28 and also something which may be described in words (*logos*) but happens to have no name;
what we mean will be clear as we proceed.

He will explain the phosphorescents later.

418a29-31 For the visible is color, and this is that **which overlies**
what is in itself (*kath' auto*) visible -
in itself visible not by its definition (not on its own account, *logos*),
but **because it has** (*ἔχει*) in it (en eauto)
the cause of its visibility.

So three:

1. the color is the **visible** (the potential sense-object, only potential).

Color lies on top of

2. a surface that **has** in it the cause of visibility

3. the cause of visibility.

Aristotle always includes the cause even when he cannot yet show it. He starts with a compressed statement, then expands it at length.

The color lies on the surface of a thing. The surface is inherently visible but not because of what the surface itself is. Rather, the surface is visible because it **has** a third thing -- the cause of the visibility (which he doesn't name).

Readings of this sentence differ as to whether "**the cause of its visibility**" is color or

light, but the next few lines state their relationship.

SEE ENDNOTE 55. ON READING 418a29-31

418a31-418b3

Every color is **capable of setting in motion** (κινητικόν) that which is **actively** (*energeia*) **transparent**, and this is its nature.

For this reason (διόπερ) it is not visible without light, but the color of each thing is always seen in light.

While hearing needs only sound and air, seeing involves a third factor, an on/off factor, not just color and air but also the light. Color is certainly one cause of visibility since it **can move** (κινητικόν) the transparent to transmit the color, but it can do that only if the transparent is already **actively** transparent. Now he says “**for this reason**” color is seen only in light. His phrase “for this reason” indicates that, of course, light is what makes the transparent **actively** transparent.

SEE ENDNOTE 56. ON TWO CAUSES: KINETIKON AND POIETIKON

He fills in the links:

418b3-6

Hence we must first say what light is.

There is, surely, something transparent.

And **I call transparent** what is visible,

not strictly speaking (ἀπλῶς) **visible in itself** (καθ' αὐτό)

but because of the color of something else.

We don't see the transparent between here and there, rather we see the colors of the things over there. So, of course the transparent isn't visible “in itself,” but because of the color of some other thing.

418b6-9

Of this sort [transparent] are air, water, and many solid bodies;

Solid bodies, for example crystals.

for it is not *qua* water or *qua* air that these are transparent, but because there exists in them **a certain nature**

When the light is off, the air won't let the colors through. The air and water don't change, so whatever lets the colors go through or not isn't the air or the water, but a certain nature

which is the same in them [air and water] both, **and also in the eternal body above.**

The transparent is obviously also up there in the sky. For Aristotle there is no empty space so that the whole thing we see up there is a field of matter all of which looks transparent.

He calls the transparent a "nature." In another book, *De Sensu*, he adds "and a power" (439a21). The complete nature is the transparent **and** light, the potentiality when it has its activity. He calls such a potentiality/activity pair a "hexis." I will explain it further below.

418b9-10 **Light is the activity** (*energeia*) of this, the transparent **qua** transparent.

Light is the activity which defines what the transparent is. Only when it has light is the transparent **what it is**, i.e., transparent.

418b10-11 **Potentially**, wherever this [light] is, there is **darkness also.**

The transparent **can be either** active or merely potential. The air, water, or crystals remain unchanged, but the transparent is an on/off thing.

418b11-13 **Light is a sort of color of the transparent,**
 when it is made **actually** (*entelechia*, completed) transparent,
by fire, or something such as the body above;

With the presence of the sun (or fire) the transparent comes to exist actually (*entelecheia*). The light up there is not transmitting the color of anything, but Aristotle says that the light "**is**" its own "**sort of color**." Aristotle means the "brightness" (the shining) that is visible in the sky (*De Sensu* 439b2).

Aristotle said earlier that the **activity** (*energeia*) of the transparent is light. Now he has added that light is also the **actuality** (completed existence, *entelecheia*) of the (otherwise only potential) transparent. Light is both. In a hexis the potentiality has the activity as its complete nature or actuality. I say more about this concept ("hexis") a few lines further down.

418b13 What then the transparent is and **what light is** has been stated,

He summarizes:

418b14-17 i.e. that it [light] **is not fire**
nor body generally (*holos*) nor an effluence from any body
 (for it would be a body in that case also),
 but **the presence** (*παρουσία*) **of** fire (or something of that kind)
in the transparent.
 For it is impossible for two bodies
 to be **together** (*ἅμα hama*) in the same place,

Aristotle says that light is **the presence of something in something**, namely fire in the transparent. Note this odd relational cluster: the presence of one thing in another. Light is not a body but **the presence of** fire **in** the potentiality for light.

418b18-20 Light is held to be (*dokei*) the opposite of darkness, and
since darkness is the privation of such a hexis

from the transparent,
it is clear that **the presence of this [hexis] is light.**

So the transparent and light (its actuality-and-activity) is not an ordinary thing, but rather an instance of that odd Aristotelian concept, a “**hexis**.” We have to keep the Greek word because the concept does not exist in English. The word is usually translated as “disposition” (but that is also used to translate a different Greek word, *diathesis*, *Meta* V, 1022b1). In Latin hexis is “*habitus*” which means “**a having**,” or habit (sometimes oddly translated as “a state” or “a sort of state”).

Light – the hexis – is the completion. The complete nature of the transparent is the having of light. A hexis consists of a potentiality which can be on or off, can have or not have its activity. The activity is also its complete nature. (*Meta* VIII-5, 1044b33).

For example, you have the potentiality to learn to make furniture. If you have not actually learned this, in what way is there a potentiality? With our usual ways of thinking we would say that this potentiality **is** your muscles, your brain capacity for attention, and whatever other factors are necessary. Aristotle would say that these are all necessary but you have them anyway. They are not the potentiality of furniture-making. That potentiality is not an additional existing thing; it exists now only as potentiality. Similarly, suppose you can make furniture, but not well. The potentiality for doing it well is again not another existing thing, merely a potentiality. In darkness the transparent doesn’t **have** its complete existence which is light. And only as light does it act transparently.

A “*hexis*” is not exactly two things since it **is** the having of the activity. But a hexis isn’t exactly one thing either, since the potentiality can lack the active.

The fire is just in one spot, yet there is light all over. This all-over brightness-light does not travel.

418b20-22

Empedocles .. was wrong to say that light travels and arrives at some time between the earth and that which surrounds it, without our noticing it. . . . For it might escape our notice over a small distance, but that it does so over the distance from east to west is too big an assumption.

Aristotle is thinking of the dispersed light which is suddenly all over when a fire is lit or the sun comes up. **As one motion** this would be gigantic at daybreak. For him light **is** activity **at once all over**. But in the next chapter he will discuss how light also moves, bounces back, reflects and disperses. If it did not, he says, it would be dark everywhere except where light shines directly on something. But the overall activity is not reducible to these motions.

SEE ENDNOTE 57. ON DISPERSION, REFRACTION, AND ACTIVITY

418b26-419a1

It is the colorless which is **receptive** of color, and the soundless of sound. And it is the transparent which is colorless, as is also the invisible or barely visible, **as dark things** are held to be (οἶον δοκεῖ τὸ σκοτεινόν).

The transparent is of this kind, **not when it is actually** (*entelecheia*) **transparent, but when it is potentially so;** for the same nature is sometimes darkness and sometimes light.

The passage can seem to say that color **is transmitted** when the transparent is only potential, i.e. dark. But Aristotle does not say that it “transmits” when dark. Rather, the transparent can take on the color of something else because it has no color of its own.

The dark is not really “invisible;” it is also an object of sight. For example, if you want to know whether it is dark outside or not, you must open your eyes and **see** that you don’t see, i.e., that it is dark, as Aristotle says in III-2. In other chapters Aristotle also mentions the soundless, tasteless, etc.

Before Aristotle can be satisfied with the argument, he has to account for the phosphorescents since they are obviously not just potential in the dark.

419a1-6

Not everything is visible in light, but only the color proper to each thing; for some things are not seen in the light but bring about perception in the dark, e.g., those things . . . such as . . . scales,

and eyes of fish; but **in none of these is the proper color seen.** .

He postpones explaining how they are seen in the dark, but argues that what we see in the dark is not their proper color. Indeed they do have a different (greenish) color in light.

419a7-11

This much is clear for now, that what is **seen** in light is color.
For this reason too it is not seen without light; for this is just what it is to be color, to be capable of setting in motion (κίνητικῶ)
that which is actively (*energeia*) **transparent;**

Color is what can move the **active** transparent,

419a11-15

and the **actuality** (*entelecheia*, complete existence) of the transparent **is light.**

and the transparent exists only as light.

There is a clear indication of this; for

if one places that which has color upon the eye itself,
 one will not see it.

His experiment of putting something directly on the eye is meant to show that there is no vision without something that exists in between (a medium).

In *De Sensu* Aristotle has a very complex theory of the material side of the transparent medium but this is not necessary to understand him here.

SEE ENDNOTE 58. ON THE MEDIUM IN DE SENSU AND COMPARISON TO THE POTENTIAL NOUS

In fact, **the color** moves **something transparent** like the air, and **the sense-organ is moved in turn by this** when it is continuous.

Aristotle's sentence reaches right across from the thing to the sense organ. In other chapters Aristotle also has such a sentence reaching across from the thing through the medium to the organ.

419a15-18 For Democritus did not speak rightly, thinking (οἰόμενος) that, if the intervening (μεταξύ, medium), were to become **empty** (κενός), then even if an ant were in the sky it would be seen accurately; for this is impossible. For seeing takes place when **that which can perceive** is **affected by something**.

Only something actual (i.e., existing) can affect our eyes. Aristotle argues that if nothing existed in between, we would not see. As he says in the next chapter, if light didn't bounce back off everything, we would see only what is directly shined on. Oddly enough he was right that such an ant is not visible unless sunlight shines directly on it (II-8, 419b31). There is be darkness in the absence of a medium that is light all over. Outer space is indeed dark.

Democritus held that light (and everything else) consists of atoms, little particles which travel across empty space. Aristotle's *Physics* precedes the *De Anima*. To understand him here, we must already know his argument (contra Democritus and Newton) that empty space (the void, the empty) does not exist. Matter exists everywhere, but for Aristotle matter does not consist of bodies. What we think of as space in classical physics is for Aristotle a continuum of matter, somewhat analogous to the modern concept of a "field." In modern physics space has field properties; it is not mere emptiness. But Aristotle thought that the field is transparent all the way up.

SEE ENDNOTE 59. ON EMPTY SPACE

SEE ENDNOTE 60. ON COMPARISONS WITH MODERN PHYSICS

419a18-19 Now it is impossible for it [that which can see] to be affected **by the seen color**; (τοῦ ὁρωμένου χρώματος)

The seen-color is the result; it is not what affects us. We don't see it if it is directly on the eye.

SEE ENDNOTE 61. ON “IMPOSSIBLE TO BE AFFECTED BY THE COLOR WHICH IS SEEN”

419a19-23

It remains for it to be affected **by what is intervening**,
so that **something must exist between** (τι εἶναι μεταξύ)

But if it were to become empty, not only should we not see accurately, but nothing would be seen at all.

The reason why color must be seen in the light **has been stated**.

The long argument has stated **the reason why it is so**.

419a23-25

Fire is seen both in darkness and in light,
and this is necessarily so;
for the transparent becomes transparent due to it.

Seeing fire seems to need no medium since we see it in the dark. But it is just the presence of fire which makes the medium actual. Aristotle is still asserting the need for a medium:

419a25-30

The same account (*logos*) applies to both sound and smell.
For none of these produces sense perception **when it touches the sense-organ**,
but **the intervening medium is moved** by smell and sound,
and each of the **sense-organs by this in turn**.

And when one puts the sounding or smelling object on the sense-organ, it produces no perception.

He asserts the need for a medium in the other **distance senses** (sound and smell) by comparing them to color and light, and by performing the analogous experiment.

As we will see in the next four chapters, Aristotle derives much of what he says about each sense by applying what he can show in the case of another sense.

419a30-31 The same applies to touch and taste, though it is not obvious;
the reason why will be clear later.

He separately asserts a medium to the two contact-senses (taste and touch). They **seem not** to need a medium. He promises to show that there is a medium for those as well.

419a32-34 The medium for sound is air, **that for smell has no name**.
For there is a quality (πάθος) common to air and water, and
this [quality], which is present in both, **is to that** which has smell
as the transparent **is to** color.

Note the proportioning by which Aristotle thinks so often. This smell-medium relates to what has smell, as the transparent relates to color.

For even animals that live in water
seem to have the sense of smell.

Since the fish come to feed on some of the things we smell, it seems that smell goes through water as well as through air. But while for sound the medium is the vibrating air itself (or the water), Aristotle thinks that smell is not an activity of the air or the water. Rather, he infers a smell-medium in them, analogous to the transparent. The medium of smell has no name. He doesn't know what it is.

We notice that the chapter on vision ends with the discussion of the medium. The different colors are discussed in the next chapter along with the different sound pitches.

SEE ENDNOTE 62. ON THE ORDER IN AND BETWEEN THE CHAPTERS ON THE SENSES

But man and those land animals which breathe
cannot smell unless they breathe. (ἀλλ' ὁ μὲν ἄνθρωπος, καὶ τῶν

πεζῶν ὅσα ἀναπνεῖ, ἀδυνατεῖ ὀσμᾶσθαι μὴ ἀναπνέοντα.)

That is why it may seem to us that the medium of smell is the air.

The reason for these things will be studied later.

II-8

OVERVIEW

The chapter continues from II-7 (the chapter-divisions are not Aristotle's) where we were not yet told exactly how light is refracted all over, (in commenting I added something from II-8), or that the different colors are proportioned in the eyes when the medium reaches them. Those parts of his treatment of color and seeing come in this chapter by analogies with sound.

THE CHAPTER CAN BE DIVIDED INTO FOUR SECTIONS:

- 1) potential sound
- 2) what makes sound **active**,
- 3) how the medium generates a thing's "own" form
- 4) Section on voice

What Aristotle concludes about sound is familiar, but let us watch how he goes about it.

In this chapter one can learn, among other things:

- 1) Something vital about what Aristotle means by "potential;"
- 2) The difference between actuality (*entelecheia*) and activity (*energeia*);
- 3) Aristotle's "realism" which is neither "naive realism" nor "constructivism."

A sensible form is neither the form of a thing as such, nor subjective; it is the form-of an ongoing activity.

TEXT

- 1) POTENTIAL SOUND:

419b4-5 . . . Sound exists in two ways;
for there is sound which is something **in act** (*energeia*)
and sound which is so **potentially**.

Aristotle begins with the object, sound. He divides it into active and potential, and discusses the potential object, i.e. of things which **can** make sound.

419b6-8 For, some things we say do not “have a sound,”
e.g. sponge or wool, while others do, e.g. bronze
and anything solid and smooth (plain, λεία)
because they **can** make a sound,

Some things have **no potential** sound, i.e., they cannot make a sound. There is no sound of wool. Aristotle defines just what it is about a thing which enables it to have a potential sound. It has, if it is solid and has a flat surface.

At 420a2 he says that by “smooth” he means “a single surface.” For example, a metal cage will make more noise when dropped on its flat bottom than when dropped on its side.

Everyone knows that solid things clang, whereas soft, fuzzy wool doesn't, but for our further study of Aristotle this instance helps us to notice: Something “potential” is not, as some commentators say, “a lesser degree of being.” It is not something vague and mysterious, not a later effect now still hidden. Potential sound is not a sound hidden in the silent thing. Rather, Aristotle tells what **is actually** there when some activity is not ongoing, but merely potential. Here, as in other instances, we can ask: When something is potential, what does this potentiality consist in? So far he has told us that the thing's potential (“can”) sound is its actual hard surface.

419b8-9 that is they **can** produce **an active** (*energeia*) **sound between**
(μεταξὺ) **themselves and the organ of hearing**.

Aristotle often begins with a statement that has the whole cause in it, but without explaining it. To “produce an **active** sound **between** (in the medium) themselves and the organ of hearing” is the cause of the whole process. At the start, a few terms hold the space for the

many intervening terms which come later. We will soon see him inserting many precise linking terms between these broad terms: “can produce” and “active sound between.”

“*Metaxu*” (μεταξύ) means “between” or “intervening.” In the Latin language what is between is called “the medium.” The Greek word means “the between.” At the end of the last chapter Aristotle argued that we cannot sense any sensible form directly; rather a “between” needs to exist and also become active to carry the sensible form to us. In the case of sound the medium is the air itself, so Aristotle need not argue as he did in the last chapter, that the between must be made to exist **actually**, since the air is always actual. But he will again argue that there has to be an **activity** of the between, and he will show what is involved in activating the air.

2) ACTIVE SOUND:

419b9-11 Active (*energeia*) sound is always of **something** in relation **to something** and **in something**;
for it is **a blow** which produces it. **For this reason** it is impossible for there to be sound when there is only one thing;

Now he has defined active sound: Notice that it is something relational, (**two things**, both of them in **the air**, and **a blow**). Sound is a four-way relation.

419b11-13 **for** the striker and the thing struck are different. Hence the thing which makes the sound does so **in relation** to something;
and a blow cannot occur without **movement**.

Now he has added movement to this string of middle terms: active sound needs a striker and a struck, both in the air, with a blow, and a blow requires movement.

419b13-16 But, as we have said, sound is not the striking of any chance thing; for wool produces no sound if it is struck, but bronze does, and any **smooth and hollow** object. Bronze does so because it

is **smooth**,

Now, from the movement he can further define something about the potential side (the qualities of the sound-capable thing. He reiterates "smooth" (surfaced) from before. But instead of "solid" (which returns at 419b20) he gives something even more sound-capable, namely "hollow." Hollow things produce echoes that reverberate many times.

419b16-18 while **hollow** objects produce **many** blows after the first by reverberation,
that which is set in motion being unable to escape.

He gives the explanation of reverberation: "that which" (he has not said what) "is set in motion being unable to escape."

Now he will say what that is **in which** the striking occurs, which will lead him a step further:

3) THE MEDIUM

419b18-19 Furthermore sound is heard **in** air ... and water... but it is not the air or the water which is responsible for the sound; rather,

This is parallel to II-7 418b6 "It is not *qua* water or *qua* air that these are transparent. . ." Of course for sound the air **is** the medium, but only when actively vibrating.

Note that he says we hear in water.

Now he tells how the medium is activated:

419b19-22 there must be solid objects striking against each other **and against the air**. This happens when the air **remains** after being struck **and is not dispersed**.

These are refinements of the middle term; we have had that the air cannot escape; now we have a more precise link: “not escape” leads to its not dispersing. Now this, in turn, leads to the more precise cause:

419b22-25 For this reason it makes a sound if it is struck quickly and forcibly; for the movement of the striker must be too quick for the air to disperse, just as if one were to strike a blow at a heap or whirl of sand in rapid motion.

The whip is his model. It shows that the air has sound, not the solid things. **This is the sound of air itself alone**, not the sound of a thing like bronze or wood (analogous to “brightness” in II-7, which is a sort of color of the transparent).

The striking has to be quicker than the air disperses. From the trapped air he can now explain reverberation and echo which lead to one more causal middle term:

419b25-27 An echo occurs when the air is made to bounce back like a ball from air which has become **a single mass on account of a container** which has limited it and prevented it from dispersing.

Another middle term: The container makes the air into **a single mass**. Now he can make the comparison between sound and light which enables him to speak of light as refraction: Just as there is not always an echo so there is not always a beam of light bounding back. Light and sound always reflect but they are usually dispersed..

419b27-31 It is likely that **an echo always occurs**, although not a distinct one, since the same thing surely happens with sound as with light too; for **light is always reflected** (otherwise **there would not be light everywhere**, but there would be darkness outside the area lit by the sun),

Aristotle has waited with light-refraction until he can derive it from a comparison with sound echos. He develops many points by comparisons between the senses.

419b31-33 but it is not reflected as it is from water, or bronze, or any other smooth object so as to produce a shadow, by which we delimit the light.

The tree will not cast a shadow in normally dispersed light. There is a shadow only if a beam of light comes across it. Similarly, we see our reflection when the reflecting surface is smooth so that the light is kept together and returned as a beam.

419b33-35 The void is rightly said to be responsible (κυρίως) for hearing. For the air is held to be (*dokei*) a void, and it is this which produces hearing, when

In a real void, there would be no mass of air that moves. We would not hear anything. This is parallel to his argument against the void of Democritus in the preceding chapter (419a15).

Some people (*dokei*) call it the “void” although it is really the air. It is active only when:

419b35-420a2 it is moved as a single, continuous mass. But, because of its lack of coherence, it makes no noise, unless that which is struck is **smooth**. Then the air becomes a **single** mass together (ἄμα) **because** of the surface of the object; **for a smooth object has a single surface.**

So “smooth” is now further defined: If smooth, the object has **one** surface rather than many small surfaces that would send the air in different directions. From “smooth and hollow” we note that he doesn’t mean “flat” since he means a container. A single surface is necessary to maintain the single mass of air.

4) THE ORGAN

420a3-4 It is, then, that which can move air **which is single** because **continuous as far as the organ of hearing** which can produce sound.

In this sentence what makes the medium active (the **single** mass) also reaches to the organ.

As in the chapter on light, when he has shown all the causes for how the object moves the **active** transparent, he is ready to show that the medium (here the single mass of air) reaches to the sense organ.

420a4-6 **Air is naturally one with the organ** of hearing; and because this is in air, the air inside is moved when that outside is moved. For this reason the animal does not hear with every part of it, nor does the air penetrate everywhere . . .

Compared to touch which is all over the animal, sound is received only in the organ.

420a7-9 The air itself is **soundless** because it is easily dispersed; but when it is prevented from dispersing, its movement is sound.

As he does in each chapter (compare 18b26), he brings up that which lacks the sense-object, here the **soundless**, for three reasons:

- 1) The soundless is an object of sense. To sense if there is silence one must be able to hear.
- 2) The soundless is capable of taking on any sound.
- 3) The medium can be either inactive or active.

420a9-15 The air **inside the ears** has been walled up inside so as to be immovable, in order that it may accurately perceive all the varieties of movement. **That is why** we hear in water too, because the water does not penetrate into the very air which is

naturally one with the ear; When this does happen, there is no hearing;
 nor is there if the tympanum membrane is injured,
just as with the cornea of **the eye** [when it is injured].

The air in the ears must be immobile so as not to have its own vibrations; else it wouldn't pick up the thing's own characteristic form of vibrating.

Next he shows that sound is the sound-**of things**, and not just a hearing-effect in the ear. He explains that if there is a constant echo or movement in the ear, this is not "hearing".

420a15-19

Further, an indication of whether we hear or not is provided by whether there is always an echoing sound in the ear as in a horn; for [in that case] the air in the ear is always moving with a movement **of its own**.
 But **sound is something external and not private to the ear**.
 And that is why they say that we hear by means of what is **empty and resonant** . . .

What **can** receive many different forms must have no form of its own. If someone's ear has **its own** ringing, we say that the person does not hear. Aristotle rejects the already then common reductive theory that we hear vibrations. No, we hear the sound of things, wood or bronze (by means of the vibrations).

420a19-23

Is it the thing struck or the striker which makes the sound? Or is it indeed. **both, but in different ways? For sound is the movement of that which can be moved in the way in which** things rebound from smooth surfaces when thrown against it.

To which does the sound belong? At first we think he means it belongs to both, (in some way, of course it is both). Then we realize, no, he said "in different ways;" he must mean that sounding is more truly the sound of the moved **ed** i.e. the struck one. The striker is the efficient cause (the blow is like fire in II-7). He seems to say that what does the sounding is the struck,

that which “can be moved. . . ,” so it seems to be the struck which is mainly doing the vibrating. But, at last we see that the sound will belong to whichever thing has the smooth **surface**, so as to make a single continuous mass of air.

If a rod strikes a bronze gong, the gong will sound the most. If you take a bronze gong and you strike a rod with it, still the gong will sound the most. We could say it will vibrate qua struck, i.e., moved, despite the fact that it is doing the striking. So whichever has the single smooth surface does the sounding. What if both do? If one bronze gong hits another, both will give their sound. And how about two rods? - - **Aha!** Now we have arrived at what Aristotle brings up next:

420a23-26

Thus, not everything, as has been said, makes a noise when it is **struck or striking** something, e.g. **if a needle strikes another**; but the object struck must be **of even surface**, so that the air may rebound and vibrate **as a mass**.

If both striker and struck are needles, there is no sound (even though their matter as such -- metal -- does have potential sound). It shows that a surface is necessary to make the medium active as a continuous mass.

5) THE PITCHES AND THE COLORS

420a26

The differences between the **things which sound** are **revealed in the active** (*energeia*) **sound**;

“Active sound” is the characteristic sound **of some thing** (the sound of bronze or of wood). It has some particular pitch, “just as” each thing has its characteristic color. Active sound is the form of **one activity** which involves thing, medium, and organ.

Only if and when the medium is in activity, can the thing give this activity a form, and only thereby does **the thing** have an active form.

This “Aristotelian Realism” is quite special to him. He assumes neither that the things already are as we perceive them (naive realism), nor that our perceptions are subjective and just made by us (constructivism). When the medium is active, the thing can determine the form

of the medium's activity which then affects our organs and there becomes a certain pitch of sound. We find this kind of objectivity again and again in Aristotle, neither simply a copy nor subjective. If the between is active, then the bronze has "its own sound" **on that activity**.

SEE ENDNOTE 63/64. ON WHAT IS FORM AND HOW DOES IT TRAVEL

Now we come to the role of the sense:

420a27-31 for **just as colors** are not seen without light, **so sharp and flat in pitch** are not perceived without sound. These are so spoken of by transference from tangible objects; for that which is sharp **moves the sense to a great extent in a little time**, while that which is flat **moves it little in much time**.

Here we need to notice his many comparisons of the senses. Aristotle compares **three senses**, not just pitches and colors but tangible sharpness and dullness. Later he explains quite a lot about the unity of the five senses from the fact that they **can** be compared. When we come to that section, let us remember how often what Aristotle says about each sense is based on such comparisons.

420a31-33 Not that the sharp [sensation] is quick and the flat slow, but the movement in the one case is such because of speed, in the other because of slowness

The sharp and flat **sensations** are not quick or slow, just **the movements that cause them**. Aristotle said in II-5 that sensations are not movements or changes, although what brings the organ into action are movements. The **movements** are quick or slow.

420b1-4 There seems to be **an analogy with** the sharp and blunt in the case of touch; for the sharp as it were stabs, while the blunt as it were thrusts, because the one produces motion in a short time, the other in a long,

so that the one is [only] **incidentally** quick, the other slow.
So much for our account of sound.

His physical explanations are so familiar to us that we may miss **how he derives them**. With modern equipment we can measure wave lengths and frequencies of light and sound. But Aristotle has only the hypothesis that colors and pitches are due to different amounts of movement per time in the medium. By comparing them with touch he can appeal to our obvious experience of different rates and kinds of motions that make these different touch-sensations.

VOICE

420b5-6

Voice is a sound made by something with a soul;

Now voice is discussed in a long section which has no parallel in the chapters on the other senses. Only sound (not color, smell, taste or touch) is emitted to signify meaning (σημαντικὸς, 420b32). In contrast to the other senses, animals not only hear but also emit sounds to each other. So the sense of hearing includes sounds that are emitted to be heard.

One might argue that Aristotle should have discussed fire-flies in II-7 since they emit light, but Aristotle did not know that they do this to communicate. Skunks emit smell but that is to protect against other species. So the sense of hearing seems to stand alone as an inter-communicative two-way function among animals.

for nothing which does not have a soul has a voice,
although some things may be said, by way of likeness., to have a
voice,
e.g. the pipe, lyre, and any other things which lack a soul but have
variation in pitch, melody, and “speech” (διάλεκτον).
there is a likeness here because voice too has these
properties . . .

Aristotle distinguishes voice from just sounds. He will gradually show in what way the soul makes voice different from similar sounds.

But many animals do not have a voice,
e.g. those which are bloodless

Aristotle will explain below why many animals have no voice although it has a valuable communicative function. He will also explain why it is the bloodless animals that have no voice.

as well as fish among those which do have blood.

And this [in fish] is reasonable enough, since sound is a movement **of air**.

But those fishes which are said to have a voice, e.g. <those> in the Achelous,

make a sound with their gills or some such part;

but voice is made not with any chance part of the body.

In the case of fish it is clear why they don't emit sound and have no voice.

420b14.

But since everything which makes a sound does so because **something strikes something in something**, and this last is air, it is reasonable that only living things which take in air have voice.

Note again this relational cluster of sound in act: "something strikes something in something."

Animals that don't live in air don't have voices, since sound is a movement of air. Aristotle did say that we hear in water (420a12), but I think he means sound in water that originated from something struck in air.

But since voice has an important function, it is a question why animals that live in water do not have it. The answer is that even those that live in air do not have the voice as the **primary** function of taking air in. Aristotle explains:

420b18-20

For nature then uses the air breathed in for two functions;
just as it uses the tongue for both tasting and speech (διάλεκτον),

and of these tasting is **essential** . . .
 while expression (ἐρμηνεία) is for the sake of **well-being**,
so also nature uses breath both to maintain the inner warmth, as
essential
 (the reason will be stated elsewhere),
 and also to produce voice so that there may be **well-being**.

So that is why some animals don't have the voice function despite its value. It is not essential for existing, only for **well-being**. As he does so often, Aristotle makes his point by comparing two senses. The tongue serves for both tasting and speaking. Breath like the tongue is essential for life (for recognizing food), whereas voice and speech have a function only for "well-being."

420b22.

The organ of breathing is the throat,
 and **that for which** this part exists is the lung;
 for it is through this part that land animals have more warmth than
 others.
 It is also primarily **the region round the heart which needs
 breath.**
Hence the air must pass in when it is breathed in.

Aristotle knew that breathing relates to the blood. (He thought it had to do with the blood's heating and cooling (De Respir. 476b25). Now he has explained the reason why the bloodless animals are the ones that have no voice. It is because breathing is for the blood. Without blood these animals don't need the breath function. Therefore they lack the secondary function of breath, the voice.

Now he has derived what is required for voice from what is required for breath.

Breath is needed **inside** the body. This shows that the air **comes into** the body for the function of breath (the lung), not just for voice. The air entering for breath also produces the voice (when breath is held) as a secondary function.

420b27.

So, the striking of the inbreathed air upon what is called the

windpipe

due to the soul in these parts constitutes voice.

For, as we have said, not every sound made by an animal is voice (for it is possible to make a sound also with the tongue, or as in coughing);

but that which **does the striking** must **have a soul**

In sound production the striker is the active agent. The soul-and-body animal (that which **has** the soul) does the striking. This is the “we” from I-4, (408b11-15). The soul doesn’t do it; we do it with the soul. The soul is a means, a ὄν.

420b32-421a1

and there must be a certain **imagination**,

for voice is a sound with **meaning** (σημαντικὸς),

and not one merely of the inbreathed air, as a cough is; rather

Imagination is of having more of a desired sensation than now obtains or of avoiding an aversive state that is not now being avoided. Aristotle implies that animals express and communicate their needs and desires. Meaning requires imagination which can concern what is not presently the case.

In terms of function (final cause) the sense of hearing includes emitting and hearing the **meaningful sounds of voice**.

421a2

with this air the animal strikes the air in **the windpipe**

against the windpipe itself). An indication of this is the fact that but only when holding the breath;

for one who holds his breath produces the motion by its means.

Now he has explained how voice employs the body parts that the breathing function requires.

it is clear too why fish have no voice; for they have no throat.

They do not have this part because they do not take in air or breathe in. The reason for this requires separate discussion.

Since the breathing function is not possible in water, fish do not need the body-parts which the breathing function requires. (Fish cool the blood with the gills. De Respir. 476a5-10).

65. ENDNOTE ON COMPARISON OF THE SOUND AND LIGHT CHAPTERS

66. ENDNOTE: IS SOUND THE ACTIVITY LIKE LIGHT OR IS IT THE OBJECT LIKE COLOR?

67. ENDNOTE ON ENTELECHEIA vs. ENERGEIA

68. ENDNOTE ON THE ORDER IN THE SENSATION CHAPTERS

II-9

OVERALL:

Most of what Aristotle says about smell emerges from comparisons with other senses. The different kinds of smells are largely parallel to the kinds of tastes. Aristotle doesn't know what the medium of smell is. As light transmits color, something common to air and water performs the function of a medium of smell.

TEXT:

421a7-10

It is less easy to determine (εὐδιόριστόν) smell and **the object of smell** (the smellable, ὀσφραντόν), than that of those already mentioned; for it is not so clear of what sort (ποῖόν τί) smell is, as it is with sound or color. **The reason** for this [lack of clarity] is that **this sense** is, in our case, **not accurate** (οὐκ ἀριβής) but is worse than with many animals;

Aristotle begins with the **potential**, the smellable, i.e., what **in the things** can make smell, and says that he does not know what that is. He argues that it is difficult to **know** this because the **sense** is inaccurate. This implies that thinking depends on sensing. In Aristotle's view theoretical understanding develops in and from sense. Without an accurate sense of smell you cannot devise a good theory of what smell is.

421a10-13

for man can smell things only poorly, and he perceives none of the objects of smell **unless they are painful or pleasant**, because the sense-**organ** is not accurate.

We miss smells that are not strong enough to be painful or pleasant.

421a13-16 It is reasonable to suppose that it is in this way too that hard-eyed animals perceive **colors**, and that the varieties of color are not distinct for them, except in so far as they do or do not inspire fear. So too is the human race with regard to smells.

He conceptualizes the inaccuracy by comparing it to animals with poor sight. Humans smell well enough to avoid danger, just as insects see well enough to avoid danger, i.e. objects that cause fear (the desire to avoid) which comes with pain (II-3, 414b2).

Aristotle uses another comparison between the senses to define the things we smell.

421a16-22 For it seems that smell is analogous with taste, and similarly the species of flavor to those of smell, but in our case taste is more accurate **because** it is a form of touch, and it is this sense which is most accurate in man, for in the others he is inferior to many animals, but in respect of touch he is accurate above all others.

The question is **why** taste is more accurate. It is **because** taste is a form of contact (which is the same word as “touch” in Greek), like the sense of touch in which humans are the most accurate.

421a22-23 **For this reason** he is also the most prudent (*phronimôtaton*, φρονομώτατον) of animals.

This is again a comparison. We share prudence (“phronesis”) with the higher animals.

We must not just pass by this assertion. From the usual reading of Aristotle which separates thought from sense it would follow that he could not possibly have written these lines. We see here that for Aristotle the sense of touch is very much involved in our thinking, since the

fineness of our touch is **the** "reason" (διὸ καὶ) why we are the smartest animals.

"Prudence" might be read variously, but notice the word "dianoia" in the next line:

421a23-26 An indication of this is the fact that in the human race
 natural ability or the lack of it depends on this sense-**organ**
 and on no other;
 for people with hard flesh are poorly endowed for **thought**
 (**dianoia**), while those with soft flesh are well endowed.

We have already discussed dianoia (dianoieisthai) which depends on the body and dies with the body (I-4, 408a34-b5). Most human thought is dianoia (Metaphysics VI-4, 1027b23-33). This close dependence of thought on sense needs to be kept in mind for the rest of the book.

Aristotle didn't say that nothing else determines **individual** endowment for thinking, just that no other **organ** determines it. Our thinking process requires the touch organ where the senses come together. We will see its roles more exactly in Book III.

SEE ENDNOTE 69 ON COMPARING THE SENSES AND THEIR RELATION TO THINKING

He returns to the analogy between smell and taste:

421a26-29 Just as flavors are sweet or bitter, so are smells.
 But some things have a corresponding smell and taste
 (I mean, for example, sweet smell and sweet taste)
 while other things have an opposite smell and taste.

The thinking you are doing here happens **in** your sense-images. You could not agree to these comparisons if you could not have an image (a left-over sense) of these tastes and smells.

421a29-421b3

Similarly too a smell may be pungent, bitter, sharp, or oily. But, as we have said, because smells are not very distinct, as flavors are, they have taken their names from the latter in virtue of a resemblance **in the things** (καθ' ὁμοιότητα τῶν πραγμάτων) for sweet [smell] belongs to saffron and honey and bitter to thyme and such like, and similarly in the other cases.

The **potential** sense qualities of the things are what sensing puts into action. So the resemblance between the taste of honey and its smell lies in the **actual** qualities **of honey**.

421b3-8

Smell is like hearing and **each of the other senses**, in that as hearing is of the audible and inaudible, and [sight] of the visible and invisible, so smell is of the odorous and **odorless**. Some things are odorless because it is impossible that they should have a smell at all, others because they have a little and faint smell. The tasteless also is so spoken of similarly.

Again he compares the senses. The imperceptible is a kind of sense-object in each sense. The imperceptibles are objects of sense because, for example, you can sense that something is tasteless only by tasting.

After the potential objects comes the medium, as usual in his order in these chapters:

421b9-13

Smell **too** takes place through a **medium** (*metazu*, μεταξύ), such as air or water; **for** water-animals too seem to perceive smell . whether they have or do not have blood just as those which live in the air; for some of these, drawn by the smell, **seek for their food from a great distance**.

Aristotle does not claim to know what the medium of smell is. Whereas sound consists of reverberations of air, he knows that smell is not a reverberation of the air. There is no smell echo. The medium of smell is not just air since water animals come a long way for the same things that we smell. The medium isn't a vibration or activity by the air or the water themselves.

So the medium of smell is neither just air nor just water but something common in both, as he said at the end of II-7.

The word “too” in the first line is a comparison with the other senses. He has no direct observation of the smell medium.

SEE ENDNOTE 70. ON THE MEDIUM OF SMELL

421b13-18

Hence there appears to be a problem, if all [animals] smell similarly, yet **man** smells only when breathing [in] but not when instead of breathing he is exhaling or holding his breath

ὁ δ' ἄνθρωπος **ἀναπνέων** μὲν, μὴ **ἀναπνέων** δὲ

ἀλλ' ἐκπνέων ἢ κατέχων **τὸ πνεῦμα** οὐκ ὁσμᾶται,

no matter whether the object is distant or near,

or even if it is placed on the nostril.

That what is placed upon the sense-organ itself should be imperceptible is common to all animals,

The lack of sensing directly on the nose is familiar to us since it is consistent with what he has already shown in II-7 (419a11-15).

Aristotle says here that **only humans** cannot smell while exhaling or holding the breath. But later in the chapter (422a7) he says rather that all breathing animals can smell only when they breathe. He has written many volumes about the exact differences between animals, for example different species of herons and different kinds of primates. In De Sensu V he discusses many of these same issues at length and also mentions a kind of smell that only humans sense, but he does not say there what he says here. I have no satisfactory reading of the human uniqueness which he twice asserts here.

421b18-19

but the inability to perceive without breathing is peculiar to humans

(τὸ ἄνευ τοῦ **ἀναπνεῖν** μὴ αἰσθανεσθαι ἴδιον ἐπὶ τῶν ἀνθρώπων·)

this is clear from experiment.

So far he has been concerned with a difference between human and other **animals that**

breathe. Now he contrasts the human to a different group of animals, the bloodless animals of whom he says that **they don't breathe**. How do they have the sense of smell?

421b19-22 So that the bloodless animals, since **they do not breathe**
(ἐπειδὴ οὐκ ἀναπνέουσιν,)
would seem to have another sense apart from those spoken of.
But that is impossible, since **they perceive smell**;

Is their perception a different sense? The animals that don't breathe do **respond to the same things** that we smell. If the objects are the same, then it must be the same sense.

421b22-26 **for**, the perception of the odorous whether it be
foul or fragrant, is smell.
Moreover, they are evidently destroyed by the same strong odors
as man is, e.g., bitumen, sulphur, and the like.
They must, then, smell but without breathing (οὐκ ἀναπνέοντα).

Foul or fragrant are the objects. It is the object which determines what sense this is, so given the same objects, this is smell.

In the next passage and from here on, humans are just one of the animals that breathe, in contrast to those that do not breathe:

421b26-422a7 It seems that in man **this sense-organ** differs from that of the
other animals,

This time he means animals that don't breathe, as the end of the passage shows.

just as his eyes differ from those of hard-eyed animals - for his eyes **have eyelids**, as a screen and sheath, as it were,

and he cannot see without moving or raising them.
 But **the hard-eyed animals have nothing of this sort,**
 but see straightaway what takes place in the transparent.

Of course he knows that humans are not the only animals that have eye lids. Since the air would bring the smell to the animal's olfactory surfaces without the need to push air forcibly against those surfaces, Aristotle hypothesizes that animals who breathe need the forced air-flow to lift some sort of a cover over the organ. The inhaling part of breathing is what would lift such a "lid."

In the same way, therefore, the sense-organ of smell
 is in some creatures uncovered, like the eye,
while in those which take in air it has a covering,
which is removed when they breathe (ἀναπνεόντων), owing to
 the dilatation of the veins and passages.

Of course Aristotle has not found those "lids." He is using an analogy to eyelids so that he can offer a possible explanation why some animals cannot smell without breathing.

And for this reason **those animals which breathe**
 (τὰ ἀναπνέοντα) do not smell in water;
for in order to smell they must first breathe (ἀναπνεύσαντα),
 and it is impossible to do this in water.

This passage says that all breathing animals sense smells only if they "first breathe."

Smell belongs to **what is dry**, just as flavor does to what is liquid

Although we smell the dry only if it is moist, we do smell the dry, whereas to taste something we have to take the whole liquid into the mouth. (So we can safely smell things that would be poisonous to taste.)

and the sense-organ of smell is **potentially of such a kind** [dry].

The last sentence of the chapter states a major plank of Aristotle's theory of all the senses. The organ is **potentially like** its objects. In II-5 he already told us that the sense must be "potentially such as any object of perception already is actually (*entelecheia*)" (418a3-6). He said there that apart from an object the sense is purely potential (417a6-9 and b17-19). If the sense of smell were actually itself some smell-form, it could not sense all smells. We will see this clause again in more detail in the next chapters.

SEE ENDNOTE 71/72 ON "POTENTIALLY OF SUCH A KIND."

II-10

OVERVIEW:

The tasteable thing is a fluid mixture, something dry dissolved in the saliva. The tasteable thing is freshly made on the tongue. Aristotle says explicitly later that the tongue is **not the organ**; the tongue is the medium of taste. The organ is further in the body. But in this chapter he does not make this clear. We must wait until the next chapter to understand how all flesh (including the tongue) is the medium of the touch sensations, and how the tongue in addition also activates and transmits taste.

What he does make clear from the start is that taste is a special kind of touch.

TEXT

422a8-10

The object of taste is something **tangible**

(Τὸ δὲ γευστόν ἐστιν **ἄπτόν** τι)

and **this is the reason why** it is not perceptible through the medium of any **foreign** body; for **no more is it so with touch**.

"The object of taste (γευστόν, the **tasteable**) is tangible, i.e., touchable, contactable, (ἄπτόν, the same word in Greek means "touchable" and "contactable"). Like touch it is not perceptible through the medium of any **foreign** (ἄλλότριος) body (such as air or water). This might seem to say that there is no medium, but Aristotle will show that touch and taste **do** have a medium but it is the flesh itself, including the tongue, part of the living body, **not a foreign body**.

The tasteable thing is a matter-and-form thing. The tasteable thing is a tangible body dissolved in fluid.

422a10-11

And the **body**, the tasteable (γευστόν)

In the next chapter he will state his theory that **the tongue is the medium** which takes the taste-form **from** the mixture and transmits it **to** an organ which he assumes to lie further in the body. But Aristotle cannot say this here because he needs the next chapter to explain how direct contact involves a medium, the flesh including the tongue. So he discusses only the fluid on the tongue which makes something tasteable.

422a18 Nothing makes the sensation of flavor **without** moisture (ὕγρότητος), but it must have **moisture actually or potentially**, as is the case with salt.
For it is easily dissolved and acts as a solvent on the tongue.

The tasteable is either actually a liquid (a drink), or potentially soluble as our dry food becomes moist in saliva and therefore tasteable in the mouth.

422a20-31 **Sight is of** both the visible and **the invisible (for** darkness is invisible, and **sight discriminates** (*krinein*) **this too**, and further of that which is **excessively bright** (for this is invisible but in a different way from darkness). Similarly too hearing . . .
And one thing is spoken of as **invisible quite generally**, like the impossible in other cases, while another is so spoken of **if it is its nature to have the relevant quality but it fails** to have it or has it imperfectly, parallel to the footless or kernel-less. So too taste is of the tasteable and the tasteless, the latter being that which has little or poor flavor **or is destructive of taste**.

The sense is a quantitative continuum. This is Aristotle's usual mention of the imperceptible as a kind of sense-object. But in II-7 and II-8 he only showed that the medium can be dark or soundless. He didn't say explicitly that these are sense-objects. (How can we know that it is dark in the room? We do it by sight -- by opening our eyes we see that it is dark.) Here he gives the cause: "Sight is of . . . the invisible (**for** darkness is invisible, and **sight discriminates this too**)." Let us notice here again that Aristotle makes many points about one sense by comparison with the others.

Next as usual he says that the organ must be capable of receiving (potentially be) every form of that sense without actually changing.

422a34-422b3 Since the tasteable is fluid (ὕγρον), its sense **organ** (αἰσθητήριον) too must **neither actually** (*entelecheia*) **be** fluid (ὕγρον), **nor incapable** of being **made moist** (ἀδύνατον ὑγραίνεσθαι).
For taste is affected by the tasteable, *qua* tasteable.

The organ must be potentially fluid, but without itself dissolving. It must retain its own nature, and yet be capable of being made moist.

422b3-6 **The sense-organ** (αἰσθητήριον) of taste, therefore, which is capable of being made moist while being preserved intact, but which is not itself moist, **must be made moist**.

These lines seem to imply that the tongue is the organ since the tongue becomes moist with saliva without dissolving itself. But he neither affirms or denies it. In the next chapter he explicitly denies that it is the organ.

An indication of this is the fact that the tongue does not perceive either when it is very dry or when it is too moist (ὕγρᾶν).

Aristotle does not say that the tongue is the organ, only that it doesn't sense when there is too little or too much fluid. Aristotle long considered the tongue to be the organ. In several of his books on bodily parts he call it the organ. (See part 2 of ENDNOTE 73.) I cannot be sure of course, but I think that when he decided that the tongue is not the organ, he hedged his text here only just enough so that it does not contradict his final view. After explaining the touch sense in the next chapter, he can tell us that the tongue is not the organ but the medium of taste. The taste-form travels **through** the tongue to an organ located somewhere inside (423b17-20).

Now as in the other chapters (the ear cannot hear if it has a sound of its own), Aristotle makes his usual next point:

422b6-10 for in the latter case [too fluid] there is a contact with the fluid which is there first,
just as when someone first tastes a strong flavor and then tastes another, and as to sick people all things seem bitter because they perceive them with a tongue full of fluid of that kind.

The tongue's own taste in its own fluid would be like drinking something strong-tasting first, so that the second thing isn't tasted.

As usual after discussing the organ, Aristotle turns next to the different qualities (analogous to the different colors) which are proportioned at the organ.

422b10-16 The kinds of flavor, as in the case of colors, are, when simple, **opposites: the sweet and the bitter;**
next to the one the oily and to the other the salt; and between these the pungent, the rough, the astringent, and the sharp.
These are held be (*dokei*) just about all the varieties of flavor.

Now, as at the end of II-9, he ends with the sentence on becoming like the object:

Consequently, that which **can taste** is potentially such [as the taste qualities], while that which makes the sense **actually** so (*entelecheia*, complete) is the object of taste (the tasteable).

As with every sense, the sense of taste is potentially all its possible objects. The sense becomes **actually** like the tasteable (the actual new mixture with the saliva).

what is the sense-organ for that which can perceive by touch, **whether it is the flesh** (or what is analogous to flesh in other creatures), **or whether it is not**, but the **flesh is the medium**, while the primary sense-organ is something else which is internal.

Later he shows clearly that the flesh is the medium, not the organ.

Here he has stated two problems, that the objects of touch are many, and whether the flesh is the medium. Now he discusses the first in detail. What is it in the things that is tangible?

422b23-27

For every sense is held to be (*dokei*) concerned with **one pair of opposites**, e.g. sight with white and black, hearing with high and low pitch, and taste with bitter and sweet; but in the object of touch there are **many pairs of opposites**, **hot and cold, dry and wet, rough and smooth, and so on** for the rest.

So in having many contrarities, many different sense-qualities, touch seems different from the other senses.

422b27-33

There is a solution to this problem at any rate, that there are many pairs of opposites in the case of the other senses also, e.g. in vocal sound there is not only high and low pitch, but also loudness and softness, and smoothness and roughness of voice, and so on. There are other differences of this kind in the case of color too.

But **what the one thing is which is the subject** (*hupokeimenon*, *substrate*) for touch as sound is for hearing **is not clear**.

Sound is one thing which underlies both loud/soft and different pitches. What is the single underlying sensible in the case of touch?

Now he goes into the second problem:

422b34-423a2 Whether the sense-organ [for touch] is internal or whether it [the organ] is [not internal but is] the flesh directly is not settled (*dokei*) with the indication of the fact that perception occurs together (*hama*) with contact. **For**

Aristotle argues that the obvious direct contact does **not** indicate that flesh is the organ. Why not?

423a2-5 even as things are, if someone were to make a sort of membrane and stretch it round the flesh, it would communicate the sensation in the same way immediately when touched;
and yet it is clear that the sense-organ would not be in this;

If some material were wrapped around the flesh like cloth or a web or membrane, we would still sense contact through it. For example, (as Merleau-Ponty similarly argued) you can feel roughness or smoothness of a surface at the other end of a pencil. That would not mean that the pencil is your sense-organ.

423a5-6 and if this were to become naturally **attached**,
the sensation would **pass through it still more quickly.**

The web is not a sense-organ. It is not sensitive, yet the contact sensations flow through it, and would **travel even more quickly** if it were an attached part of the body. It is clear that Aristotle thinks of the touch-sensation as traveling. Since he says “still more quickly,” clearly this travel takes time.

423a6-10 Hence, the part of the body which **is** of this kind [i.e., attached] seems to be to us as the air would be if it were naturally attached to us all round; for we should then have held (*dokei*) **that we perceived sound, color, and smell by virtue of a single thing.**

and that sight, hearing, and smell were a single sense.

If the air were attached to us we would not realize that color, sound, and smell are different senses, since they would all come to us in the same place, -- i.e., at the outer edges of the attached medium. We would not know that eyes, ears, and nose are different organs at different locations inside. Like the flesh is in fact, the air-envelope would be all around the body, so that we would seem to see and hear all over, as we now have touch sensations all over the whole body.

For the many touch-contraries this is the condition which obtains. We don't know if there are different organs for different touch qualities. We feel all the different touch-sensations at the outer edge of the flesh. Since flesh of the whole body is touch-sensitive (not like an organ which is only at one location), therefore the flesh is the medium.

Now he has related his two problems and is solving them through each other. The many different touch-objects seem to us to be the objects of one sense because they all reach us through the flesh which is not the organ but the medium.

423a10-12

But as things are, because that through which the movements occur is separated from us,
the sense-organs mentioned are manifestly different.
But in the case of touch, this is, as things are, unclear;

We differentiate eyes, ears, and nose because although we receive sound, hearing, and smell through the air, we receive them at different locations. If a bag of the air were attached to us, we would receive all three sensibles at the outer surface of the bag. In that case we would think that color, sound, and smell are one sense. Aristotle says that this is exactly why we think the many touch-senses are all one sense. Different organs for the several touch qualities may be hidden by the attached medium.

SEE ENDNOTE 74. ON MANY TOUCH-CONTRARIETIES

The attached medium is not made of air, as he now explains:

423a12-13 **for** the ensouled body **cannot** be composed of air or of water,
for it must be something **solid**.

Because the attached medium is part of the body, it has to be made of something solid rather than air or water which are the usual media.

423a13-16 The remaining alternative is that it is a mixture of earth **and** these
[i.e. earth plus air and water],
as **flesh** (and what is analogous to it) tends to be;

The **attached** medium can only be a mixture, since according to Aristotle only mixtures are solid bodies. Water, air, and fire are not solid, and completely dry earth falls apart into a powder. (*De Sensu* V, 445a23, *De Gen & Cor* 330b23, 335a1).

hence, the naturally adhering **medium** for that which can perceive by touch has to be a body,
and perceptions come **through it**, manifold as they are.

So he thinks he **has shown** ("hence") that the attached medium which explains the many touch qualities, must be the flesh.

423a16-18 That they are many is made clear by touching with **the tongue**;
for it perceives all tangible objects with the same part as that with
which it perceives flavor.

The tongue senses not only taste but also hot and cold, hard and soft, rough or smooth. This shows that many different sense objects can indeed be perceived through one attached medium, (in this case, the tongue).

423a19-21 If, then, the rest of the flesh perceived flavor, taste and touch

would be held to be (*dokei*) one and the same sense, but as things are they are two, because they are not interchangeable.

If all the flesh were like the flesh of the tongue we could sense taste and touch all over. In that case we would not know that they are two different senses with two interior organs. Similarly we don't now know whether the different touch qualities are different senses with different organs further inside.

423a22-423b1

One might raise a problem here. Every body has depth, and that is the third dimension, and if between two bodies there exists a third it is not possible for them to touch each other. That which is fluid or wet is not independent of body, but must be water or have water in it. Those things which touch each other in water must, since their extremities are **not dry**, have water between them, with which their extremities are full. If this is true, it is impossible for one thing to touch another in water, and similarly in air also (for air is related to things in it as water is to things in water, although we are more liable not to notice this, just as animals which live in water fail to notice whether the things which touch each other are wet).

Even when two things seem to be touching (in contact), there will be some water or air on their surfaces. **So contact has to go through something anyway.**

423b1-2

Does, then, the perception of everything take place similarly,

Do all sensations travel through a medium?

423b2-6

or is it different for different [senses]
as it is now held (*dokei*) that taste and touch act by contact, while the other senses act from a distance? But this is not the case; **rather we do perceive the hard and the soft through**

something other also,

just as we do that which can sound, the visible, and the odorous. But the latter are perceived from a distance, the former from close, and for this reason the fact escapes our notice; since we perceive everything surely through a medium but in these cases we fail to notice. Yet, as we said earlier, even if we perceived all tangibles **through a membrane** without noticing that it separated us from them **we should be in the same position as we are now when in water or in air**; for we suppose that we touch the objects themselves and that nothing is through a medium.

We would not notice if touch had to travel through cloth or a membrane. In air and water when we seem to touch a thing directly, we do it through something between. Similarly, we don't notice that the flesh is between the thing and the organ. Aristotle says that **all** sense-forms travel through **something else**, i.e., a medium.

423b12-17

But there is a difference between the object of touch and those of sight and hearing, since we perceive them because **the medium acts (ποιεῖν) on us**, while we perceive objects of touch **not through the agency of** the medium **but together (hama) with the medium**, like a man who is struck **through** his shield; for it is **not that the shield is first struck and then strikes the man**, but what happens is that **both are struck together (hama)**

SEE ENDNOTE 75. ON HAMA

So the contact-sensation travels through its medium like the other senses, but the flesh medium (and the film of air or water) function in a different way than the media of the distance senses. In the latter, the media are affected, and separately affect us **in turn**. It is not the shield that hits the man. The impact travels through the shield; it is not an action of the shield. It is not like the air which first reverberates and then, in turn, moves the ears. Similarly, the flesh is not first hit and then actively hits us in turn. Rather, the touch organ and the flesh are affected **together**. The impact travels **through** the flesh to an organ located deeper in the body.

Now he states the conclusion:

423b17-20 Universally (*holôs*), **just as** air and water
 are to sight, hearing, and smell,
 so the flesh **and the tongue**
 are to their sense-organ as each of those is.

Note that in this spot Aristotle says explicitly that **the tongue is the medium of taste, not the organ.**

His conclusion is: just as those are **the medium for** sight and hearing, so the flesh (including the tongue) is **the medium of** touch, not the organ.

423b20-23 And neither in the one case nor in the other would perception come about when contact is made with the sense-organ itself, e.g. if someone were to put a white body on the surface of the eye. From this it is clear that that which can perceive the tangible is internal.
 For then the same thing would happen as in other cases; for we do not perceive what is placed on the sense organ but **we do perceive** what is placed on the flesh.

Now in this argument Aristotle can use what at first seemed not to apply to touch. Since flesh **is in contact** with the thing **and yet we do sense**, therefore flesh cannot be the organ.

423b26 **Hence the flesh is the medium** (*μεταξύ*) for that which can perceive by touch.

SECOND PART OF THE CHAPTER

As in the other chapters, after medium and organ Aristotle next discusses the various qualities, such as the pitches or colors.

423b27-29

It is **the defining qualities** (διάφορον) **of body, qua body**, which **are tangible**. The qualities which I speak of are those which define the elements, **hot and cold, dry and fluid**, of which we have spoken earlier in our account of the elements.

A body could be defined in many ways, for example as a professor or a stone, but as considered just “qua body” it is defined in terms of these four qualities.

Aristotle is referring to *De Gen and Cor*, where he **defined** each element by a pair: hot and fluid (air), cold and fluid (water), hot and dry (fire), cold and dry (earth).

All four touch-qualities are also what bodies are made of. Color and sound do not constitute a body. They are **only potential** in bodies. Bodies have no active color in the dark, and there is no sound in bronze unless it is struck. In contrast, the touch-sensibles **are** what bodies actually are, a mix of some ratio of hot-cold and fluid-dry.

This must not escape the reader. In Aristotle’s view touch-sensing proportions and defines the concrete qualities that define bodies. In the usual modern view sensation is something extra, so we might miss the fact that for Aristotle animal sensing is an activity in nature. The sensible (touchable) qualities **define the elements**. And, for Aristotle, hot, cold, fluid, dry are not just “qualities,” but forces. In a body the hot holds the other three together. Every body is a mixture of these four, and the degree of a body’s softness or solidity depends on the ratio of its mixture. In Aristotle’s view bodies **are** their **contactable i.e., touchable qualities**. This view will be important in a number of ways in the rest of the *De Anima*.

From his concept of “mixture” Aristotle derives the degree of solidity. From their solidity he derives their definite extremities. Fluids have no definite limits which enable them to “contact” each other without merging. Bodies properly “touch” only when their extremities come “together” without merging. By touch we also sense the lesser tangibility of fluids and wind which do not have definite limits.

Again I emphasize that in Greek “touch” and “contact” are the same single word. In English usage the word “touch” refers to sensing, whereas “contact” is used for inanimate things, but this distinction is foreign to Aristotle’s text. In using the two different words we happen to have in English, translators naturally use them as fits our linguistic habits. But we have to be on guard lest we impose our modern view that perception is an extra, that what is “real” is explained only by inanimate qualities. For Aristotle nature and the universe are not

exclusively inanimate. In the De Anima from the characteristics of life he develops concepts which he considers **basic** to nature. For Aristotle, living and perceiving are as natural as elements and heat, and they are studied within natural science. Aristotle builds perception in as a major activity in the order and proportions of nature.

Of course, when inanimate bodies touch they don't perceive **each other**, but their contactability without merging depends on their ratio of heat energy to cold, and dryness to fluidity, and these are what the sense of **touch contact** perceives. Whichever English word is used, we need to think the other word as well.

SEE ENDNOTE 76. ON SOLID = TOUCHABLE BODIES

423b30-424a4

Their sense-organ, that of touch ("contact"),
in which the sense called touch (i.e., "contact") primarily resides,
is the part which is potentially such as they are.

For perceiving is a kind of being affected;

At the end of II-5 Aristotle said that we have to use the word "affected" for "coming into act," although when something comes to enact its own nature this is not the usual kind of affecting. As he explained in II-5, coming into act is not a change. But it can require ordinary affecting **as well**. For example the light affects a change in the eyes and thereby activates (does not change) the potentiality to see every color.

424a1

hence, that which is itself **in act** (*energeia*) makes that part like it,
which is potentially already so.

Hamlyn, Ross and Hett should not substitute "actual" (*entelecheia*) where Aristotle says "in act" (*energeia*). They would not wish to have Aristotle say that the flesh actually becomes hot or hard when it touches something hard. Like the eyes and ear, the flesh is affected by the sensible things but thereby becomes **active** so as to sense every hot/cold and hard/soft without itself coming into the actuality (complete existence) of being these. The sensing does not actually become hot or cold, rather it actively registers how much an object is **hotter** or **colder**.

For this reason we do not perceive anything which is equally as

hot or cold, or hard or soft, but rather what exceeds these,

But how can the touch organ maintain its own composition while still being made active (but not changed into) the thing's hot/cold and fluid/dry? He explains this:

424a4-7 the sense being **a broad mean** (μεσότητος) between the contraries (hot/cold, fluid/dry) in the objects of perception.
 And that is why it discriminates (κρινεῖν) the objects of perception.
 For **the mean** (*meson*, μέσον) can discriminate (κριτικόν);
for it becomes to each extreme in turn the other extreme.

For example, an average-sized person is **taller-than** some people and also **shorter-than** others, **without changing**. A point on a line **discriminates** between the two segments. Although the point doesn't change, it is to each segment the start of the other segment. A mid-point creates a proportion between the two segments. On a weighing scale the balance point measures all other weights. All quantities can be expressed as deviations from a mean.

Aristotle says that the solid but pliable flesh is a mixture that is just at the mean between hot and cold, and between fluid and dry. Although staying the same, the mean becomes the **warmer** one when something colder affects it, and the **cooler** one, when the other thing is hot. So it comes to have the sensation of hot when the object is hotter, and vice versa.

Within a middle range the internal touch-organ maintains its own temperature and consistency, and senses only the ratio by which the object differs from it. So, the flesh and the touch-organ do **not become** what the thing actually is; rather they are **active** in discriminating it by becoming its contrary although staying at the mean (where the ratio of cold to hot is equal).

Notice that the organ (made of flesh) defines the touch qualities, **not vice versa**. The "hot" in things is defined as a "touchable" sensible quality. The more pleasant word "tangible" hides the (to us jarring) fact that Aristotle **defines** physical and chemical bodies in terms of qualities which he defines as touchable. Of course he doesn't think stones and metal perceive each other when they touch, but they consist of perceptible factors. The sense organs provide the proportions that define the sensible qualities. We might assume that orderly relations exist just alone in nature, and perception is explained by unperceived factors. But Aristotle explains bodies by their "**tangible**" (perceptible) qualities.

SEE ENDNOTE 77. ON MEDIUM, MEAN, AND BROAD MEAN

424a7-10 And **just as** that which is to perceive white and black **must be neither of them actively (*energeia*, ἐνέργεια)**, although both potentially (and similarly too for the other senses), **so** in the case of touch that which is to perceive such must be neither hot nor cold.

Although in this different way (by being in the middle), the touch sense is like the others, potentially all degrees while itself neither hot nor cold (i.e., neither more hot than cold, nor more cold than hot).

424a10-16 Again, **just as** sight was in a way of both the visible and the invisible, and just as the other senses too were similarly concerned with opposites, **so** too touch is of **the tangible and the intangible** (ἀνόπτου); and the intangible is that which has to a very small degree the distinguishing characteristic of things which are touchable, **as** is the case with air, **and also** those touchable things which are **in excess, as are those which are destructive**.
The situation with respect to each of the senses, then, has been stated in outline.

The perceptible is a range, a quantitative continuum. Aristotle is building up to the next chapter (he did not have chapter breaks) where his argument depends on the fact that beyond the middle range the sense-organ is disrupted and hurt, or senses nothing. This is because the sense **is** a proportion, as he will now show.

II-12

OVERVIEW

Aristotle has not yet discussed just how organs manage to take on a sensible form from a medium. For example, in the case of sound he showed only that the air is continuous with air encased in the ear, but did not say how a thing like the ear could potentially enact all the forms it can hear, while being actually none of them. He shows it in this chapter.

The chapter says that the sense **is** a proportion in the sense organ, and can therefore receive proportions, **just as** a string instrument is tuned by **proportions between the strings**, so that its strings **can** be plucked to enact all possible melodies without any change in the lyre's own proportions between the strings.

TEXT

The chapter begins with a jump to the universal level from the five senses we have discussed.

424a17-20 Universally ("*katholou*"), **with regard to all sense-perception**, we must take it that the sense is that which can **receive perceptible forms without their matter**, as wax receives the imprint of the ring without the iron or gold,

The metaphor is again (as in II-1) the seal ring which presses its pattern on the wax. The shape on the wax will be the same regardless of whether the ring is of gold or bronze. The wax leaves the matter of the ring and takes on only the form.

The next sentence reiterates in a more intricate way that the sense does not sense what the things are (gold or bronze), but does sense the kinds of sensibles, i.e. color, sound, smell, taste and touch.

424a20-24 and it takes the imprint which is of gold or bronze,

but not qua gold or bronze. Similarly too in each case, the sense is affected by that **which has color or flavor or sound,**

i.e., the things

but by these **not in so far as they are what each of them is spoken of as being,**

It is not qua being a ring, or a plant, or a shirt that it has a given color or makes that sound

but in so far as they are of a certain kind and

The phrase “of a certain kind” refers to what makes things potentially seen or heard. They are of some sensible kind

424a24

in accordance with their proportion (κατὰ τὸν λόγον).

Vague translations of “logos” such as “principle” or “account” will not do here. The translation needs to be “proportion.” A few lines further down Aristotle likens this “logos” in sense-organs to the tuned strings of a lyre. That leaves no doubt as to what “logos” means here. When we sense the sensibles we sense their **proportion**.

SEE ENDNOTE 78. ON LOGOS

The primary sense-organ is that in which such a potentiality resides. αἰσθητήριον δὲ πρῶτον ἐν ᾧ ἡ τοιαύτη δύναμις.

The “**primary**” sense-organs (e.g., eye, ear, nose) are where the sensations are first made. This is in contrast to the “**ultimate**” or “last” sense-organ (*eschaton*, ἔσχατον) which is the touch organ as the organ to which the other sensations are conveyed to it (III-2, 426b16 and III-7, 431a19), and where they terminate.

The relation between a sense and its sense-organ is being clarified here. The organ is the means, **by which** (ᾧ) there is sensing. The organ is the instrument, the matter-and-form. The sense-power is part of the soul, the capacity to function and also the form-of body (here the form of the sense-organ). As Aristotle said in II-2 (414a5), “that by means of which we sense” can be said to be either just the soul, or the soul-and-body combination.

424a25-26 These are then the same,
 although **what it is for them to be such** is not the same.

Aristotle often says that a single concrete thing has different modes of being, i.e., it can be defined in different ways. If you point at me, “this” is a body and also a professor. If you point at an eye, “this” is both the sense of sight and the sense-organ. Now he will differentiate the two ways of defining this:

424a26-28 **For the instrument** which perceives (αἰσθανόμενον) must be a particular extended magnitude (*megethos*), while what it is **to be able to perceive** (αἰσθητικῶ) and **the sense** (αἴσθησις) is surely not a magnitude but rather **a certain proportion** (*logos*) and potentiality of that thing.

The **organ** is a three-dimensional thing (“a magnitude,”) while the **sense** is not, but is rather the capacity for functioning.

SEE ENDNOTE 79 ON AISTHETERION.

A “magnitude” (*megethos*) is a sizable thing (not an abstract mathematical quantity, and not a quantity as in the *Categories*). It is a thing, like an eye, a nose, or a rock.

SEE ENDNOTE 102. ON MEGETHOS

He concludes that the sense is a proportion or ratio (*logos*), and a power or potentiality **of** that extended thing.

424a28-31

It is clear from all this too why excess in the objects of perception **destroys** the sense-organs (for if the movement is too violent for the sense-organ, **its proportion (logos) is destroyed** -- **and this we saw the sense** (αἴσθησις) **to be** --
 ἐὰν γὰρ ἢ ἰσχυροτέρα τοῦ αἰσθητηρίου ἢ κίνησις, λύεται ὁ λόγος τοῦτο δ' ἢν ἢ αἴσθησις

How is this “clear from” what went before? Aristotle has often told us that excess is destructive of the sense, but now he gives the reason **why**. Excess of brightness or sound volume or heat destroys the proportion, and the sense **is** a proportion. This is the key to a great many questions.

Because “the sense is a proportion (logos),” **“that is why** excess destroys...” Clearly we have to read “logos” as proportion.

424a31-32

just as the **consonance** (*sumphōnia*, συμφωνία) and pitch **of the strings** are destroyed when they are struck too violently. ὥσπερ καὶ ἡ **συμφωνία** καὶ ὁ τόνος κρουομένων σφόδρα τῶν χορδῶν.

In the case of a musical instrument, plucking or banging too hard disrupts the “tuning,” i.e., its proportions. It does not destroy the instrument; only the proportions are disrupted. The length and tension of the strings changes slightly so that they no longer have their exact relationships to each other.

A “consonance” (*sumphōnia*) also means a chord, a harmonious together-sounding.

The lyre with its strings is a concrete extended thing, of course, but **its capacity to have melodies played on it consists of the proportions between the strings**. The lyre and the string-proportions are one and the same thing, but with different “modes of being,” i.e., the concrete thing includes the wood and string material, its shape, the lengths and tensions of the strings. On the other hand, the capacity to play a tune consists not in the strings or even their lengths and tensions, but only in the proportional relations between them. On a much larger instrument all those material factors will have different quantities, but the proportions will be the same.

On tuned strings you can play **every and any** tune. We recall Aristotle saying so often that the sense-organ must be capable of (be potentially) all the sense-objects while actually being none of them. But until now he didn't offer an example. How could anything be like that -- potentially every kind, actually none of them? Now we have the tuning proportions of the strings on a lyre; they are potentially every tune, actually no tune at all.

Exactly how is a lyre able to play any tune, while itself being none of them? It is because the strings are tuned, and tuning is a system of proportions. Let us see if we can make it clear to ourselves, why proportions work in this way.

One form (one tune) is not the whole system of proportions. A form is rather "in accord" (*kata*) with it. Here is the difference:

The proportion consists of relations along the whole range, all notes or all colors in relation to each other. **A form is** some particular pattern within that whole proportion, or as he says, "according to" (*kata*) the proportion-system, for example one melody, or even one note, say the "D" above "middle C." The "D" can be defined and played only on the system of proportions by which the strings are tuned. Distinct sounds do not come first alone, only later being put into relations with each other. A "D" **is** the sound that is one notch above "middle C," which is the center of our system of octaves. **In the instrument every single sound is located within a proportioned system of its relations to all other sounds.** This system stretches indefinitely up and down, even if the range of the given instrument happens to be just a few octaves.

The system of proportions is provided only by the organ. A given air vibration is potentially a certain sound which means that when it is heard the organ will receive is as having certain proportions, certain relations to other sounds. But without the organ it would not have these.

Someone might grant all this, but still find it a fanciful idea that sensing, like tuning, is a proportioning. But we can recognize that something basic is involved, considering how the idea has continued. For example, Hume made only one exception to his rule that "all ideas come from impressions." He said that having seen two shades of blue, one can imagine the shade in between, even if one has never seen it. Kant took this over as his second "Category," the intensity of sensations as quantitative relations. It is a long-lasting idea that sensations come in gradations of intensity which can be measured by mathematical proportions. So a given sound is not only this one sound; a single pitch is a certain proportional relation to all other notes.

We might think that every sound has quantitative relations to other sounds without any hearing, measuring, or thinking activity. Aristotle calls that character of things "potential."

Proportions come from the proportioning of the sensing activity.

Of course, Aristotle is not imagining that sense-organs have strings which someone tunes regularly. Rather, the idea of proportion (or ratio) is a basic way Aristotle looks at the order in the universe. We notice that he is constantly saying “just as ..., so.....” In III-4 he will discuss how understanding arises from sense, and it will then be vital to recall that the sense is a proportion.

Proportions are such a key concept for Aristotle because proportions are separable from things. Let us see what this means: The proportions or ratios on a given instrument are not limited by the physical construction or size of that instrument. The instrument is made in accordance with the proportions. It is characteristic of proportions that they can be separated, copied, and repeated on some other thing. For example: How is it possible that a little flat photograph is a picture of you? It is because the proportions of eyes, ears, nose, and the proportion of the width and length of the face are -- the proportions of your face.

Let us not take this lightly. We just assume that there can be pictures of things. How can your face appear on a piece of paper? We have to stop and let it come home to ourselves, that pictures are possible only because of proportions. A picture is a group of proportions that have traveled. Proportions (ratios) are inherently repeatable elsewhere. They are separable from that of which they are the proportions.

It is due to this characteristic of proportions, that a sensible form can come to be separable from the thing and can travel -- i.e., can become the form of something else.

For example, a recipe is a system of proportions. It says 2 pounds of tofu and ½ teaspoon each of four spices, but of course you know you can use one pound and half that much of each spice. The recipe is independent of the particular stuff in your kitchen and it is separable from any one set of numbers.

A melody can be played in many keys -- it does not consist of certain notes. It is separable from the notes. Yet, if you untune the strings, the melody cannot be played at all.

Aristotle thinks of the sense-organ as active in making the proportional interrelations between the colors, and between the sounds. The organ has the system of proportions. One thing has only one proportion. In this way Aristotle can explain how an organ might receive a separable form or pattern without the thing, just the proportion. Receiving one tune does not change the tuning. Receiving a single proportion does not change the system of proportions in the organ.

A sensible form is inherently a set of proportions; this is why it is separable, why it can

travel, why it can become the form also of something else (first of a medium, then of the organ). So let us not just airily say that a form is separable from matter, that it can somehow travel, and be received. Rather, **a form is** what can be in many places, what can be separated from one thing and reproduced in another **because** it is a proportion or a set of proportions.

424a32-424b3

It is also clear why plants do not perceive, although they have a part of the soul

and are affected by tangible objects; for they are cooled and warmed.

The reason is that **they do not have a broad mean** (μεσότης), **nor a first principle** (*arche*) **of a kind such as to receive the forms** of objects of perception;

rather they are affected by the matter as well.

Although they can be affected by the tangible qualities, the plants lack the active “broad mean” (μεσότης), i.e., the system of proportional relations. Therefore the plants cannot take on a relation to a mean, so they cannot receive a separated form, only form-and-matter. They are heated by heat and frozen by cold, but cannot receive just proportions alone.

424b3-8

Someone might raise the question whether that which cannot smell might be affected by smell, or that which cannot see by color; and similarly in the other cases.

If the object of smell is smell, then smell must produce, if anything, **smelling** (ὄσφρησις);

hence nothing which is unable to smell can be affected by smell

(and the same account (*logos*) applies to the other cases),

What is translated as “the object of smell” is in Aristotle’s words “the smellable.” Aristotle’s word “the sensible” is translated throughout the book as “object of sense,” (Similarly Aristotle’s the hearable, seeable.) **The sensibles activate what can sense.** The smellable is always some existing thing, but it activates the nose qua smellable. **Considered qua hearable or smellable,** things can affect only what can have the **activity** of **hearing** or **smelling**.

or the water?

424b14 Will those other sensible objects too, then, affect them?

This is not the same question as the one we settled above. Now Aristotle asks whether bodies can be affected by hot and cold and by taste (and smell) because these sensibles can in fact affect bodies that do not sense the heat or the smell.

424b14-16 Or is it the case that **not every body** is affected by smell and sound, and those which are affected are **indeterminate and inconstant, like air (for air smells as it has been affected)**?

The media elements (air and water) hold no determinate shape. Water has the shape of the cup or of the ocean-bed. The air takes on the shape of the room; it has no solid limits such as would keep out heat or smell. **This is why air and water are media of the distance-senses.** The air can get foul, or take on the smell of the flowers or the cheese. Is this then a case of smelling?

424b16-17 What then is **smelling** apart from being affected?

If air can take on smell, is it then like a sense-organ? If the air smells, is that the same thing as when animals smell the air?

424b17-18 Or is smelling also **perceiving**,
 whereas the air when affected quickly becomes **perceptible?**
 ἢ τὸ μὲν ὁσμᾶσθαι αἰσθάνεσθαι, ὁ δ' ἀὴρ παθὼν ταχέως **αἰσθητὸς**
 γίνεται;

The fluid media are quickly affected by what we sense. Here again we can see that by “a perceptible” (translated “an object of perception”) Aristotle means neither simply the thing nor

only our taste or smell split away from the thing. It is rather **the thing** considered **qua smellable**. Now he distinguishes the smellable from the sense-activity of smelling.

In modern science sensing is rendered as if it were the being affected (with “consciousness” as something added on -- as if the sensing can be understood as material events that would not inherently have to include that separately conceived thing we call “consciousness.”

Some translators add the word “conscious” or “aware” or “an observing of,” but it falsifies Aristotle’s view to impute a separate term. No such term appears in the text. The modern concept assumes a separate entity, “consciousness,” which can be added to events that are conceived only materially, as if they were complete without what Aristotle calls “sensing.” For Aristotle sensing is an essential life activity of animals, how we move, feed, and interact in midst of things and other creatures. This cannot consist of mere structural events inside the body with a separate “consciousness” added to them. A merely observing consciousness added to De Sensu would not constitute perceiving. His contrast here is between **sensible** and **sensing**.

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150. On How Much Is Linked in the Chapter

Chapter 13

151. On Touch Is the Terminus of the Delaware Anima

Endnotes

Book I

1. On the Terms in 402a1-11

Τῶν καλῶν καίτιμιόν τὴν εἶδησιν ὑπολαμβάνοντες, μάλλον δ' ἑτέραν ἑτέρας ἤκατ' ἀκρίβειαν ἤτῳ βελτιόνων τε καὶ θαυμασιωτέρων εἶναι, δι' ἀμφοτέρω ταῦτα τὴν περιτῆς ψυχῆς ἱστορίαν εὐλόγως ἂν ἐν πρώτοις τιθεῖμεν.

δοκεῖ δὲ καὶ πρὸς ἀλήθειαν ἅπασαν ἢ γνώσις αὐτῆς μεγάλα συμβάλλεσθαι,

μάλιστα δὲ πρὸς τὴν φύσιν·

ἔστι γὰρ οἷον ἀρχὴ τῶν ζώων.

ἐπιζητοῦμεν δὲ θεωρῆσαι καὶ γῶναι τὴν τε

φύσιν αὐτῆς καὶ τὴν οὐσίαν,

εἶθ' ὅσα συμβέβηκε περὶ αὐτήν·

ὧν τὰ μὲν ἴδια πάθη τῆς ψυχῆς εἶναι δοκεῖ,

τὰ δὲ δι' ἐκείνην καὶ τοῖς ζώοις ὑπάρχειν.

“**Insight**” (εἶδησιν, line 1)

and

“**consider**” (θεωρῆσαι, theorein) line 7, fourth line above:

“Theorein” can refer to “considering” any topic but it includes the highest kind of contemplation (θεωρία, Meta XII- 1072B24). At the end of the *Ethics*, Aristotle says that “self-sufficiency belongs most to contemplating (theorein).” Then he says: “Those who **have insight** (εἶδησιν) will have more pleasure than those who inquire” (1177a). In the first sentence of the *Metaphysics*, usually translated “All human beings by nature desire to know,” the word for “know” is insight. Πάντες ἄνθρωποι τοῦ εἰδέναι ὀρέγονται φύσει.

For more on theorein see 408b22-27 in I-4, ENDNOTE 46 in II-5, and ENDNOTE 117.

γνώσις and γῶναι see ENDNOTE 102 IN III-4.

“dokei” (δοκεῖ)

“Dokei” appears near the start (fourth line), but why? How can it be uncertain that “an acquaintance with the soul makes a great contribution to the truth of **everything?**” How can **any** topic fail to contribute to the truth of everything? What is special, and not certain, about the soul in this respect? Aristotle alludes to the ancient view that the soul **is** in a certain way **all things**. In the next chapter he will mention this long held view. Plato also said “The soul is akin to **all things**” (*Meno*). So it is quite appropriate to state this very big idea tentatively. Later in III-4 and III-8 Aristotle will give his own well-differentiated version of the way in which “the soul **is** all things.”

“Dokei” appears again near the end of this passage, since people believe (dokei) that the soul can be affected. Therefore Aristotle for the moment considers **that there might be** affections (pathe) peculiar just to the soul as such.

“arche” (ἀρχη)

Arche (ἀρχη, line 6) means “source” or “principle.” It might require much investigation and thought to determine what the arche of something is, but Aristotle always means something which can be sensed or understood directly, and which is the source of other things.

“living thing” (ζῶον):

The word “ζῶον” can mean either “animal” or “living thing.” Obviously here it means the latter. It has the latter meaning also, for example, when Aristotle says: “We hold that God is a living thing, eternal and most good.” φημὲν δὴ τὸν θεὸν εἶναι **ζῶον** αἰδίου ἄριστον (*Metaph* XII-7, 1072b.28). The theos or nous of the universe is alive, but is certainly not an animal; “animal” is defined by having sensation and a body with sense-organs. In this widely discussed chapter many commentators and translators miss Aristotle’s elegant beginning with its systematic divisions and subdivisions because they translate “ζῶον” as “animal”.

“substance” (οὐσία ousia):

I think one should not translate ousia as “essence,” as Hamlyn does in its first three occurrences here, and surely not if one translates the same Greek word as “substance” just a

few lines further and in other places, especially at the start of II-1. Then the English reader cannot learn its use, and cannot follow how Aristotle begins this science here and again in II-1.

I will comment on Aristotle's use and meaning of "substance" in ENDNOTE 2 after the word appears a three more times.

"nature" (φύσιν)

A natural thing's nature determines its kind of motion and growth (Meta V, 4, 1014b18). For Aristotle a natural thing (a rock or an animal) has its own way of moving or growing. Not every substance is a nature. The prime mover is not a nature, since it does not move or grow.

"attributes" (συμβέβηκε, symbebeke):

One kind of "properties" are "affections" (πάθη, pathe). and Aristotle further subdivides within these. Aristotle says: "of these (properties), **some** are held to be (dokei) **affections** peculiar to the soul."

By translating pathe as "properties" here and at 403a3, Hamlyn loses the connection to Aristotle's mention of "pathe" at 403a10 where he does translate pathe as "affections." Hamlyn obscures the fact that for Aristotle there are not only passive "affections," but also active kinds of properties, e.g., habits and powers for activity. Aristotle's usual distinction between active and passive properties (*Categories* 8) will be important for understanding what Aristotle means by "soul," since he means just the active attributes, i.e., what he calls "habits" and "powers." Those are the soul as such, and will all be included in the *De Anima*. This is the dividing line between what the *De Anima* will include, and what it will exclude. If there were pathe of the soul as such, the *De Anima* would include them, but it will turn out later that there are no passive properties of the soul as such.

2. On Substance 402a8-23

Three mentions of "substance" (οὐσία) so far:

- (a) "First . . . we must determine . . . whether [the soul] **is a . . . substance** . . ." (402a23)
- (b) "those things **the substance of** which we wish to ascertain" (402a14)

(c) “we want to ascertain **the substance of** the soul,” (402a.8)

Aristotle will begin his formal treatment in Book II-1 by showing that a living body **is a substance**.

The above three uses of “substance” (οὐσία) all refer to the **whole** living thing. One must not read “substance” as if it were a more basic part inside a thing. It can seem so, because:

a) the whole individual living thing **is a substance**,

but also

b) the soul is **the substance of** the living thing. (402a.14)

“**things of which** we wish to ascertain the substance (οὐσία)

περὶ ὧν βουλόμεθα γινῶναι τὴν οὐσίαν.)

And also, he said we want to ascertain

c) **the substance of** the soul,

(as he said at the start, 402a.8 γινῶναι τὴν τε φύσιν αὐτῆς καὶ τὴν οὐσίαν.)

In the Western philosophical tradition “substance” has usually denoted a more basic sub-entity in a thing, rather than simply the whole thing. If that were Aristotle’s meaning, b) could be a more basic sub-entity within a), and yet b) could also have a still more basic sub-entity c). That would be understandable with our English habits of thought. But Aristotle is explicit that in all its uses “substance” refers to **the thing**, not a more basic aspect of the thing.

Some translators substitute “essence” for “substance” (οὐσία) in b) and c) above. Although they translate *ousia* generally as “substance,” they substitute “essence” when “substance” makes them uncomfortable. But the substitution does not let English readers grasp Aristotle’s use of “substance” from its contexts. One has to be able to check the Greek words because most current translators interchange Aristotle’s terms at will. They do this especially with his most important terms, partly because there are no appropriate English words for his many distinctions.

Translating οὐσία as “essence” (even when done consistently) is confusing because

Aristotle has other terms (εἶναι, einaí, or τὸ τί ἦν εἶναι, to ti en einaí) which is traditionally translated as “essence” (Latin) or also as “being.” By a thing’s “essence” or “being” Aristotle means what explains how the thing exists.

For Aristotle substances have the special characteristic that they are explained neither by something else, nor by sub-parts in them, nor by their material. They are explainable from themselves, from their own what-they-are, their own “being” (“einaí” or “to ti en einaí”). The “being” of most things depends on something else and this has to be brought in to explain them. Such things are not the same as their “being” (essence). **By “substances” he means things that don’t depend for their existence and explanation on something else.** This is what he means by saying that substances are “not different from their being.”

“A particular **thing is** considered to be nothing other than **its own substance**, and the to ti en **einaí** is called **the substance of that thing** (Meta VII-6, 1031a17).

ἕκαστόν τε γὰρ οὐκ ἄλλο δοκεῖ εἶναι **τῆς ἑαυτοῦ οὐσίας**, καὶ τὸ τί ἦν **εἶναι** λέγεται εἶναι ἢ ἐκάστου οὐσία.

“... the being (einaí) of the soul is the same thing as the soul.” (τὸ γὰρ ... ψυχῆ εἶναι καὶ ψυχὴ ταυτό.)

“Soul and the being of soul are the same.” (ψυχὴ μὲν γὰρ καὶ ψυχῆ **εἶναι** ταυτόν, Meta 1043b.2).

“**the soul is the** ‘what it is for it to be what it was’ (τὸ τί ἦν εἶναι) and **the definition (logos)**,” (II-1, 412b15-17)

(τὸ τί ἦν εἶναι καὶ ὁ λόγος ἢ ψυχῆ)

In the special case of substances, the things don’t differ from their “being” (essence). That is why the thing’s “being” (essence) can be “called **the substance of** that thing.”

In II-1 Aristotle says that **a living body is a substance** ,(412a15) and also that the soul **is the substance of** a living body in the sense of its form (412a19-20) and also that the soul is the living thing’s **being** (to ti en einaí) and its logos (412b11-15).

So, yes, a living thing **is a substance**; the soul is **the substance of** the living thing (its form), and also: we are investigating **the substance of** the soul. “Substance” does not mean something more basic underlying the thing. Rather, in all its uses, “substance” means the thing.

(See Kosman: “The substratum of the white horse is the horse.” Kosman in Frede & Charles, page 320). See also Inciarte, “The Unity of the Metaphysics.”)

Now, how can we understand this? What does it mean to say that a **thing is its own substance** and not different from its being (essence), i.e., not different from what explains it?

What Aristotle calls “a substance” can be understood without recourse to other things. For example, a relation is **not** a substance because it exists only between two other things. A thing is **not** a substance if it consists of a combination of parts that exist separately. Artificially made things (tools, paintings, houses) are **not** substances (Meta 1043b23). Their existence as tools depends on someone who uses them, and makes them out of ready parts. Natural bodies are substances but **living things are in the fullest sense (“malista”) substances** (Meta VII-8, 1034a4) They exist and are explained from themselves.

Why is this significant? Aristotle comes after a long series of other philosophers. Some said that nothing exists independently, only a matrix of relations. With Plato, if you think further about anything, it turns out to **be** its relations to, and differences from, other things. Only the undefinable whole fully exists. Others said that all things are really atoms. For the physicists like Democritus only atoms moving in the void really exist. No thing exists **as that thing**. The thing exists as atoms, **their** existence and combination. In their view the many different things in nature seem not to exist as themselves, only as particles in empty space.

Aristotle denies that empty space **exists**. And, there are no ultimate particles. He has a different way of thinking about existence. **For him some individual things exist as themselves**. He calls them “substances.” In III-4 (see ENDNOTE 105) Aristotle shows their difference.

But what is existence for Aristotle? Existence is activity (and secondarily motion which he calls “incomplete”activity”). Living substances exist as their internal power to originate their activities. This power is what he means by “soul”.

3. On 402a25 - 402b24

In II-1 Aristotle’s answer to the question about the category of substance will be straightforward. Regarding the other questions Aristotle will make new distinctions. When Aristotle brings a previously-made distinction to a new topic, he often finds that it doesn’t simply apply. Rather, he lets it generate a further distinction from the new topic.

Using his distinction between potentiality and actuality, Aristotle defines the soul as a potentiality in one respect, an actuality in another respect. At the start of II-1 he creates (just for living things) the term “first actuality.” The soul is the **potentiality** for enacting the life-activities, but it is the **actually existing** form of a body.

Concerning “And we must inquire also if it is divisible or indivisible . . . “ we can notice something important about Aristotle’s method. In modern science we divide anything we study down to its least parts. We say we understand something if we understand how it is constructed out of understandable parts. Aristotle considers from the start that what he studies (here the soul or living) might be indivisible in some respects. If it is, he implies that he will find ways of studying it without dividing it. Chapters II-2 and II-3 explain in what respects the soul is always just one, and in what respects it has a kind of “parts.” III-6 concerns the sensing and thinking of something that is indivisible.

But how can one study something without making distinctions in it in some way? Aristotle asks “whether every soul is of like kind or not ... and if not of like kind whether they differ in species or genus” (402b5). In II-2 he explains on what basis one can divide between the species.

Notice that by ζῷον here he means “living thing” not animal, since he says the term can apply to god who is living but not an animal. Animals are defined by having sense-perception.

The universal “living thing” is not something that exists (except in a “secondary” way, as a concept in thought). The same is true of “animal” and other general terms, he says here. (Metaphysics VII explains this.)

A second way of dividing concerns Aristotle’s meaning of the word “parts” here. Since the soul is one and indivisible in each living thing, the animal’s potentialities for several different life-activities cannot be separated from each other. We will have to see in what way one soul-potentiality can exist without the other.

On the question, “which ... [parts] are really different from each other” (402b9), Aristotle distinguishes two very different kinds of soul-potentialities. Having listed the potentialities for the various life-activities in II-2, Aristotle in II-3 adds a merely potential kind of distinction: He adds desire to the list of soul-parts, but this adds no activity since it concerns only again

sensation and locomotion. Then, at 414a33 he says that one could add more potentialities (distinctions in what an animal can do) which are presupposed in the capacity for the single activity of sensing. Later in the book (433b1) he explains that a great many presupposed potentialities could be distinguished, but those are not potentialities for **different** activities. Only activities determine truly different soul-potentialities.

Aristotle organizes the *De Anima* in accord with the different activities. After II-3 the *De Anima* has sections on reproduction (II-4), sensation (II-5 to III-2), thinking (III-3 to III-8) and locomotion (III-9 to III-11).

At the start of II-4 Aristotle says that since the soul-power is defined by the activity which it is the power to enact, we ought to begin with activity, and since the object determines the activity, we ought first to study the object. But in fact Aristotle always begins with the soul-power and is **led from** it to the activity, and from this in turn to the object which determines the activity. Then, turning back, we can say still more. As he often says, one begins with the obvious and arrives only later at what determines that, and really comes first. We move first in the one and then in the other order.

We see both orders also in the order of the chapters. Chapter II-5 tells about all of sensing; chapters II-7-11 are about each of the senses; then in II-12 he is able freshly to define sensing as a whole. Similarly III-4-5 are about nous; III-6-7 deal with its objects and operations in detail; III-8 is again about nous as a whole.

4. On Why Sensation Is Not an Affection Peculiar to the Soul

Affections are those attributes of a thing which makes it possible for it to be affected, changed, or moved. Other kinds of attributes are powers or habits, traits which enable a thing to act. Sensation is not an **affection** (pathos) **of the soul** but rather a **power** of **actively proportioning** and thereby producing the sensible forms, colors, sounds, and tastes, etc.

Although what we sense changes all the while, the sensing activity does not change. Sensing something does not change the sensing part of the soul which is the power for the activity. Neither is it a change when the sense power comes into action. For example, when we hear something after not hearing anything just before, Aristotle argues that this, too, is not a

change. In II-5 Aristotle concludes that going into action is a “change **into itself**,” and therefore should not be called “paschein,” (being affected, which means being changed). (See also Physics VII-3).

However, sensation is also a “pathos,” but it is a pathos of the soul+body (*De Sensu* I, 436a7-10 and 436b2-10). In that regard Aristotle devotes a whole book to it. Aristotle is clear throughout, that in sensation the ensouled body is affected. The soul **actively** produces sensuous forms by proportioning the **bodily** effects.

The medium (air or water) which is affected by a motion from a sensible thing, in turn affects the sense-organs. But this does not change the sensing, the soul-functioning. What seeing is doesn't change whether red or blue light affects the bodily eye.

Aristotle makes a similar point about the sense organs. Although they **are affected**, and this **is** a change, even the organs change only within their own proportions and limits. Seeing must not change the eye so that it can no longer see. If overly bright light damages the eyes, we should not call that damaging process “seeing.”

5. On the Emotions

The emotions are not studied in the *De Anima* because they are affections of the soul-and-body, But they are not studied in the books on the body either, because emotions are not a function that defines the body or any of its parts. Aristotle thinks they are like drunkenness or illness. Where then will Aristotle study them? They are discussed in the *Ethics* where he shows (for example) that one needs to be neither too easily angry, nor too mild. But chiefly, the emotions are taken up in the *Rhetoric*. There they have their essential role. In the rhetorical arguments of public speaking one must know the emotions well, in order to appeal to them. But there is one other vital and appropriate place which is not often mentioned. It is a long passage in Aristotle's *On Dreams*.

For Aristotle the emotions are not powers by which we apprehend our situations and therefore they cannot be explained as activities or powers. He has shown this (above) by arguing that **how strongly** an emotion affects us **depends** on the state of the body before the emotion-inducing situation happens. He thinks we become violently angry at small events when the body is already “in state of tension resembling its condition when we are angry.” He explains this aspect of them most clearly in what was for him an appropriate location, in his

treatise concerning illusions, namely *On Dreams* (II, 460b3-27).

“We are easily deceived about our perceptions when we are in emotional states . . . so that even from a very faint resemblance the coward thinks that he sees his enemy, and the lover his loved one. . . In a fever some think they see animals on the walls from a slight resemblance of the patterns. . . those who are not very ill are aware that the impression is false . . .if the illness is severe they move themselves in accordance with what they seem to see. The reason for this is that the controlling discriminating does not happen by the same power by which images come.”

In III-3 Aristotle says that we need not be in error when a large thing (e.g., the sun) is imagined as small, because not imagination but the joining of the

five senses enables us to judge (discriminate) size, motion, and the other common sensibles.

In our chapter Aristotle argues similarly that the emotions do not apprehend situations; they are bodily states which only distort our realistic apprehensions that come through perception: “in the absence of any external cause of terror one may find oneself experiencing the feelings of someone in terror.”

Aristotle began a long-lasting depreciation of the emotions in Western history. But can we understand why the emotions were not credited as powers to apprehend a person’s real situation? Emotions do narrow one’s perceptions of situations. Even today we are taught to count to 10 before speaking when we are angry. We are likely to speak from what makes us angry without taking the whole situation into account. Our usual perception is narrowed when we have strong emotions. So it is true at least in some regards, that emotions interfere with perception and judgment. What one might miss in Aristotle’s work is something like a “felt sense” (See Gendlin, *Philosophy of the Implicit*, www.focusing.org) which is wider, more inclusive. For Aristotle, potentiality is all defined. It has already been in act before, and will be again. He has no room for something not actually or potentially just those forms. He dismisses Anaximander’s “seeds” as indeterminate (Physics I-4, 187a23). Plato, in the Meno argues that there is a superior kind of “inspiration” which is wiser than reasoning. Also In the Republic he argues for both possibilities: The tyrant’s single emotion is blind, but there is also a wider wisdom of the whole. Aristotle saves everything. Where does he have something like this? Practical judgment in the *Ethics* is the closest I know.

The fact that the emotions are not included in the *De Anima* goes against the modern view of psychology. But the De Anima is not all of what might be called Aristotle’s “psychology.”

That would include many other theoretical treatises, and practical ones like the *Rhetoric* and especially the *Ethics*. The reader might want to look at *De Sensu*, *Memory and Recollection*, *On Sleep and Waking*, and *On Dreams*. These are all psychological topics, but they belong to **soul-and-body**.

We can also say that the *De Anima* is not exactly psychology; rather it is the philosophy of psychology. In Aristotle's terms: The *De Anima* is about determining the kind of existence and the starting points (principles, premises) and main attributes of living things. These are the premises for all the other sciences about living things, both in theoretical science (for example *Parts of Animals*, *Motions of Animals*, *Generation of Animals*), and in the practical sciences (especially the *Ethics*).

6. On Why There Are No Pathe Peculiar to the Soul As Such

There are "pathe of the soul" but they are not peculiar to it (not **idia** pathe) because they are traits of body-and-soul. Of course the soul is affectable, but only by affecting the body. This becomes obvious if we grasp the basic notion of the soul that Aristotle is building here. **The soul is the power for active functioning**. Throughout his works, Aristotle **defines** "matter" as that, in anything, which can be affected or changed. So, of course, the matter-and-form organism can be **affected** only through its matter, i.e., that in it which is affectable. Affectability **is** what Aristotle means by "matter." "**Matter qua matter** is the capacity of being affected (pathetikon)" (*De Gen* I-7, 324b18). The body is an organism's matter-formed-by the soul. The functioning of the soul can be affected, for example in drunkenness or disease, but this happens by affecting the soul-and-body organism through the body. If the soul as such **also** had an affectability, it would have still another body. Its affectability **is** precisely the body. The soul is the capacity for the active functioning. So the pathe belong to the whole organism, the soul-and-body.

Why can there be no **pathe** peculiar just to the active functioning as such? Take for example your radio. You need it to be "affected" by the incoming signal, but you need this not to affect what makes your radio work. So in one way the signal has to make a change in your radio; in another way (functionally) it must not change the radio. The radio's **functioning** needs to continue unchanged. If your radio stopped working just when you were listening to a politician you despise, you might joke that he broke your radio. But you would know that its functioning is not something that can be affected as such. Only the function-matter combination

can be affected.

Once we make a separate definition for the function (even though it doesn't exist separately), we can say as Aristotle does, that the embodied functions of the soul do not die of themselves; they die only because the living body dies.

Aristotle sometimes uses the word "pathe" more widely. In II-5 Aristotle discusses the broad and narrow usage of "affected."

7. On the Choice of Aristotle's Examples

Two questions:

a) To illustrate how the science of nature studies both form and matter, why is Aristotle's example a house, an artificial thing, not something that would be studied in the science of nature?

b) And why only three causes? Why omit the builder, the source of the motion of building the house?

a) In teaching the four causes we use an artificial thing (a statue is the typical example) because in an artificial thing they are nicely separate. This can be misleading since Aristotle so often finds that two or three of them are (in different respects) the same existing thing. In living things the soul is three of the four. Of course the soul is each cause in a different respect, but the difference is not so easily seen. And, even when the four are different, Aristotle wants them linked in the thing, (the "form in the materials for the sake of ...").

b) But if the house is used in order to show the causes separately, why omit the builder? Of course it might have been an oversight, but in other cases with Aristotle (and some other authors) when an example doesn't fit, one discovers later that one has misconstrued the issue that is being exemplified. (See, for example, Williams and Joachim at *De Gen. et Cor*, II-7, 334a30-36, cited in my paper on prime matter and mixture.)

Elsewhere he says that living things and moving bodies have their own source of motion

from within themselves as part of what they are. Artificial bodies do not. They are products, separated from an external moving cause. Perhaps that is why the builder is not included.

It might still seem that a living thing would have been a better example. To show a living thing's causes takes him from II-1 to II-4, so here he has to use examples that do not yet require the actual discussion. But this is not a completely satisfying explanation.

8. On the Difference between Dianoia and Nous

Most nous activity is dianoia. The word “dianoia” could be interpreted as “through-nous,” or “open to nous.” The “dia” similarly in “diapseudesthai” means “open to error.”

With dianoia we can be mistaken because it combines (συμπλοκή). Aristotle distinguishes dianoia from nous which does not combine.

... for falsity and truth are not in things ... but in thought (dianoia) whereas with regard to the simple concepts and “what it is,” truth and falsity do not exist even in thought (dianoia).

οὐ γάρ ἐστι τὸ ψεῦδος καὶ τὸ ἀληθές ἐν τοῖς πράγμασιν, . . . ἀλλ' ἐν διανοίᾳ, περὶ δὲ τὰ ἀπλά καὶ τὰ τί ἐστὶν οὐδ' ἐν διανοίᾳ.

the **combination** and the **separation** are in thought (dianoia) and not in the things

. . . ἐπεὶ δὲ ἡ **συμπλοκή** ἐστὶν καὶ ἡ **διαίρεσις** ἐν διανοίᾳ ἀλλ' οὐκ ἐν τοῖς πράγμασι, *Meta* VI-4, 1027b.25-31).

(Similarly Meta XI-8, 1065a24.)

Only the grasp of single essences, unities, understandables is beyond truth or falsehood.

“Every saying says something of something . . . and is true or false.

But not all nous is such. Nous that makes no assertions is never false since it “does not say something of something” (III-6, 430b26-29).

This passage also shows that the word “nous” has a more extended use. Since he says “not all nous” makes assertions, evidently some nous does. There is also

nous which reasons for the sake of something (οὐνεκα) and **is practical!**

νοῦς δὲ ὁ ἐνεκά του λογιζόμενος καὶ ὁ πρακτικός.

It differs from the contemplative (θεωρητικόν) nous in respect of the end. (III-10, 433a14).

The word “noein” appears similarly extended (III-3, 427b9, 17).

In the PoA (II-19) and in the Ethics Aristotle makes clear that the single grasp of nous is the source both for the first universals with which dianoia begins and also for the principles at which we arrive last.

“For nous is concerned with the ultimates in both directions. **For both the first terms and the last are objects of nous and not [objects of] reasoning.** καὶ ὁ νοῦς τῶν ἐσχάτων ἐπ’ ἀμφοτέρα: **καὶ γὰρ τῶν πρώτων ὄρων καὶ τῶν ἐσχάτων νοῦς ἐστὶ καὶ οὐ λόγος,** (EN 1143a.35-b1)”

We arrive at principles last, but cannot be proven. They have to be grasped. This is often by analogy. For example, in the first part of Meta IX-6 Aristotle gives a long list of potentiality/actuality paired examples, and then says: “What we mean can be plainly seen in the particular cases by induction (ἐπαγωγῆ). “We need not seek a definition for everything but must immediately see the analogy” (τὸ ἀνάλογον συνορᾶν.) (Metaph 1048a.37).

Aristotle makes a sharp distinction in our chapter: Nous is eternal whereas dianoieisthai belongs to soul-and-body. III-7 explains: The **dianoetikon** makes assertions, is moved, and guided by the sense mean. Sense and dianoia are moved by a single **bodily sense mean** with different einai. That is also why imagery is required for thinking (III-7, 431a16-20). But although thinking happens in imagery, the thinking is not the images. The thinking power (dianoetikon) perishes because **it uses** memory and images, but qua thinking it depends upon nous.

At the start of the Metaphysics and at the end of the Posterior Analytics Aristotle makes explicitly clear that demonstration is derivative since it depends on the premises, and on grasping the initial primary concepts. Everyone grasps those starting universals, like “animal,” “tree,” and “stone.”

The end result of thinking is also a single grasp. One grasps **the causal understanding of what something is**. After much combinatory thinking (dianoia) we sometimes grasp, for example the cause of what an eclipse is. For example, what **is** an eclipse? Someone might say that it is darkness of the moon. But the cause is the earth between. For Aristotle such a causal understanding is not a relationship added on to two things, but rather a single grasp. Aristotle shows this by saying: If you stood on the moon during an eclipse, you would see the earth between. That much is perceptual, but you would grasp – all at once – the

understandable essence of an eclipse, i.e. the being-between of the earth shutting off the light. Your single concept of “eclipse” would contain the cause. **The cause is what the thing (the eclipse) is**, not a predication combining it with another thing. The earth’s being between is what an eclipse is.

In contrast, by “dianoia” Aristotle means a combination such as “Cleon is white” (III-6).

Book II

9. On "Matter" and "Substance"

Aristotle is usually taught to have said that the form is universal and only matter individualizes, but we notice here that Aristotle also says that no individual thing can exist without a form. It is the form that first makes something an individual thing, a "this," (τόδε τι). By "form" Aristotle means what the thing is. To exist, it can be in this way or another way, but always in some way.

Here Aristotle says:

". . . **matter**, which in itself is not a particular 'this,' . . ."

ὡς ὕλην, ἃ καθ' αὐτὸ οὐκ ἔστι τόδε τι,

Many commentators have difficulty with Aristotle's concept of "matter" which, considered alone, just itself as such, is "not a this," i.e. does not exist. In Aristotle's basic concept of "matter" it exists only together with some form. You cannot take it out of its form and have just the matter.

Aristotle also has a derivative concept of "matter" which is not just matter, but rather a matter-and-form thing which can serve as the matter for a further form. For example, lumber is a matter-**and-form** thing, but it can become the matter of a bed, a table, or a statue. Giving the wood different shapes is "**accidental change**" because the wood keeps its form so that it remains wood. Its **essential** attributes remain the same. Only its accidental attributes (shape, surface polish, etc.) are changed (*De Gen. et Cor.* I-4, 319b25-31). Since it is itself a matter-and-form, you can have it apart from the bed-form.

In both kinds of cases, Aristotle's concept of "matter" is inherently related to his concept of "change." What can change has matter, and what has matter can change. What cannot change has no matter, and what has no matter cannot change. Where there is change, what Aristotle calls "matter" is that which is changed **from one form into another form**. Matter is that which, although now in one form, is now "potentially" in other forms. What he calls a thing's "matter" is the thing's potentiality for change.

In the case of "accidental change" (for example, making a bed out of wood) we can identify the matter. It can exist as wood apart from the bed. The wood might already be a bed, or if it is still lumber, it is potentially a bed. The matter can exist either way.

But can we identify what Aristotle calls "matter" when the wood does not remain but burns and is turned into fire? What is the matter of wood which is potentially fire? Aristotle denies the existence of unchanging particles like our carbon or hydrogen atoms that would remain and only be rearranged. For him the "underlying" changeable substratum, which is potentially either wood or fire, has **no characteristics of its own**, and cannot exist separately. It can exist only **either** as wood **or** as fire **or** in still another form. Alone it is not any existing "this."

What is conserved when the matter changes essentially? For Aristotle, only certain quantitative proportions and relations: So much wood can be turned into just so much fire (*De Gen et Cor.* II-6, 333a23).

We are accustomed to think of "matter" as particles, identifiable little bodies that retain their own characteristics like electrons, protons, or neutrons. For Aristotle these would not be just matter but rather matter-and-form. What makes something identifiable is its form.

Aristotle denies that there are unchangeable bodies, atoms, or particles. He argues consistently against the Greek Atomists. He says that the most basic elements can change into each other. For him, "matter" in its essential and controlling sense means just changeability, just certain proportional relations when the elements mix, or when they change into each other. When one element changes into another, Aristotle calls it the "destruction" (Latin: "corruptio") of the one element and the "generation" of the other.

"Matter in the chief and controlling sense of the word is the substratum of generation and corruption." Ἐστὶ δὲ ὕλη μάλιστα μὲν καὶ κυρίως τὸ ὑποκείμελον γενέσεω καὶ φθορᾶς δεκτικόν (*De Gen et Cor* I-4, 320a2).

"Matter qua matter is the capacity to be affected" ἡ δ' ὕλη ἢ ὕλη παθητικόν (*De Gen et Cor* I-7, 324b18).

Aristotle's concept of "just matter" (matter in itself, sometimes referred to as "prime matter," πρώτη ὕλη) can be disturbing to anyone accustomed to the classical Western concept of "matter" even though modern physics has long ago rejected this classical concept. Currently in physics there is no identifiable unchanging matter, only the relationships of equations in which (some of) the basic particles can change. This is more like Aristotle's physics than like Newton's. But one should not read either classical or modern physics into Aristotle. Instead we have to grasp his concept of "matter" as he defines it. There is no inherent reason why change cannot be conceived in terms of quantitative proportional relations rather than in terms of identifiable "stuff" or particles which are only rearranged.

For Aristotle matter fills the cosmos, there being no separable "space" **in** which matter

could exist as separably identifiable; only some form gives matter any identity such that one could speak of "this matter" or "that matter." Matter as such is preserved only as proportional change-relations; so much water can turn into only so much steam.

Aristotle's statement here is important for understanding him throughout, so it needs to be remembered. **He is explicit that matter just as itself is "not a this," i.e., not something that can exist without form.**

Metaphysics VII-3 (1029a1-30) has a more elaborate version of our passage:

Now in one sense we call the substrate matter, in another the shape, and in a third what comes from both. (1029a3).

(τοιοῦτον δὲ τρόπον μὲν τινα ἢ ὕλη λέγεται, ἄλλον δὲ τρόπον ἢ μορφή, τρίτον δὲ τὸ ἐκ τούτων.)

... all other things are predicated of substance, but this is predicated of matter. Thus the ultimate substrate is in itself neither a particular thing nor a quantity nor anything else. ... γὰρ ἄλλα τῆς οὐσίας κατηγορεῖται, αὕτη δὲ τῆς ὕλης, ὥστε τὸ ἕσχατον καθ' αὐτὸ οὔτε τι οὔτε ποσὸν οὔτε ἄλλο οὐδὲν ἐστίν· (1019a23).

"If we adopt this point of view, then, it follows that matter is substance. **But this is impossible**; for both separability [existing on its own] and 'thisness' are thought to belong chiefly to substance.

ἐκ μὲν οὖν τούτων θεωροῦσι συμβαίνει οὐσίαν εἶναι τὴν ὕλην· ἀδύνατον δέ· καὶ γὰρ τὸ χωριστὸν καὶ τὸ τόδε τι ὑπάρχειν δοκεῖ μάλιστα τῇ οὐσίᾳ, (1029a.26-28).

See also Appendix, my article "Aristotle on Prime Matter and Mixture.")

(See also ENDNOTE 17 below.)

10. On the "Proof" at 12a16

At the start of Book I (402a5) Aristotle said: "the soul is as it were the **principle (arche)** of living things." He also several times reaffirmed in Book I, that **soul and life are co-extensive**. (See the first two pages of my commentary on Book I.)

Aristotle says that definitions cannot be proven (*Posterior Analytic*) but they can be exhibited in syllogistic form. He does this in our text.

Let us set out the syllogistic form of the definition here:

By soul we mean **living** which is self-nutrition.

but **living** is the kind of body.

(So) soul is the kind of body.

In a demonstration the soul would be the middle term, due to which we attribute living, since the soul is the principle of life. But here it is not the middle term because this is not a demonstration but a definition in syllogistic form. The soul is a principle (arche). One must not read mysterious meanings into Aristotle's word "soul." The soul is not the sort of thing about which you might wonder whether you have one. A principle (arche) for Aristotle is always a first premise which we have directly, a self-founding premise, more obvious than everything that follows. **You don't wonder whether you are alive or not.** "Soul" means being alive. It is clear that for Aristotle "soul" as principle refers to the same thing as "living." **But what is being alive?** Its reasons and causes, what is involved in being alive, that is what the book is about. Here the first defining cause of living is the capacity for self-nutritizing. SEE ENDNOTE 19 FOR MORE ON "PRINCIPLES."

11. On Method of Division 12a16-20

In *Prior Analytics* I-31 Aristotle criticizes "the method of division" as used by Plato in the Dialogues. When Socrates sets out a distinction, the respondent seems able to answer in which division a thing falls. For example, if diagonals are lengths, and lengths fall into two divisions, commensurate and incommensurate, in which are diagonals? "The incommensurate, of course" the person might answer. Just by posing the distinction, it seems to follow which division a thing must fall into. But Aristotle says that this seems to prove something that is in fact only assumed.

Aristotle represents the method of division as a syllogism with two premises and a conclusion that **does not follow**. In our example it would be:

All length are either commensurate or incommensurate

All diagonals are lengths

(It doesn't follow that:) All diagonals are incomm.

What does follow is only that diagonals are **either** comm. **or** incomm.

In our case here it would be:

first premise: substance is **either** matter (body) **or** form **or** compound.

second premise: soul is a substance.

If you accept the premises it still does **not** follow that the soul is the form.

What follows is **only** that the soul must be **either** matter **or** form **or** compound.

To place a thing into a division requires a reason, a middle term that links the thing to the division. Therefore Aristotle always cites the reason, the "cause," what it is about the given thing which makes it go into that slot.

In our instance here, although the soul is the source of the kind "living," the middle term ("cause" or reason) which links the soul to form is that it is the kind. "**Since** it is indeed a body of such **a kind, for** it is one having life."

12. On Potentiality Is Preserved in Actuality

In modern usage, we say that something is "potential" only when it is **not** actual, but for Aristotle the fact that something "can" is most obvious when it is doing it. So the potentiality is not gone when it is actual. The body that is "potentially alive" is a body that **can** be alive, and if it is actually alive, then of course it can.

On a snowy day in Chicago when many cars don't start, I might ask someone in the next office "Is your car running?" I don't mean that it might now be running in the parking lot. I mean **can** it run today? But of course if I get a ride and we're already going down the street, this is the surest way to know that it **can** run.

When a **can** (a potentiality) moves into activity, the activity preserves the **can**.

In addition to the difference stated explicitly here, one can notice the difference between the two terms in a many other places. For example, in comparing II-7 and II-8, light is the entelecheia (completion) of the medium (because the medium is the transparent which does not have an existence of its own without light), whereas sound is not the entelecheia of the medium (because the medium of sound is air which exists on its own, without sound). (SEE also Meta IX-1 and IX-6, and ENDNOTE 67.)

14. On Wax 12 B7

Of course the impression cannot be separated from the wax, but like most of Aristotle's examples, the analogy goes further.

The flesh is at the midpoint of hot-cold and fluid-dry, and can therefore take on touch sensations (II-11). The heated wax is like the flesh in that its hot/cold ratio enables it to take on the impress form.

For Aristotle wax is not what it is in our chemistry since Descartes, not the same matter (paraffin) whether solid or liquid. In Greek chemistry solids and liquids are different elements. But like the flesh, the power of the wax to function -- i.e., its **can-take-on-and-keep** impressions -- requires a matter at midpoint between solid and liquid, just the right amount of hot versus cold, and liquid vs. dry, so that it is just soft enough to let the seal-impression in, but hard enough so that the impression stays. This middle-point of hot-cold fluid-dry is the material side of the can-take-on-and-keep (III-12, 435a1). The can-take-on-and-keep power of the wax is analogous to the soul. If we heat or cool the wax too far, it loses this potentiality and is then no longer the **matter-of** the form-function of taking on impressions. Similarly, excess heat or cold destroys the solid/liquid proportion of the touch-sensing flesh.

15. On Logos and "What It Is For It to Be What It Was." (412b10)

In our definition of the soul here, Aristotle uses five terms to be noted:

"what it is for it to be what it was" (to ti en einai)

This famous, oddly turned phrase names that, in a thing, which a verbal definition would define. The phrase probably arises from how Aristotle characterizes activity (*energeia*) in contrast to motion or change. Motion is never complete. When it arrives, it stops altogether. An activity is ongoingly complete, always complete – every moment fully **what it is and was**. For example, sensing and understanding are activities, whereas learning is a change. Aristotle says: At any moment "**we see and have seen . . . we understand and have understood . . .**" He contrasts this with motion or change, for example: ". . . we cannot at the same time learn and have learned." (Meta 1048b20-30). Substances (especially living things) are defined by their own internally-arising activities.

This is also

"logos." This term can mean a verbal account of the thing, or it can mean that which a verbal account would tell, i.e., what is proper to that thing. Aristotle uses another word (*horismos*) for a merely verbal definition. He knowingly uses "logos" both ways.

"Logos" means proportion, proper account of that which makes a thing what it is, but it also means definition, formula, account, and it can also have some other meanings. There are many English translations of it, and no quite right one. Combine "a proper account," "definition," "what something is," "what we would properly say of it" and "it's proportions," and you come close. But we must keep in mind that it is a single word which brings all these meanings. They are not separate meanings. The context interacts with the word to generate its specific meaning in any one spot. The whole complex of meaning is brought by the word in each use. One gradually comes to understand the import of this word.

"What it is" (*ti esti*). This term includes substance (I-1, 402b16) but is more inclusive.

"Universally stated" (*kathalou, kata holos*). The soul is not a universal; rather the account of the soul here applies to all souls, i.e., all living things. For Aristotle universals exist only in the soul.

Here all five **can** apply (in different ways) to one statement, but this is not always so.

16-17. On a Meta-Definition and a Science of Living Things 12b16

Aristotle's definition of soul (i.e. of "living") in this chapter is really what I would call a "meta-definition:" What defines living things is that they **have a certain kind of definition**, the kind which is also the inner source of starting, stopping, and resuming its life-activities. Since the word translated by "definition" here is "logos," it means not just a verbal definition; rather, logos is that, **in a thing**, which a definition would define. Let me therefore rephrase this "meta-definition:" What makes a living thing what it is, is that its "what it is" is also an internal source of its functioning, i.e., of starting, stopping, and resuming its life-activities.

In II-2 and II-3 Aristotle shows that different life activities and their capacities organize different living bodies. Because of these differences Aristotle says there, that an overall definition cannot be useful for demonstrations. But since he offers one here, we can ask: Of what use is an overall definition of every kind of soul?

The soul as *logos* is best understood on a meta-level: The definition is: soul **is a certain kind of logos**, the kind which enacts life-activities from inside. The internal cause of life-activities is also their kind (or form) of matter.

We don't want his "metadefinition" to remain an empty Aristotelian formula; we want to grasp the linkage Aristotle is asserting here. The cause of the life-activities is also the actuality (completion) or form of the body -- its kind or form of matter. Its functions **define** its matter. In II-4 we will see how its functions also **generate** its matter. As the *De Anima* proceeds, Aristotle explains how activity and function determine and generate the matter.

Aristotle calls what something is its "form." What moves it, is its "source of motion." In the Latin tradition of Aristotle scholarship these are called the "**formal cause**," and the "**efficient cause**." In that tradition, what I call his "metadefinition" is pointed out by saying: "In living things the 'formal cause' is also the 'efficient cause.'"

But let us not, with the Latin words, divide the four causes, as if "formal" and "efficient" cause were still two different things, as if it were only a happenstance that they fall together in living things. This is not an accidental relation. In living things they are one thing; they **are** the first actuality, i.e., the soul. But we want to understand the internal link which is the crux of

Aristotle's conceptual strategy, rather than only repeating a traditional Aristotelian formula.

Let us first take up what all natural bodies share with living things. In the *Metaphysics* Aristotle says that only natural things are substances, because only these have a "nature" (an internal source of motion). ("... a house or utensil. Perhaps, indeed, neither these things themselves, nor any of the other things which are not formed by nature, are substances at all; for one might say that the nature in natural objects is the only substance to be found in destructible things." ... οἶον οἰκίαν ἢ σκεῦος. ἴσως μὲν οὖν οὐδ' οὐσίαι εἰσὶν οὔτ' αὐτὰ ταῦτα οὔτε τι τῶν ἄλλων ὅσα μὴ φύσει συνέστηκεν· τὴν γὰρ φύσιν μόνην ἄν τις θεῖη τὴν ἐν τοῖς φθαρτοῖς οὐσίαν, *Metaph VIII-3, 1043b.20-23.*) If you have read this passage and wondered why artificial things are not substances, our passage in the *De Anima* explains why not. In a substance its defining character, its "what it is and was" (its "to ti en einaï") **enacts** its activities. Its nature is an internal source of its motions. In contrast, the motions that arise from the inside of an artificial thing (falling down) are not those that define it as what it is (an axe or a house).

In Newtonian science the bodies are considered inert. They have to be forced to move by external forces acting on them (for example, gravity). Everything moves only by being acted-upon by something else. So there seems to be no major difference between natural things and things we make, since in our science there is no inwardly arising motion. For Aristotle, stones, rain, wood, and metal have an internal source that determines their kind of motion. Since the *De Anima* is preceded by the *Physics*, Aristotle assumes that we know that he defines bodies by their motions. Motions are defined by their direction and endpoint. And, the matter of all natural bodies is inherently connected to their characteristic motions. An earthen body moves down. Becoming fiery moves it up.

Aristotle says that the inanimate natural things **always** move in their own characteristic way to their characteristic places, if they are not stopped by something else. A stone or a piece of metal **always** moves toward the center of the earth, unless something impedes it (for example, a shelf). And, the inanimate bodies also rest when they reach their natural zone, for example, when the air moves up and then rests below the sun, or when rain drops reach the ocean. The things still move that way today but we think about it differently. Let us now ask about the difference.

Aristotle argues in I-3 (406b22) that the movement and rest of inanimate bodies doesn't explain how living things rest (and then resume their activities). He describes inanimate bodies by how they differ from living bodies. On the material side we saw that inanimate bodies differ from living ones in that the inanimate ones have no organs, no differentiated parts for different

activities. The organ-patterning is the actual form of the existing body, but it goes along with a further difference: Only **living** natural bodies rest of their own accord and then move again. In contrast, stones and metal always fall if not impeded. They never stop for a while in midair. Everyone knows this difference, but Aristotle is making a concept from it: The kind of potentiality that can start, stop, and resume is the soul, the “first actuality,” (or “first completion”). The term “first actuality” does not appear in the *Physics* since **only living things have two kinds of actuality**:

Aristotle interposes a functional level of body-organization between the life-activities and the material composition. We tend to assume that the flesh **is** a combination of certain elements, and that we will soon be able to make flesh in the laboratory. Like our scientists, Aristotle also says that bodies are composed of the elements, but in his science the composition is determined by an overarching functional level. Aristotle agrees that flesh consists of a certain mixture of elements, but that is not what flesh **is**. The “what it is” of flesh is its capacity to originate the function of flesh (touch-sensing). Only what internally originates the life-functions can determine and create the particular mixture of elements as its matter. Aristotle says that there is also a special kind of heat in living bodies (Gen of An, 735b30-39) and a substance he calls “pneuma” which is needed for living things to initiate motion. Even though the elemental composition of flesh can last a while, and of bones even longer, the flesh without sensing is no longer the same matter, no longer what can function as the flesh of a living animal.

Aristotle’s science is primitive on the material side but very extensive. His several books about anatomy, separately about movement and then about reproduction are not widely read, but we need to know that he studies the material very extensively, with much longer books than the short *De Anima*. The functions of living are the topic of the *De Anima*. Aristotle’s strategy is of interest. **He can analyze the matter of living things in terms of its elements and material parts, but can first interpose determinative effects on the matter from the functioning side.** These are effects on matter from living activity. In our time we observe many such effects and correlations, (for example, psychosomatic effects from living), but they are anomalies because we have no modern scientific version of life-activity affecting matter.

In modern functionalism one thinks of living bodies as computer hardware; the functions are like software programs. This approach separates matter from function, just as an axe could be made of bronze, iron, or steel. For Aristotle **only** in artificial things is the function (and the organ-organization) added to a separately defined body, so that the body could be made of iron,

or bronze, or steel. For example, a bed can be made of metal or wood. The material is not defined by the bed-function. Aristotle quotes Antiphon who said that if the wood in a bed sprouted, it would produce a tree, not a bed. In contrast, a living thing has matter that cannot be other than what the living activities determine and generate. In living things **the functioning determines, makes, and is the kind of matter it is.**

Traditionally it was said that II-1 is about the soul as formal cause, while II-2 is about it as the efficient (moving) cause. As we see, this is not completely correct. Aristotle just derived the moving cause here in the last part of this chapter as being the form, logos, and first actuality of the living kind of body. But it is true that all of II-2 will be about the form as moving cause.

18. On the Proportion from the Eye to the Whole Sensitive Animal 13 A2

ὥς μὲν οὖν ἡ τμησις καὶ ἡ ὄρασις, οὕτω καὶ ἡ ἐργήγορσις ἐντελέχεια,
 ὥς δ' ἡ ὄψις καὶ ἡ δύναμις τοῦ ὀργάνου, ἡ ψυχή· τὸ δὲ σῶμα τὸ δυνάμει ὄν·
 ἀλλ' ὥσπερ ὀφθαλμὸς ἡ κόρη καὶ ἡ ὄψις, κακεῖ ἡ ψυχή καὶ τὸ σῶμα ζῶον.

ongoing seeing (orasis)	as	ongoing life-activity
can see (opsis dynamis)	as	soul psyche (first actuality)
pupil	as	body
opsthalmos	kore	opsis ----- psyche, soma zoon.
eye	pupil	can-see soul body animal

These three are our familiar two actualities and the body.

When Aristotle makes a concept, he makes it right in front of us and leads us to make it along with him. Here he moves from the function of the part (which he has shown) to the function of the whole. **Just as** the eye consists of its matter-and-power-to-function (its pupil-

and-can see), **so** the soul-and-body make up the animal. It is a proportion; the concept of the function of the whole animal is jumped to from the part.

In the order in which we discover parts and wholes, the parts come first, but in nature the whole determines the parts -- a seeing eye determines its parts. And an eye exists only within the whole functioning animal. We jump FROM the parts TO the whole, but once we get it, we have to say that the whole is prior, and determines the parts.

Aristotle's earlier examples were from plants. Now the examples are coming from animals.

Did we not already have the function of the parts earlier (12b2) about the pericarp and the leaf? But there the functions of body-parts were shown only in relation to **each other**. Here we have the eye's own seeing as its **own** function.

Aristotle characteristically does not render everything in one whole; there are sub-systems with independent functions and distinct limits. There is not only one overall body-pattern. Rather, each part is again its own kind of organized whole.

19. In What Way Is Chapter II-2 Another Fresh Start in Relation to II-1?

Aristotle does not mean that in his own first chapter he was foolish like the people who give definitions that fail to contain the cause. I noted that he did tuck in the cause (at 412a14), namely "self-nutrizing." This is the cause and middle term for attributing "life." But he did not show how he arrives at the cause. How to arrive there belongs to this second chapter. Aristotle begins our chapter by saying:

"Since it is **from** things which are obscure but more obvious **that we arrive at** that which is clear and more intelligible according to its proper account (logos) . . ." Everyone knows that humans are alive and also die, that animals live and die, and that plants grow. Everyone knows water and sky and sun and earth and food and sleep, and life and death. **For Aristotle these familiar fuzzy understandings are the "principles" or "sources" of an inquiry**, insofar as inquiry begins with obvious things whose nature is obscure. (*P.A. II-19, Metaphysics I-1*). In reading Aristotle we need to remember **initial** "principles" (arche), as well as the "principles" (also arche) at which we arrive last.

The chapter is arranged in the order of discovery. We begin with ordinary observations

(of growth, for example) and gradually arrive at the causes. In contrast, in the “order of nature” the complete form is prior. That was the order of II-1. The causes and species are first in the order of nature. For example, while this little plant might be just a green shoot, the plant from whose seed it came is complete. In nature some substances are always already complete. In contrast, the individual begins as an embryo. In the individual the complete form and power to enact all the activities comes last. Similarly, in the order of discovery we arrive at the principles and sources of motions last. In the order of this chapter we begin at the bottom.

20. The Analogy Is Itself an Example 13 A1 1

diagram

The same single line (x) is the **long side** in the little triangle, and the **short side** in the big triangle. The line x is the mean proportional, the middle term of the proportion

$$\frac{a}{x} = \frac{x}{b}$$

as

Once you have found the line x, you can **generate** the square whose area is equal to the given rectangle. In geometry a figure is generated by a line that moves in a certain way. For example, a cone is made by a line fixed at one end, with its other end moving around a circle. A square is generated by moving a perpendicular line along a line of the same length. The soul is like the line because it is the generative cause of the living thing.

The soul or cause is the mean proportional, the middle term. It is the **potentiality** for the activity, **and** it is also the **actual** form of the body.

Aristotle's examples usually have this reflexive character. For instance in *P.A.* one of his examples of a middle term is the cause of an eclipse of the moon. It is the earth's coming-between sun and moon, like a cause or middle term comes between the subject of the first

premise and the predicate of the second.

A "middle term" comes between two terms so as to generate the conclusion. If you want to understand and conclude that all A is C, you need a middle, a "B" such that A is known to be B, and B is known to be C.

Middle terms are what classifies: If A has B then it is in class C. Classification might work if B is merely a mark by which we can recognize class C, but Aristotle classifies by the cause (and in this chapter, by the form-and-moving cause.) So we can expect that Aristotle will present the causal links, the "middle terms" by which he will classify the living things. They will be what **generates** their bodies and their activities.

In the geometric example, **one** line defines the **one** square which is equal in area to an infinite number of differently-shaped rectangles. So also does a soul-power, for example sensation, define many very different animal bodies, organs, and modes of sensing.

Illustration: Many different rectangles are "squared" to the same single square.

For example, here are two rectangles: Sides 30 x 2 = area 60, and sides 12 x 5 also = area 60. They have the same area and the same mean proportional line. The diameter of one circle is 32, the other only 17. The same mean proportional line appears, but much closer to the edge of the larger circle, closer to the center in the smaller one.

21. About "Mortal Beings"

Only in mortal beings does living require nutrizing. God or the nous-activity of the universe (*Metaphysics* XII-9, 1074b35) is a "living thing" but without nutrition.

22. Kinds of "Separate" and "Inseparable"

Among the various types of separability/inseparability he has shown here, some occur only in this chapter. Others, especially the first two below are familiar to readers of Aristotle. We will meet those again.

- 1) Aristotle raised the question whether these soul powers (moving causes) are

separable from the body like a sailor from the boat. The answer was that this might be the case only with nous.

The other soul powers are inseparable from from the body because they **are** forms-of-body (or forms-of parts of the body).

These forms are the actuality (completeness) of the body. Therefore they are inseparable from the body. Their unity is between actuality and that of which it is the actuality.

2) These parts are also not separable from each other in space. Cutting a plant or an insect in half does not split between parts of the soul. Each half has all the soul parts together. If the living thing has several soul-parts, they are spacially inseparable.

3) The soul (in plants and insects) **can** always be divided (is **potentially** divisible) into two, but each half **actually** exists always again as one undivided whole soul with everything that the original one had.

So this is a third kind of separability/inseparability: "one in actuality, potentially many."
(413b16)

4) There is an actual kind of separability between the soul-powers across different species. We see that nutrition **can exist actually without** the other powers in plants, and nutrition and sense can exist actually without locomotion, and all these without the dianoetikon.

5) "Only in definition" is another kind of "separable." Sense, pleasure, and desire differ **only** in definition. They are quite different powers but in no living thing does one of them exist without the others.

23. On the Order in the Lists

Only now is he classifying animals. To do it he will order them so that soul-powers that can exist without others come first. The nutritive is first, since it can exist without any others.

Then the senser, then locomotion, then last the thinker. **Neither of the two lists he gave us are in the order he defines here at the end.** We have to recall that there are living things that sense but do not move from place to place. Therefore animals that have locomotion have to be classified after sense and before thinking. Neither of the two lists (413a20 and 413b13) is in the order that would serve to divide between the species.

We have to keep in mind that he is classifying only mortal beings (413a32).

The first list (413a20) is ordered from the top down, the highest first, and activities are listed before motions. It begins with nous which occurs only in humans who have all the other soul-powers too, so they would all fall together. Or, if we run this list from the bottom up, nutrition would be the right start, but locomotion could not be the second group, because locomotion always requires sensation but some animals have sensation but lack locomotion. So as the second group locomotion would include most but not all of the animals that have sensation. Then sensation would not work as a separate third group.

The second list (413b11-13) begins with the nutriter but the senser and thinker come next, before locomotion. This is a list of soul-powers, not living things. There is not a “**mover**” since locomotion does not involve a separate soul part. Locomotion is done by the senser, and has both sense and thought for its objects. The sections of the De Anima are arranged in this order because sensing and thinking are both needed **to discuss and explain** locomotion. But, since all animals that think have locomotion, locomotion could not be a separate class of animals, if those that think are **classified** ahead of those that locomote.

To classify the living things as he says here, one needs an order which separates them by adding successive powers. He says that living things that exist without the next-added power must always come ahead of those who have the next one. But he offers no third list.

Aristotle has already used this way of dividing but only to distinguished plants from animals (413b2-4). Now he has established this as the way to classify all living things by their soul parts.

Immediately below, in the next chapter, he explains this order further. Before he does so, he has to discuss the relation between the different powers and the forms of the bodies.

24. On Why the Moving Cause Differentiates the Species.

Why is just the **formal** cause (II-1) the comprehensive definition of all living things? Why is it the **moving** (efficient) cause which defines and classifies the different species, rather than the formal cause?

Since the soul is both the formal and the moving cause, could Aristotle have done the opposite of what he did in the first two chapters? Could he have written a first chapter using the **moving** cause for a comprehensive definition of all living things, and then specified the different living things by their different **formal** causes? If we cannot answer, we probably don't understand these causes. Doesn't the formal cause come in these different forms of living bodies, as well as the moving cause? Once we have the different moving causes, aren't they different formal causes too? Why did Aristotle keep the formal cause merely on the meta-level: (they have **the kind of form** which is also the source of their moves and rests)? Couldn't he have said the very same thing as a **general** statement of the moving cause of all living things? Indeed, he gives this general statement of the moving cause here, in the proof. He calls it "a form" that is active in a matter as its receiver. Couldn't he have said that first, and then used the formal cause to differentiate the different living things?

Yes, he could have kept the moving cause general, and treated the variety as the different forms of the living bodies, but this would leave the question **why** they have different forms. **Then he would still have had to discuss each of the different activities and the different moving causes (soul powers) for them, so as to explain the reasons why the different living things have to have the different forms of body.** The different activities explain **the reasons for** their different forms.

In modern terms we also say "form follows function" (i.e. is determined by function) but can we see why? If you see an odd shape on an animal's body, what do you ask? "What is that for?" And the answer is usually something that part **does**, or something the animal does which requires that part. In the case of tools and machines this is obvious. You ask "What are these little wheels for?" and the answer is some role they play in some activity. In nature could it be the other way round? Once in a long while some part happens to be there, and only later acquires some use, but this is rare. Did giraffes somehow have long necks and only then discover that the leaves at the top of trees taste better and are more easily digestible? Or did the **functioning activity** of reaching the high leaves precede the form-of-body with the long neck? The function of eating the more digestible leaves came first, even in modern theory.

Those who happened to have slightly longer necks ate higher up and survived more often, thereby breeding longer and longer necks.

In instances like that of the giraffe we have a material explanation (“natural selection”) of how the function causes the structure, (although modern theory has no explanation of how the new structures of new species arise). The ubiquitous functional aspects of every kind of living thing have been well studied in modern ethology, zoology, and botany, but no basic concepts have been derived from them. In most cases there is a gulf between the functions and our physiology and neurology.

Since Aristotle defines (formal cause) all bodies by how they move or function, their different motions and functions determine the forms of their bodies. Therefore the different species are classifiable by the internal sources of the various activities and motions which determine their bodies.

25. Questions on the Proof

a) The first premise says only “That by means of which we **live and perceive** is spoken of in two ways . . .” Why is **thinking** not mentioned? Of course this is because we think by means of nous which is not dual because nous does not involve the body. But then, why is **knowing** said to be spoken of in this dual way? Exactly why does “that by means of which we **know**” have this duality which “that by means of which we **think**” does not have?

b) Is the active nous (as discussed in III-5) part of what is meant by “the soul” in the dektikon role? Where, if at all, would the active nous be placed in this proof? Of course Aristotle cannot explain this here, but if we have read III-4 and III-5 we should be able to answer.

c) Where does health fit in this proportion? If knowledge is to **soul** as health is to **body**, what is the soul/body relationship in this proportion? I must tell the reader some of what Aristotle wrote about health in other books.

d) In the examples, the soul is mentioned as a recipient (**dektikon**), but the conclusion is that the soul is a form and not a recipient. How does the example fit with this conclusion? Since the soul is the passive or secondary of the two in the first premise, how can he simply say in the second premise that it is the **primary** of the two?

THE FOLLOWING ENDNOTES ATTEMPT TO ANSWER THESE QUESTIONS

26. Knowledge in the Soul

The first premise does not include thinking, whereas the second premise includes it.

- 1) That whereby (ὅ) we live and perceive is spoken of in two ways,
- 2) The soul is primarily (*protos*) that by means of which we live, perceive, **and think** (Καὶ διανοοῦμεθα).

The soul is "primarily" that whereby (ὅ) we do all three, but in the case of thinking **it is not** spoken of with this duality. Why not?

Since nous is not bodily, Aristotle treats the duality of the living and perceiving soul separately from the duality of knowledge/soul. They are not the same relation, only analogous. But Aristotle's view that the means by which we think is not bodily does not answer the question why that with which we think is not dual. Isn't that whereby we know not bodily either? And yet he says "spoken of in two ways, as is that by means of which we know (we so speak in the one case of knowledge, in the other of soul, for by means of each of these we say we know)."

Why is the means for knowledge dual in this way, whereas the means for thinking is not?

I will now show in what way knowledge is the potential nous-soul's "form-and-generative cause," the main topic of our chapter. Then we will see why this is not so in the case of active thinking.

The potential nous consists of no machinery, no organ, no additional bodily part, only the forms which it is habituated to know and think. Aristotle says that one cannot think (*dianoia*, combine concepts) until one has grasped and learned some concepts (universals). For Aristotle the nous by means of which the soul does *dianoia* is not bodily and is **nothing in act** before it learns.

“That part of the soul, then, called *nous*, (and I speak of *nous* as **that by which (ὅ) the soul thinks (*dianoesthai*)** and supposes (*ὑπολαμβάνειν*) is no existing thing in act (*energeia*) before it thinks(*noein*)” (429a22-24)

ὁ ἄρα καλούμενος τῆς ψυχῆς νοῦς λέγω δὲ νοῦν **ὅ διανοεῖται** καὶ ὑπολαμβάνει ἢ ψυχὴ) οὐθέν ἐστιν ἐνεργεῖα τῶν ὄντων πρὶν νοεῖν· (III-4, 429a.22-4)

There are three conditions:

a) **Before it thinks at least some universals**, this "potential nous" has no actual existence.

b) **After it has learned**, when it thinks, it is in act **nothing but** the particular forms it thinks just then

c) **Only qua potential is this soul all the forms it has learned**, so that it has a kind of existence of its own. As knowing many forms, this soul is something more than any one form which it actively thinks. Once the knowledge-forms are acquired, the soul has the knowledge even when we don't think, for example when we sleep. Once acquired, the knowledge of the potential nous is its own **first-actuality**, an existence of its own but only potential, without **actively** (*ἐνεργλεια*) thinking. Knowledge is a "first actuality" (*ἐντελέχεια ἡ πρώτη*) as Aristotle said in II-1 (412a27-28), i.e., knowledge is the actual form-of something (this part of the soul) and also the potentiality for the activity.

At that point we, the soul-and-body humans, have the developed habit so that we **can think** whenever we wish. And this can-think is dual, the knowledge forms and the soul.

But actively ongoing thinking is not dual. In thinking only just this or that form is enacted. Of course we have our knowledge also during thinking, but only potentially. The habit is more than the enacted thought, but a habit always remains potential, the power for the activity. That is why Aristotle adds the caveat in III-4 (429a28) where he says that those were right who said nous is "the place of the forms," **except that this is so only qua potential.**"

The knowledge is the can-think soul's formal and generative cause, (what I have also called an "internal form-and-moving cause"), the kind of cause that our chapter is about. The potential nous-soul is **the receptacle of** the knowledge-forms. We **know** "by means of the knowledge" and also "by means of the (habituated can-think) soul." This dual relation is analogous to health and the body, an active form-of something receptive.

Qua potential, **all** the knowledge is the form and first actuality of the nous soul. But this is only the potentiality for a thinking activity. Only the form that is being enacted is in act. The activity of thinking is not dual.

THIS LINE OF DISCUSSION CONTINUES THROUGH THE NEXT TWO ENDNOTES.

27. *Is the Active Nous Part of the Soul in the Example in the First Premise?*

Some commentators doubt whether the active nous is part of the soul. In III-5 Aristotle says explicitly that the distinction between active nous and potential nous is a “difference **within the soul**.” There he says explicitly that active and potential nous are parts of the soul. But only the potential nous is formed by knowledge forms. The active nous does not change (Physics VII-3). The active nous is not in the role of a dektikon.

But what the active nous enacts is determined by what is being grasped just then. The active nous does not determine whether we think of grass or the sky, nor does it determine what color they are. It “makes” (enacts) **their** understandables just as light makes their actively-sensed color forms. Aristotle calls the active nous the “poietikon” (ποιητικῶν), the maker, “like light which makes (poiei) potential colors into active ones” (III-5). Similarly, the individual carpenter does not invent the chair form. It stems from the carpentry art (and from the human sitting function). In another book Aristotle calls the carpenter a “poietikon” and says that the carpenter moves differently when making a table, than when making a chair (*Gen Animals* I, 730b12-26). But according to Aristotle our activity of understanding does not move at all. Just as the carpenter only enacts the chair form into the wood, the nous (like light) does not invent the forms of the things, but only enacts them as understanding-activity.

28. *Health and the Proportion of Soul and Body*

Shouldn't Aristotle have said (notice: he did **not** say) that knowledge is to **the soul** as **the soul** is to the body. Why not?

The proof is meant to bring home that the soul is the form-efficient cause of the body. Knowledge is the form-efficient cause of the potential nous soul, but of course knowledge isn't the form of the rest of the soul, only of the nous-soul. And the nous soul is not the form of the body. So Aristotle has to split knowledge/nous-soul from living-perceiving-soul/body, although they are analogous in that they are each a form-and-efficient cause shaping its receptacle. So the duality is similar.

Could he have said that knowledge relates to the nous soul as the nutrizer-and-perceiver soul relates to the body? But this isn't so either, as Aristotle says in a little read treatise: Knowledge has a contrary – ignorance – and can be destroyed by forgetting, whereas the nutrizing and perceiving soul has no contrary, and cannot be destroyed at all, except “accidentally” through the body. The soul as such has no possible mode of destruction of its own. Parts of it die only because of the destruction of the body (*Length of Life* II, 465a12-b10).

The soul can exist without knowledge but the body dies without the living-perceiving soul.

Note: **The health-form is not the soul.** Health and illness corresponds to knowledge and forgetting. One has a living-perceiving soul although sick, just as one has a nous soul although ignorant. **Therefore he uses the analogy of health.**

Aristotle frequently pairs medical knowledge and health in his works. Let me say why he does. If we take the knowledge as medical knowledge in the soul of the doctor, the knowledge is the same in form as the health in the body. The doctor thinks the health-form as a form-**of-body**, of course, but the doctor can know the health-form and yet be sick. The knowledge-form in the soul of **an individual** is not the health-form of that person's body, but they are the same in form, i.e., the form of the body.

Let me now fill the reader in on what Aristotle has said about health in other places. The body heals itself if nothing impedes. The healing-form is an internal formal-moving cause, like the principle of motion of inanimate bodies in that it is always in act unless something else impedes it. The physician only removes the impediment to the body's internal self-healing.

The health form is the active self-healing of the body. It is the formal-moving cause of every living body **as body**. The doctor cleans the wound and removes impediments but then can only wait for the body to heal itself. We still say this, although the living body's self-healing is not well understood. For Aristotle the matter of living bodies is different from that of inanimate bodies. One difference is their self-healing as their active internal formal-and-moving cause as bodies. Aristotle says that health is like a medical art inside the body.

The health-form is knowledge in the doctor's soul. It is also a form-moving cause in the living body.

medical knowledge		health
_____	=	_____
soul		body

The relation of soul and body does not emerge on either side. It emerges only if we view the proportion by alternando:

medical knowledge		soul
_____	=	_____
health in body		ensouled body

On both sides the relation is form
form&matter

29. Proof in II-1 Compared to Proof in II-2

In II-1 as here Aristotle proportions the soul to knowledge, **just as** . . . **so** . . .; We often see Aristotle's use of proportions to create new concepts. Let us pinpoint the difference:

The analogy here cuts across the analogy in II-1: In II-1 knowledge and the soul were on the same side, (we have them when sleeping as well as when waking), as against ongoing **contemplating** (theorein) and other life **activities**. Here in II-2, **differently**, knowledge is in contrast to soul. Knowledge is the active form like health, while the soul is the recipient of the form, as the body is recipient of the health-form.

This chapter's proportion cuts across the proportion in II-1. In II-1 -- **like knowledge** -- the soul is a first actuality. Here, In II-2 **knowledge** is the form -- whereas the soul is **formed**. Back in II-1 we said "Oh, yes, a person **actually** has knowledge and a soul (is alive) both asleep and awake; so that is what "first actuality" means, the can-do which is actually there whether in action or not.

Here we say “The knowledge-form is an internal efficient cause; it is the form which the potential nous-soul **becomes** as it learns (III-4&5). But this applies only to the thinking part of the soul.

In II-1 all the parts of the soul (including those that are form-of-body) are **like** knowledge in being a first actuality. I wondered in II-1 why Aristotle chose to compare the soul to knowledge since knowledge is not the actuality-of a body, and I answered that this shows that for Aristotle an **actuality** can exist as such; it need not be the actuality-of something. That is true, but we see here that knowledge is the actuality-of the potential nous soul.

30. On the Self Organizing of Growing and Perceiving

Aristotle greatly changes the meaning of “form.” It doesn’t mean what it means for Plato, or in common English. We see this best right here. The form is an inner forming-activity which accounts for the living thing’s form-of-body as well as its observable motions and activities.

In Aristotle’s *Physics* the kind of motion which defines a body is due to the **internal** activity (heat) which holds the body together and maintains the proportion of its elements. In natural bodies the formal defining cause of a body also determines its motion.

Knowledge/soul and health/body are analogous to how sensation and nutrition are active soul-forms-of the body. Aristotle will show in the coming chapters how he can study sensation not just as a reception of outward forms, but as an internal form-and-efficient cause, an internally active **forming** in the sense-organs and in the sensitive flesh. And nutrition is the internal formation of the body from an embryo.

To understand Aristotle we need to see in what specific way his approach differs. In modern science the living activities such as desire, perception, and nutrition are explained as passive effects of chemicals and molecules that are moved in certain ways. These passive and separable molecules are taken to be “the body.” There are no concepts for how the complex life-functions organize the body. Since there are no concepts about this higher organizing, we encounter it as a host of “anomalies.” For example, in the development of an embryo a certain molecule stretches out into a long string, so as to effect a certain development into some organ or later body-part. The mechanics of this is taken to be the embryonic process. Then it becomes a puzzle why this stretching out and other such events are “controlled” by a

neighboring molecule which is otherwise simple and chemically well-defined. If that innocent-seeming molecule is moved, these processes do not occur. (Pattee). Such unanswered questions concern higher organizing activities which seem to determine chemical and mechanical formations, but cannot be studied within the kind of concepts of current biology.

Aristotle's strategies are still of interest, despite our vastly greater knowledge. For example, they may become useful in the current attempts to restore "self-organizing" as a concept in biology (Kaufman, Ellis).

In our passage here the basic strategy of Aristotle's life science is to consider **higher order active self-organizing processes as functionings and material formations.** That appears to be the meaning of "a formal cause that is also an internal moving cause."

31. The Desire for Food Presupposed in Touch

People have always found it easier to understand material and moving causes. Formal and functional causes are more difficult. As moving (efficient) cause the sensation are the pleasures or pains, and thereby the desires to pursue or avoid. In this respect sensation would be listed first. But food is **functionally** prior to sensation, Aristotle demonstrates that this function defines the sense of touch. In that respect the function of food is prior to sensation. The desire for food is of course part of nutrition in animals since they must find and sense food. This is prior and is the formal and functional definition of touch. On the other hand, sensation is the material and generative cause of desire. **So the causation goes both ways in different respects.**

The moving cause and the final cause are quite often reciprocal in this way. As the moving cause, exercise produces health, but as the final (functional) cause one walks for the sake of health.

For Aristotle the function (or final cause) usually determines what the other three causes "have to be, if" the function is to happen. Therefore Aristotle is more likely to have put desire ahead of sensation on the list.

Because it is easier and more common to think in terms of moving causes, therefore people want "desire" to come after "sensation" on the list. The manuscripts differ. Apart from my argument above, can we determine which would be Aristotle's original, and which is likely to

have been a change that someone else made? We can make an educated guess. Since desire **obviously** requires sensation, while listing “desire” first is **more difficult to understand**, we can guess that desire was listed before sensation in Aristotle’s original. If Aristotle had originally placed it after sensation, no editor or copier would have moved it to where it is more difficult to grasp.

For Aristotle the living of animals is integral to what nature is. Later on, in II-11, Aristotle says that touch defines the hot, cold, fluid, dry, by giving them their proportions. “It is **the defining qualities** (διάφορον) **of body**, *qua* body, which **are tangible**. The qualities which I speak of are those which define the elements, **hot and cold, dry and fluid**” (II-11, 423b27-29). Touch defines the elements in his “chemistry” (*De Gen & Cor*) (formally, by proportioning them), and touch is also defined by them (materially, since flesh is composed of them). So for Aristotle it isn’t that some of the things which are made of hot/cold fluid/dry elements just happen to be food. Rather, **the food-function** defines the sense of touch, and the sense of touch defines the proportions between the tangible definitions of the elements of which all bodies are composed.

To understand Aristotle here we cannot just assent to the familiar facts he states. We want to understand the approach he applies to these facts. In Western science animal perception is given no role in defining or explaining anything. Only our theories define the orderly relations we study. For Aristotle animal sensing is also an ordering process which defines nature.

32. On Numbers

The **three** soul-parts and **three** object-forms are in a complex interplay with the **four** activities.

The soul power for locomotion is desire (III-10) but this is the same soul-part as for sensing because it is always the sensation itself which is pleasant or painful. What pain is, is inherently the desire not to have it. The pain is the aversive sensation itself. Conversely the pleasant is the wanting more of it. Extremes are painful, sensations within the sense-proportion are pleasant (III-2, 426b4-6-8). Since the desire is the actual sense, therefore they are the same soul part although desire is a different potentiality (and its object is a potential sense-condition that does not actually obtain).

There are only three kinds of objects because locomotion has sensible and thinkable things as objects and adds no additional object type of its own.

In II-3 there are four activities because locomotion is a separately added activity, since some animals sense but do not locomote (change their places).

In II-2, in the list of potentialities (413b13), threptikon, aisthetikon and dianoetikon are listed with their “ko” endings, but we noticed that “kinesis” (motion) is listed, not “kinetiko” (the mover). (θεραπευτικῶ, αἰσθητικῶ, διανοητικῶ, κινήσει.) Why not? Although these four separately existing activities involve four potentialities (II-3), the locomotion-power is not a different soul-part (which is the concern of II-2). In II-2 there is not a “mover” since desire and locomotion are by the senser.

But in the list at the start of II-3 Aristotle discusses not powers each of which can exist without the others (as in II-2), rather now he also includes powers that are never found or added alone. Here the orektikon can be in the list, and also a “kinetikon.

33. On Dianoetikon

In the top-down order in the starting list of observable motions and activities (II-2, 413a24) “nous” was listed first (412a23). In contrast, in the list of potentialities (II-2, 413b13) (as also in II-3, 414a29) Aristotle lists not the “noetikon” but the “**dianoetikon**.”

Aristotle says that nous requires an entirely different discussion than logismos and dianoia. “Dianoetikon” names the soul-power to think (dianoia) and combine thoughts, partly guided by the sensitive mean (III-7). Dianoia can be mistaken because it combines (συμπλοκή, *Meta* 1027b.29-30). It dies, he said explicitly in I-4, because it is done by the soul-and-body. It involves the flesh: Aristotle says that finer flesh makes one better at dianoia. “People with hard flesh are poorly endowed with **thought** (*dianoia*) (II-9, 421a23-26.)

The noetikon, in contrast, is not bodily, has no matter, and is just the soul’s potentiality for grasping forms (eidei). As just a power, just potential, it does not actually exist at all (III-4, 429a24).

For purposes of classifying the animals “dianoetikon” will do, since only humans have it so that adding nous characterizes no further group. Only God doesn’t fit since God has nous, but no dianoetikon. That is one reason Aristotle separates nous and the “theoretikon” (413b24-

27) from this classification. Aristotle separates nous also because it is “separate” from the body, and because he cannot discuss it here. It need not be discussed since he limits the classification to mortal beings (413a31).

In II-3 Aristotle says that the later-mentioned powers **presuppose** the earlier, but nous does not presuppose the earlier ones since God and the universe have nous without the other powers. So again he has to limit the groupings to “perishable” living beings (415a7-12).

The “dianoetikon” and “nous” are cited separately at 414b18 (he says that some animals have both). At the end of the chapter (415a7-12) he says: “**The contemplative nous** (νοῦς θεωρητικός) **requires a separate discussion** (logos).

On dianoia see ENDNOTE 8.

34-35. Neither One Activity nor Two (415a24)

For Aristotle life-activities are inherently interactions. What he calls the “object” is the external thing with which the living thing is in interaction. In nutrition the external object is digested and takes on the living thing’s form. In sensing and understanding the living thing takes on the object’s (potential) form. In either case the activity has only one form, the form of the interactional activity.

The two “works” or functions are from the same power, and they are interactions with the same external thing, food. They also have the same form, the living thing’s form. **Only in act** do growth and reproduction differ. But since they have the same object-form, and this is what defines an interactional activity, they are not two activities. **That is why he calls them two “works,” neither one activity nor two activities.**

In *Generation of Animals* Aristotle emphasizes that the power is the same, but the two works are never in act together; rather one continues into the other. The ensouled thing

grows **itself** and then -- when it merely maintains itself and has stopped growing -- **only then** does it make an offspring (which then grows itself in turn).

36. On Whether Plants Desire (Oregetai) 415b1

Plants don’t have desire as a soul-power, but he uses the term here in a special way as

he does also in the *Metaphysics* (1072a26) in the same context as here. The first mover is likened to “an object of desire” (ορεκτον) **of the whole cosmos**. When we desire something, it causes **us** to move. The object of desire needn’t do anything. It need not move, but nature’s motions arrange themselves in relation to it. The motions come from within nature.

This is further discussed in the next ENDNOTE.

37. On the Two Kinds of Final Causes

Type “FOR WHICH” (οὐδ): Does only the reproductive part of the soul have eternity as its final cause? Aristotle says “for the sake of that (eternity) they do **whatever** they do according to (their) nature.” The “nature” in each thing is its internal moving cause. The natural things originate their own motions and activities, aimed at eternity.

Nous is not nature, but creates in parallel with nature. At the end of this note I comment on that distinction. All soul activities have eternity for their final cause.

Type “BY WHICH”(ὅ): **The soul is the kind of final cause which is also the means by which** the end is achieved. The natural bodies are employed in digestion and in making artificial things, but this is a different kind of final cause. The natural bodies do not organize themselves in relation to the soul as their final cause. The soul is not the object of their desire. The food does not of its own accord turn into the animal-form.

In nutrizing and growing, the soul makes the completion, the complete form-of body, which the soul also is. Many translators misunderstand this double role of the soul as maker and final cause. According to the English Greek grammar, the “ὅ” can mean “instrumental” or “beneficial.” The latter is the source for the translators’ phrase “for the benefit of whom.” But the soul is not the beneficiary of the activities; rather it enacts them. They happen “by means of the soul,” and the soul is also their telos, the completion of the body. (On telos see *Physics* 193a13-194b1).

Aristotle said a few pages ago in II-2 that “the soul is the primary “ὅ” **by which** we live, perceive, and think.” Notice again that the soul is that by which **we** live, perceive and think. In Book I, (I- 4, 408b15) he said that it isn’t right to say that the soul pities or thinks. Rather, **we** pity and think **by means of** the soul (the same grammatical case as “ὅ”). The “ὅ” appears in II-2 twice in this connection. See also II-12, 424a25, and at the start of III-4, 429a10 and 23, as

well as at III-10, the instrument of moving.) At the end of our chapter “ὧ” occurs four times as means which are each also an intermediate end.

In the *Metaphysics* (1072b1) there is a similar distinction between two kinds of final cause. (In both the Loeb and the Ross editions the translators insert a whole sentence about beneficiaries which does not exist in Greek. (ὅτι δ' ἔστι τὸ οὐ ἕνεκα ἐν τοῖς ἀκινήτοις, ἢ διαίρεσις δηλοῖ· ἔστι γὰρ τινὲς τὸ οὐ ἕνεκα Ἰκαὶ τινός, ὧν τὸ μὲν ἔστι τὸ δ' οὐκ ἔστι. κινεῖ δὴ ὡς ἐρώμενον κινούμενα δὲ τὰλλα κινεῖ.)

Aristotle says that one kind of final cause exists in eternal things, the other does not. The eternal kind moves something without moving, rather by being loved or aimed at. The other kind moves something by doing the moving.

In the *Physics* (194a28-34) also there are two kinds of final cause; again one of them is a means. For Aristotle, the means (“ὧ”) is usually a chain. **Each link can also be something that is aimed at in turn.** (*Physics* II-3, 194a28 and 194b36.)

In our chapter, the chain of means runs through food and heat. Food as a means is “**that by which** it is fed,” the “ὧ τρεφεται.” Food is also called the “equipment,” i.e., a means, (ροφη παρασκευάζει, 16b19). At the end of the chapter, heat is cited as a means that aids digestion. In medicine the chain of intermediate final causes includes many means. For example, when a doctor prescribes a medicine, obtaining the medicine becomes an intermediate aim. The art of shipbuilding aims at the ship as its telos, but the ship is equipment and means for the sailor. **Insofar as it is aimed at, each means is also a final cause.** In contrast, a “beneficiary” would be separate, merely profiting but not a link in the action.

Above I used justice as an analogy: Nature **aims at** eternity somewhat like a court aims at justice. The court is the means **by which** a judgment is achieved. Justice does not move, but it moves the judge and all the participants to arrange themselves to aim **at it**, so as to arrive at a just judgment. The finished judgment is the aim of all the proceedings, the chain of intermediate means. One aims at a court date, one works with the aim of finding witnesses, hearing testimony. These are intermediate aims, final causes, links in the chain. The judgement is their telos, their completion for the sake of which they are means. The court is that **by which** justice is done in the situation. The court does not benefit from it (or at least, should not).

In our case the soul qua moving cause is the means by which the body acquires its

complete form which is again the soul. And the soul is also the means **by which** the mature body engages in its life-activities, one of which is its nutritive and generative work.

So we recognize that one kind of final cause is the same thing (though certainly not with the same definition) as the moving cause. The chain of intermediate moving causes is also a chain of intermediate final causes.

The difficulty is that we are accustomed to separate the four causes utterly. Then it seems that the moving cause (“that by which”) cannot possibly also be a kind of final cause. Of course it is not both in the same respect. That by which we live, perceive, and think (the soul) is moving cause as the source of the activity (the “can,” the power). But it is also a kind of final cause for the sake of which it uses other things.

For teaching the four causes, it helps to make clean separations between them. (See Rosamond Kent Sprague, *The Four Causes, Aristotle’s Exposition and Ours.* *The Monist*, Vol. 52 No 2, 1968.) The favorite example is a statue. The causes are nicely separable when an artificial thing is made: The form is put into the material by an external agent for the pleasure or use of others. But, as Aristotle just showed, in living things the same thing (e.g. the soul) is all three causes, although not in the same respects.

Aristotle has been discussed most often in Latin. “Final cause” and “efficient cause” are Latin terms. Our use of them makes them seem like entities, familiar Aristotelian pieces. But Aristotle calls the efficient cause “that by which” the motion comes. In Greek his terms have the freshness of their derivation directly from ordinary language use. One recognizes the “for which” as a ubiquitous aspect of things. It seems much more doubtful as “the final cause.”

Aristotle says that “nature does not deliberate.” The complete form does not exist in a mind like the form of a thing that a sculptor would make. There is no separate form as a purpose. There is only the form and activity of each living thing. Aristotle observes means-end relationships and regular development. In a living thing its nature (the soul) is the making by which the living thing arrives at its mature form of body, **which the soul itself also is.**

There can be an ambiguity about the phrase “**Of this sort** is the soul in accordance with nature, **for** all natural bodies are organs of the soul.” ὥσπερ γὰρ ὁ νοῦς ἕνεκά του ποιεῖ, τὸν αὐτὸν τρόπον καὶ ἡ φύσις, καὶ τοῦτ’ ἔστιν αὐτῆς τέλος. Can we be sure that it says that the soul is an end, a telos, a final cause, or is the soul rather like nous and nature insofar as it makes for the sake of something? Grammatically the sentence could be read to mean either, and both are true. The phrase “of

this sort" means the sort of thing that is an end, a telos, a final cause, but of course the soul is also the maker by which this happens.

Nous makes. It is a "poetikon," (430a12). Nous makes (enacts) the forms which are the tools for thinking, just as the hand makes (III-8). Nous is that by which (ᾧ) we think. λέγω δὲ νοῦν ᾧ διανοεῖται καὶ ὑπολαμβάνει ἡ ψυχὴτ (429a23).

But nous is not the completion of something. The active nous is always complete. The individual development of our potential nous is not something generated either. Aristotle argues in *the Physics* (VII-3, 247b1-248a7) that the acquisition of knowledge is not a becoming. And in the *Ethics* he says: "The activity of nous (nou energeia) ... in theorein... aims at no end (telos) other than itself" (X-7, 1177b).

38. On the Arguments for the Efficient Cause (415 B 12)

The proof(s) about the source of motion differ somewhat from those about form and final cause. On substance and on the for-the-sake-of-which Aristotle first defines that kind of cause in the first premise by saying what it causes. Then, the second premise says that in living bodies the soul does that. (Substance is the cause of being in anything. In living things their being is living which the soul causes. The final cause is that for which something is made. The natural bodies are used in the soul's forming of the body.)

For the proofs concerning the source of change, the premises are that this specific kind of change occurs **only** in living bodies, and that these are ensouled bodies. The compressed proof is: Since these motions happen only in living things, something about living accounts for why these motions happen, and the soul accounts for living.

Only on the source of motion does he have three kinds. Perhaps this is why the proof(s) on "motion" differ in this way from those on the formal and final causes. But I am not sure that this is the reason for the difference.

1 On **change of place** he doesn't offer a proof, saying instead that this is not coextensive with "living" (i.e., soul). Not all living things have locomotion. I would add: Many non-living things also change their place. Stones roll down the hill. So change of place is neither true of all living things nor only of living things.

2 On **alteration** (qualitative change): Sensing is “generally considered” (dokei) a kind of alteration. In the next chapter he is more specific about what aspect of sensing is change. But since sensing is not coextensive with living, why does he provide a “proof” for sensing and not in (1)? I don’t know why.

He adds “**and growth**” under the heading of qualitative change. We have seen and see here again that growth is of course a change from embryo through stages and that it stops at its completion (in contrast to the activity of nutrizing which always happens fully and completely.) And growing to maturity is coextensive with living bodies and occurs only in living ones (as he has argued above in contrast to fire).

3 Growth is of course **also** a quantitative change in size, while decay is quantitative diminution.

39. On Why the Efficient Cause Comes Last Here

When Aristotle sat down to write something, he no doubt had in front of him a mass of collected material. He needed to organize it along several lines at once, so as to achieve the most economical order. Aristotle rarely tells about doing this.

In our instance it does not matter much, but we often wonder whether the great degree of organization we find in Aristotle’s text is as deliberate as it seems. Are we reading it in? He hardly ever tell us. For example, in our chapter, as usual, he doesn’t say that he is placing the moving cause last among the “proofs,” so that he can continue into the rest of the chapter which will be about this cause. But at the beginning of *Generation of Animals* (I-1 715a15), where the situation is quite similar, he does say it. He has just completed *Parts of Animals*, and now he is continuing into his next book which treats the moving cause, as its title says. At the start, introducing the book, he says:

“[We will discuss]. . . generation about which I have so far said nothing definite, and of causes we still have the moving cause to deal with, and to explain what it is. And, in a way . . . these . . . come to the same thing, **and that is why** our treatise has brought the two together **by placing these parts at the end of our account** of the parts, and by putting the beginning of the account of generation immediately after them.”

In our chapter also, Aristotle puts the moving cause last deliberately, so that he can continue with it for the rest of the chapter.

40. On Holding the Elements Together (15 B 28)

Aristotle rejects the theory of the atomists according to which the atoms of the elements are actually present in a mixture. Aristotle argues that the elements change completely when they join in a “mixture” such as bronze, flesh, or bone. “Mixture” is his concept of the material side of **a further organization** beyond the elements. He argues that even the smallest particle of a mixture **is** mixture, so that the elements are **not actually present**. To get an element back, one has either to heat or to cool the mixture, and either to liquify or to dry it. Bronze, wood, or a living body **does not consist of actual** fire, air, water, and earth. Each mixture is a new kind of matter. Living matter does not consist of inanimate particles. The living nutritive function determines the making of the matter. Aristotle rejects how Empedocles defines compounds so that the particles retain their identity “like stones in a wall” (De Gen III-7, 334a26).

Aristotle defines bodies by how they move, so that if particles of earth and fire were present in a living body, they would move in opposite directions and it would come apart. But, while a mixture is **a proportion of** the elements going into the mixture, the mixture itself is a unique form of matter in which the elements change utterly and are only potentially (not actually) present.

For Aristotle any natural **body** that has dimensions and limits (for example, a stone) is held together by the continually ongoing activity of its internal heat. A natural body has an internal “nature” which is something **“aside from”** the elements (Meta VIII-3). SEE ALSO ENDNOTE 2 ON SUBSTANCE.

Living bodies are generated and maintained not just by heat, but by a soul, i.e., a more complex organization with different powers.

As a modern example, ethologists conclude from studies of every kind of animal that certain fixed behavior patterns are “built into” the body, (i.e., they are inherited, not learned), but there are no concepts with which to think how physiological structures generate behavior. It has been found that evolutionarily more evolved species have more complex behaviors. But in our current science there are no bridge-concepts with which to study this linkage. We can see the outlines of such bridge concepts exhibited as Aristotle builds inherent connections from

internally arising activities to functions, powers, organs, the direction of motions, mixtures and the elements, all involved in the body's organization.

41. Why Is the Object of Reproduction Food? (416 A 19 to 21)

One might have thought that "the object" of reproduction is the other species-member. We seldom see or think of food while we are engaged in reproduction. Someone might consider this a very sexless theory. But of course reproduction includes not only intercourse but the whole period of generating the new organism. Very well, but why not the infant? Why is food the object rather than the new creature?

By "objects" Aristotle always means something that exists and "stands over against us." The word he uses here is *αντικειμενα*.(415a20). Hamlyn translates this as "correlative objects." In the second half of the sentence Aristotle says that by this he means "**food**" and "**the sensible**" (*αισθητου*) and "**the understandable**" (*νοητου*). Although translators add the Latin word "objects" throughout the book, Aristotle from now on uses only these words, rather than "objects" (*αντικειμενα*).

The life-activities are what I call "interactions." One single activity involves both the ensouled body and the food. The one activity has one form. In act the body and the thing are both involved making or enacting the form.

The infant is its own life activity. The mother's activity is one with the infant only in that activity which turns food into the animal's form.

The question is the same as why the same power effects both nutrition and reproduction (See ENDNOTE 35).

42. On the Meaning of the Word "Activity" in Contrast to Motion

In sensing, the organs are affected, but their make-up and the sensing **activity** are not affected. Aristotle's concept of "activity" (*energeia*) is basic for him.

Take for example your radio. You need it to be "affected" by the incoming signal, but you need this not to affect the matter-and-form arrangement that makes your radio work. So in one

way the signal has to make a change in your radio; in every other way it must not change the radio. The radio's capacity for its **activity** needs to continue unchanged. If your radio stopped working just when you were listening to a politician you despise, you might joke that he broke your radio. But you would certainly know that its capacity for its activity is not something that can be affected in that way. But a radio is an artificially made thing. It does not determine its activity, the designers do. It does not generate itself by its own activities, as living things generate their bodies from embryos and reproduction, feeding, and growth.

The concept of "activity" in contrast to motion is fundamental to Aristotle. Without it, or something like it, he could not maintain that we are (and live among) living things which **act from themselves**. A science of the living in living things would be impossible.

Aristotle has three terms where we have only two. He has "rest," "motion," and also "activity." An internally arising, self-ordering activity is **more active** (more determinative) than the changes it makes, yet it does not change. It may be better to translate "energeia" as "energy" despite so many centuries between, since in our usage an "energy" can be present without itself changing, whereas in English an "activity" without change can seem puzzling.

In philosophy one has to become accustomed to ways of thinking that change what the words usually mean, rather than assuming that everything can be said in the usual usage of words. There is no English word whose usual use means what Aristotle means. One needs at least a phrase to say that for him "an activity can exist alone" and is in fact the only thing that can. (Motion requires a body.) Our English word "energy" might be used for what he means by "energeia" if we try to say that in English "an energy can exist independently regardless of whatever else exists." We have difficulty imagining an activity if it doesn't act on something but we can imagine an energy that exists as such by itself.

In Aristotle's concept, "an energeia" is also an active organizing. In classical Western science "energy" doesn't organize anything but in modern physics it does. But most people still unconsciously assume the classical physics according to which nature does not make order and laws. It only "obeys" laws. Who makes the laws? The scientists do. In Western history it was God who made the laws which nature **only** obeyed. In our sciences nature still only obeys, but now nothing actively makes the laws. In the modern view nature is only organized, but does not do **active organizing**, **lawing**. In Aristotle's view nature determines; it is not only determined.

Let us not try here to decide the issue. Rather, let us try to grasp how Aristotle's view differs from our usual approach. For Aristotle activity (or energy) is something that actively

exists. But it can seem to be no more than just a regular "pattern." With modern habits we are comfortable with the idea that the bodies and motions of nature are lawfully organized **ed** by regular patterns even though we assume that nature is not doing the organizing **ing**. The motions of bodies which we observe just happen to fit into abstract patterns which we take to be just thoughts. To Aristotle it seems observable that nature organizes itself. It consists of self-organizing activities. Living things not only move and change; they enact their own organizing of their moves and changes.

Motion is always unfinished, always still potential (Physics III-1, 201a10 and Metaphysics XI-9, 1065b21). As long as the motion is happening, it is on the way to somewhere, hence not complete. A motion is never fully actual at any point. It is always from....to. When it is complete, it has stopped.

Aristotle defines motion (including change) as "incomplete activity," or "activity of the incomplete." In contrast, activity is **both complete and ongoing**, the energy of the complete. Activity is the *energeia* of the *tetelesmenon* (III-7, 431a6). *ἡ γὰρ κίνησις τοῦ ἀτελοῦς ἐνέργεια, ἡ δ' ἀπλῶς ἐνέργεια ἑτέρα, ἡ τοῦ τετελεσμένου.*

For example, growth is ongoing change, always incomplete until it stops. But nuturing is complete at any point.

Or, for example, the ball you are seeing is not yet here, rather only **on the way to** your side of the court, but your seeing is complete all the while.

The activity is not to be equated with the changes which it enacts. The activity is the internally arising structuring and enacting of the changes. For example, the activity of digesting is fully ongoing in each moment. "Fully ongoing" means that the phases are happening as organized by the unchanging activity. The food from lunch is going through changes, but unless you have digestive trouble, the activity of digestion is fully ongoing at any moment or period of time.

There is change in what we sense. What affects the organ changes, but these changes don't change the activity of sensing. If hearing a really deafening noise does change the activity of hearing, this change could not be called "hearing." It was not one of those changes which are enacted by the unchanging activity of hearing.

The change that an ulcer makes is not one of the changes organized by the digesting activity. Digestion's own changes don't change the stomach in a way that would change the capacity for the digesting activity, whereas ulcers do.

Not only motions but also the absences of motion are organized by *energeia*. Consider the rests in music. During a rest there is no motion, but the musical **activity is going on**. It determines where the rests come, their length, and their effects in the music. The composer's sense of the whole piece has actively created the spots where the rests must come. Some changes happen only for a short period, others like the heart pounding goes on all the time. But the constant ongoingness of living activity is not the constant heart-pounding. It is rather the functional organizing which determines that the heart must pound all the time whereas other parts must act only briefly at certain stages. The whole chain of motions and changes does not itself change. So we can grasp how activity differs from motion: Activity is the self-organizing functioning which organizes both motions and absences of motions.

For example, in a watercolor, perhaps the clouds are just white space. The painter has moved no paint there, yet the art-activity has made it into a cloud. We might scoff: It's the surrounding paint that makes it have the form of the cloud. In Western science everything is explained by the bodies and motions themselves. It is the same acidic action, whether it eats into the food or the stomach. Of course, we moderns also distinguish between digestion and ulcers, but the difference seems to fall into an "unscientific" merely wishful realm of "values," which is excluded by our science. It seems to make no scientific difference whether acid works within digestion or changes and harms it. Nature doesn't organize itself. Living things don't self-determine their living. They are only affected by chemical and physical impacts. It is considered accidental that certain functions are performed and living happens.

For Aristotle, living substances **exist** as self-organizing "activities" (with the potentiality for enacting them from inside, and the necessary matter). *Energeia* is a higher-order concept which explains what generates and connects the physical and chemical changes. He is just as interested in the latter as our scientists are, but for him the unchanging activities are what chiefly exists and determines what the changes have to be, and why they are as they are.

Throughout Aristotle's works, activity is prior. Activity creates or activates all the things. Bodies continue only as long as their internal heat activity holds them together.

43. On the Senses Not Sensing Themselves (417 B 20)

Aristotle seems to contradict this later, when he says something that may at first sound as if the senses do sense themselves. He says "**we sense that we see and hear.**"

The difference is: When we actually see something, then we also sense the fact **that** we see. But it is always something else we see, and **only thereby** also **that we see**. We cannot see the color of our eyes, except by seeing a mirror. We cannot sense the hot/cold of the flesh with which we are sensing something. We can sense the cold of the snow, or the cold of the air, or some other part of our flesh. A finger can feel the cold of the face. But if we want to sense the cold of the finger, we need to attend from the face, to sense the finger as an object.

Sensing senses the things, not itself, even when it is actively sensing. We see that we see only by seeing some color.

The external thing is needed in two ways: It moves the potential sense into activity and it determines the form (red, cold, or middle C). Without a particular thing, the sense makes no sense-forms. It has potentially all forms and actually none. The activity of sensing is the form-having, e.g., seeing is seeing color. The object-form defines the activity.

Sensing is ready for the whole range of colors, sounds, and touches. Therefore sensing is **inherently potential** in regard to any actual thing that can determine an active sensing. To understand Aristotle from here on, let us keep with us the fact that for him sensing always requires an external thing. It is not as if we sense "sense-data;" rather, we always sense an externally existing thing. In the next chapter he takes up how we can err about what that thing might be. But he asserts here explicitly that if there is sensing, some external thing is involved. (For Aristotle images, dreams and hallucinations are not sensations but memories moving back to us from a storage bank. See *Mem&Recoll.* We will discuss this in III-3.)

44. On Potential Fire and Entelecheia/Energieia

Aristotle says that "fuel doesn't burn itself from itself." In order to burn, the fuel needs "**actually existing** (entelecheia) fire." Wood contains potential fire, but no actually existing fire.

Already in II-4 we saw that the elements in a living body are not quite themselves since they don't move in opposite directions as they would if they were actually existing. The flesh is a mixture. In what Aristotle calls "mixture" the elements are not actually there; they are only

potential. (See ENDNOTE 40. The hot and dry of fire do exist in wood, but not in the extremes of hot and dry which are fire. Therefore fire is present in it only potentially. To heat up the wood to the extreme heat which is fire, you need actually existing fire.

Fire does not have a first actuality, a kind of entelecheia that may be not in act, like knowledge or like the powers of the soul. When fire **actually** exists, it burns.

Aristotle says that actual (entelecheia) fire is needed to kindle the wood. He always uses entelecheia when he argues that something must **already actually exist** in order to cause something else. In the *Metaphysics* XII he refers to the nous of the universe as “energeia” many times, but the word “entelecheia” is used where Aristotle argues that a substance must **actually exist** in order to cause anything else (XII-5, 1071a36). That is also the relevance here of needing actually existing fire.

45. On Changing into One's Own Nature (417 B 16)

“Changing into its own nature” is not an ordinary change, but the developing or enacting of an activity. An ordinary change (or “being affected”) is **change into something else**. An activity is not a change into something else since it is within a thing's own nature to engage in that activity. So when a living thing first develops such an activity, it comes into its own nature. Similarly, it is not a change into something else when from having been inactive, the activity becomes ongoing.

An activity can include changes without itself being a change or a series of changes. (See Endnote on Activity in II-4, and ENDNOTE 114 on “hexis”). The builder considered as builder doesn't change by getting up to build, but getting up does require changes in the muscles and limbs. To activate the activity of sensing, the thing (via the medium) does affect the sense organ, but this does not change the organ, nor what sensing is. The eardrum is affected by the sound waves of bronze, but its potentiality for all sounds within a certain range is preserved, not altered by hearing this sound.

To develop the innate power for an activity is not a change into something else. The activity realizes a potentiality of that living thing, part of its matured form. And then, when the matured power has developed, the transition from resting to activating it is not a change into something else either. The whole complex activity was already all there.

But let us do more than repeat Aristotle's formula. Can we really show ourselves exactly what it is about activating which is so different from any other change? I think we can:

Imagine a builder who is being changed, say by fire or flood, unhappiness, ecstasy, hunger, or falling down, --- would changing him result in some new complex activity such as building? The result would probably be some arbitrary effect, perhaps a headache. But what if, in some rare case, we saw that the result was a whole train of well-organized steps that all fit together into some life-forwarding activity? Say he fell two stories down because the wooden floor boards gave way, landed hard in front of a piano and then played Beethoven? In that case we would surely not say that falling "changed" him into a piano player, but rather that he must already have known how to play.

But even the first acquisition of knowledge is not just a "change" either. The learning activates a human capacity to learn.

Could we try to argue that the fall activated his capacity for falling? A capacity yes, but falling is a capacity in the nature of every body mixed with earth, not one that distinguishes human nature.

Take another example: We put a tray of water out for the birds, and they come, dip into it and then perform an immensely complex set of movements, with feather spreading and shaking and almost dancing. We say "they're taking a bath." Do we say that just water makes this change in them? The water does indeed "affect" the bird, getting it all wet and cool, but can this create such a sequence? We know that the whole sequence is already there, waiting only for a little bit of water to "elicit" it. But of course some physical effect is required to elicit all this. Similarly, sensing requires that some motion from the thing affect the sense organ.

It takes only a moment for the builder to get up, but many years to become a builder. But neither transition is a change into just something else. Both are developments into the human's own nature, a "change" into being more itself.

In Aristotle's example the boy is potentially a man. Many **other** things could happen to a boy that would not be becoming a well-organized, complete, complex thing with its own form and limits.

So we can specify both the long-term development and the instant activation as not being changes into something else. The difference stems from recognizing a complexly organized, unchanging functional sequence. (See Endnote on Activity in II-4)

46. On Knowledge in Act in the Controlling Sense

I must emphasize one of Aristotle's distinctions here, because we will need it in III-4-8 in regard to understanding. We need to look more exactly at Aristotle's statement that **fully actual knowledge** is ongoingly knowing **a particular**, for example **this** letter A.

Aristotle presents three ways in which one can know:

- 1 Just potentially, any human is by genus capable of knowing (homo sapiens).
- 2 A learned person can at wish enact acquired knowledge (the concepts, universals).
- 3 Actually knowing a present particular, e.g., the grammarian knowing this "A."

In III-4 Aristotle says that the enactment of (2) is still only "potential ... although not in the same way ..." (429b5-9). Please note that Aristotle's fullest and controlling sense of "actual (entelecheia) knowledge" is **thirdly** "the one who is already . . . actually (*entelecheia*) and in the controlling (κυρίως) sense knowing **this particular A.**"

(ὁ δ' ἤδη θεωρῶν, ἐντελεχεία ὄν καὶ κυρίως ἐπιστάμενος **τόδε τὸ Α.** (417a.27-29).

Actualizing only the universals whenever one wishes is not the fullest actual knowing. The fullest actuality is knowing **a present particular existing thing.**

To appreciate the difference we need to know that Aristotle argues strongly and consistently in the *Metaphysics* (especially Books VII, VIII, and XIII) that universals are not substance, and that universals do not as such exist in things.

In *Metaphysics* XIII-10 Aristotle asserts again that "knowledge in act" requires a present existing particular. This time he explains it more clearly. He says that **in one respect** knowledge is of universals, but **in another respect it is not. Knowledge of universals is only "potential and indefinite."** Knowledge in act is knowing a definite particular, for instance "a grammarian contemplating that this particular alpha is alpha." καὶ ὁ **θεωρεῖ** ὁ γραμματικός, τόδε τὸ ἄλφα ἄλφα· (1087a20).

Actual (entelecheia) knowledge is knowing a present particular thing.

I take the larger issue up in ENDNOTE 117. I continue on this narrow point in the next ENDNOTE.

47. On Knowledge in Act of Sensible Things (417 B 28)

We cannot produce sensible things at will, nor do we actually know one of those merely from the universal concepts, and this is for the same reason: Sensible things are existing particulars.

But one could object: Isn't most knowledge about sensible things? Aren't most universals about sensible things?

If we keep in mind what I showed in ENDNOTE 46, we can see that here Aristotle does not mean universal knowledge about sensible things; he means rather the fully ongoing knowledge of a definite sensible thing. He has just explained that we can **think** the universals whenever we wish, but we cannot **sense** the things whenever we wish because sensing requires the presences of an existing particular. Then he adds:

"The situation is similar with the **knowledge** dealing with the sensible, and for the same reason (*aition*) that the sensibles are **particular** and external." 417b25-27)

ὁμοίως δὲ τοῦτο ἔχει κἀν ταῖς ἐπιστήμαις ταῖς τῶν αἰσθητῶν, καὶ διὰ τὴν αὐτὴν αἰτίαν, ὅτι τὰ αἰσθητὰ τῶν καθ' ἕκαστα καὶ τῶν ἔξωθεν.

Aristotle means that knowledge fully **in act** requires a definite present particular. Knowledge of universals even when enacted is only potential.

The Prior Analytic also bears out this conclusion:

"For we do not know any object of sense **when it occurs outside our sensation** – not even if we have perceived it – except by universals, and possess the knowledge of the particular **without exercising** (energein) it. (Prior Anal II-21, 67b1.)

οὐδὲν γὰρ τῶν αἰσθητῶν ἔξω τῆς αἰσθήσεως γενόμενον ἴσμεν, οὐδ' ἂν ἠσθημένοι τυγχάνωμεν, εἰ μὴ ὡς τῷ καθόλου καὶ τῷ ἔχειν τὴν οἰκείαν ἐπιστήμην, ἀλλ' οὐχ ὡς τῷ ἐνεργεῖν.

48/49. Comparison with Knowledge

Aristotle often makes his concepts by comparing, analogizing. In four of these first chapters we saw him comparing the soul to knowledge:

In II-1 he made the concept of "first actuality" from having knowledge both when awake and asleep. The soul is a first actuality, like knowledge.

In II-2, knowledge (as a form-and-internal-moving cause in the nous-part of the soul) is compared to the living and sensing parts of the soul (which are a form-and-internal-moving cause in the body).

In II-4 "knowledge" (the habit in the potential nous) is not mentioned. Rather, the activity of the active nous in making the concepts is compared to the activity of the soul in making the body. "For just as nous makes (*poiein*) for the sake of something, in the same way also does nature, and this something is its end (*telos*) . . . of this sort [an end] is the soul . . . for, all natural bodies are instruments for the soul . . ." (415b15-21).

In II-5 here, most of our chapter consists of a comparison between sense and knowledge. The difference between the long-term development and the instant actualization of knowledge is the model for saying that the potentiality of sensing is fully developed at birth, and that the transition from potential sensing to sensing in act is parallel to the transition from acquired knowledge to knowledge fully in act.

50. On "Objects"

Although translated as "**object of sense**," in Greek Aristotle speaks simply of the sensible (*αἰσθητῶν*). So, for example, what Aristotle calls "the tasteable" (*τό γευστόν*) is translated "the object of taste." This is not wrong, but it can be confusing because Aristotle means **neither just the thing, nor just the sensation**. He means the thing insofar as the thing is sensed.

Sensibles exist. "The visible" is color caused by some thing, not just the seen-color, not just the image that is there before us. When Aristotle speaks of just sense-presentations, he calls them *αἰσθήματα* (as in III-7, 431a14-16).

The **visible** or **sizeable** is not just red or a size, but the red or the size of some thing that is red or large. We may be mistaken about what or where that thing is.

SEE ALSO NEXT ENDNOTE

51. *On We Cannot Be Deceived*

418a16 We cannot be wrong **that there is red**, but we can err about “what or where the colored thing is.”

“**That there is red**” is not to be confused with **that we see** red. When we see red we can also be certain **that we see** (red), but Aristotle discusses this in III-2. If here he meant being sure that we see red, we would be **equally** certain that we see movement when we see movement. But he says we can err in the latter case. We may be sure that we see movement and yet there may not be movement. So the certainty is not just that we see red, but rather the certainty **that there is** red, (ὅτι χρώμα).

When we see something moving, there may be no movement. Just what makes that difference? Why is it not certain **that there is motion** when we see motion?

Whether the thing moves or not must not be confused with the fact that a motion of the medium is what brings the special sensible to the organ. The motion which causes the white is the only motion which reaches us directly. If the thing moves, we see this only through seeing the white, not through **still another** motion that would separately affect us. Therefore when we see white, there is white somewhere causing the sensation, but if we err about it moving, then **that motion** doesn't exist anywhere; there is no fact (oti) of that motion at all.

Like motion, the other common sensibles affect us only through the special senses. If we err in regard to a common sensible, what we sense simply isn't. If you sense four apples as five, there is no five. If something large at a distance seems small, there is no small thing there.

The fact that we sense the thing's motion only by the motion from the white, also explains why (as he says later, in III-1) it is only **by** sensing across the senses that we can discriminate the commons as distinct sensibles.

Although we can err about what and where the sensed thing is, Aristotle does assume that the color is necessarily caused by a thing which has that color. Even if a white thing looks red in the sunset, we err about what is red, but a red is there. However, in his book on the sense organs, in discussing the composition of the organs Aristotle notes that “When the eye is pressed and moved, fire seems to flash out.” I mention this here because the finger that does the pressing is not a red thing. But Aristotle adds: This naturally happens in the dark or when the eyes are

closed" (*De Senu* II, 437a24). What we "see" in the dark or with our eyes closed is not for Aristotle a case of sensing. Images, dreams and hallucinations are not cases of sensing (III-3, 428a5-10). I think pressing the eye is like a ringing in the ear.

For Aristotle sensing always involves some present thing whose sensible form is only potential until it is in act as the single form of our sensing. So a thing by itself can't just "be" red; it can only be potentially red which means precisely that the thing determines that its sensible form will actualize as red in our sensing. Conversely, if we sense red this means that some thing somewhere was potentially red. In his theory of sensation the thing's sensible form in act **is** the form of the sensing activity.

52. Sensing Ongoing Motion, Not Atomic Times

In the modern West we tend to assume that motion is perceived by comparing bits of momentary perception and noticing the difference. Aristotle argues against atomic bits of matter and time throughout his works. He is sure that we perceive motion **directly** and not from static momentary bits. In III-1 we will discuss this further, and in III-6 he takes the issue up in detail.

53. The List of Common Sensibles

Aristotle speaks of "megethei" as sensible **things** . In Greek "to megethos," "the sizable," is a sizable **thing** not a mathematical abstraction (see endnote III-4 on megethos). When we see "the white" we see a white **thing**, and when we see "megethos" we see a sizable **thing**.

In III-1 his list includes "one." Here he ends the list with "and such as these," thereby leaving room for other common sensibles. In III-1 we will discuss why "one" is added there.

Sensing sweet by seeing white is not mentioned. It is first brought up in III-1.

54. *On Accidental/Incidental*

We see our friend's color on his face, and also its shape, and the motion of the familiar gestures. These affect our senses **directly**, i.e., καθ' αὐτά, essentially. In the incidental (accidental) way, indirectly, we also do **sense** him, the son of Diarous. In the same way we perceive the yellow fluid directly, but we perceive only indirectly what it is (for example, "that it is bile," III-1, 425b1).

To prevent confusion, it helps to distinguish what is accidental (incidental) to sense-perception from what is accidental (incidental) to the thing. It turns out that what **the thing** is essentially (kai auto), is **sensed** incidentally, whereas what is essential to perception is accidental to the thing.

Of course, what a thing essentially is (this person) isn't an accident **of the thing**, but perceiving what it is is an accident **of the sensing**. Conversely the directly (kath auto, essentially) sensed color and motion are accidents **of the thing**.

55. *On Reading 418a29-31*

Nothing is really riding on this sentence because Aristotle makes himself clear about the relation of light and color in the next few lines, and then, in *De Sensu*, about the transparent in things.

Only in *De Sensu* does Aristotle tell us that the transparent exists also **within** bodies, not only between them in air and water. In *De Sensu* III, Aristotle says that the transparent in bodies shows on the surface (on the "limit" of "defined bodies" (the solid bodies that stay in one piece so that they have limiting surfaces). A "limit" for Aristotle is just a surface, not a concrete thing.

"What we have called the transparent ... resides in all bodies to a greater or lesser extent. Hence just as every body must have some bound (ἔσχατον), so must this .. and it is plain from the facts that **this bound is color**. For color is either in the limit (πέρας), or is the limit (πέρας) ..." (De Sensu III, 439a28-30)

See Endnote 58 for more detail on Aristotle's theory of color as the surface of the transparent in things.

Now we can interpret our sentence:

“For the visible is color, and this is that which overlies **what is in itself (*kath' auto*) visible**

(namely the limit of the transparent in things)

- in itself **visible** not on its own account, (*logos*),

(not qua transparent)

but because **it has** (*ἔχει*) in itself the cause of its visibility”

(Light, the hexis is the transparent's having of its complete nature which is light).

τὸ γὰρ ὄρατόν ἐστι χρώμα, τοῦτο δ' ἐστὶ τὸ ἐπὶ τοῦ καθ' αὐτὸ ὄρατοῦ· καθ' αὐτὸ δὲ οὐ τῷ λόγῳ, ἀλλ' ὅτι ἐν ἑαυτῷ *ἔχει* τὸ αἴτιον τοῦ εἶναι ὄρατόν.

The key word is “has.”

The usual interpretations are not really possible, but they do no damage.

To read color as the cause of visibility isn't wrong because color is one cause of it. But in that reading what color **overlies** also has color **in it**.

Another reading: The thing is often taken to be “what is visible *kath auto* but not *kath auto* on its own account.” But Aristotle said just above in II-6 that the things are seen **not** *kath auto*. So he would not say here that they are seen *kath auto* but not on their own account. But it is true, as those who read the sentence this way point out, that things do not have color in their definition. The son of Diares who looks white, or my white shirt are not defined by their color. And it is also true that the definition of a color does not include the definitions of the things that have that color. Nevertheless it is not qua bronze surface or cloth surface that the surface is visible *kath auto*.

As usual, Aristotle discusses the material side not in the *De Anima* but in another book. (See ENDNOTE 98 and my comment to I-1, 402b26, where I discuss what he does and doesn't include in the *De Anima*.)

We don't need it right here, but in ENDNOTE 58 I take up Aristotle's theory of color and why he would explain potential colors as forms of a transparent **in** bodies.

56. On Two Causes: Kinetikon and Poietikon

There are two causes:

The color is **the mover (kinetikon)** which moves the medium. Through the medium the color moves to the eyes, but color can move only an already active medium.

Light is **the maker, (poietikon)**, the activity of the medium.

Let us be clear about these two.

For example, **if** a radio station is already actively transmitting, then if you speak into the mike, your voice is “the mover” (kinetikon). Your voice moves the radio waves to take on the pitch of your voice and your loud and soft, so that your voice moves to everyone’s living room and car radio.

The radio transmitter is the maker, the poietikon, the radio activity. It is the active maker of the radio transmission. Without active transmitting your voice is only potentially a mover.

Similarly, the color-form alone is only potentially a mover, but it moves the medium when the medium is active. The color travels; it moves through the active medium to you.

The light is the poietikon, the active mover, the medium activity.

The mover is the form that travels. The mover determines what is transmitted. The light transmits the color which is already potential. So it transmits the green of the grass.

In other works, Aristotle calls a carpenter the “maker” (poietikon). The form of a chair is only potential until the carpenter enacts the form in the wood. The chair-form moves into the wood by moving the carpenter (if he is active). Aristotle says that **the chair-form leads the carpenter to make different moves** than if he were making a table. The form is not invented by the carpenter; it comes from the art of carpentry. Therefore Aristotle often says that the art is the efficient cause (as well as the carpenter).

57. On Dispersion, Refraction, and Activity

Light enables us to see the colors of all the things simultaneously. Sound does not do that. You hear **only** the sound from things being hit. If seeing were like hearing in this respect, you would see only an object on which a flashlight is trained. Also, when several things are hit, (or several people speak at once), the sounds merge, but the colors of the things we see do not

merge. So there is a distinctly different effect in the case of light, which enables us to see all the things. This overall visibility is the light of which Aristotle says that it is an activity, not a motion. **But Aristotle also says that light does move.**

Of course he knows that one can see one's face reflected in still water. In the next chapter he says that light moves and is reflected back. He says it there because he gets the concept of reflection from the echo of sound. As so often, he develops the concept by comparing two senses. In II-8 (419b25) he says:

"An echo occurs when the air is made to bounce back like a ball . . . It is likely that an echo always occurs, although not a distinct one, since the same thing surely happens with sound as with light too; **for light is always reflected (otherwise there would not be light everywhere, but there would be darkness outside the area lit by the sun)**, but it is not reflected as it is from water, or bronze, or any other smooth object, so as to produce a shadow, by which we delimit the light."

The word for "reflection" (ἀνακλᾶται) means "thrown back." Light is an activity, not a motion but it involves motions. The dispersion involves **motions** forward and reflection back. He says that otherwise it would be dark and we would see only the spot on which the light shines. Shadows make it obvious that light moves. They show exactly where the light is blocked.

So light does move. But the activity is not the motions. For Aristotle an activity does not reduce to the motions it may involve. As in nutrition and in all sensing, the activity includes and organizes certain motions. The overall visibility (the active transparency) is not a movement:

". . . for **light . . . is not a motion (ou kinesis)**. . . for spatial movements (foras) of course first reach the intervening medium before going further, but **a change of state (alloiosis) can occur in a thing all at once**... as water may freeze all at one time . . . although **each part is affected by the next**. All of it need not change (metaballei) together (hama)." (446b28)

58. On the Medium in de Sensu and Comparison to the Potential Nous.

We don't want to forget that Aristotle has many long material accounts of psychological processes in other books. The information is primitive and not widely read today. But what we need to understand about Aristotle is not an absence of material accounts, rather the absence of such accounts **in the De Anima**. The reason for their absence in our book shows where Aristotle differs from the usual modern view: The functioning, i.e., living, sensing, and understanding are the real events for Aristotle and they determine what the physical structures

have to be, to make the functioning activities possible. Because the functioning determines the structures, the De Anima can present an analysis of the functionings without discussing the physical processes and parts which can be discussed in other books. (See ENDNOTE 98 for a longer discussion of what is included in the De Anima.)

1. How an actual thing can have a potentiality that is not an existing thing as just potential:

Aristotle's concept of "hexis" is so odd to us because it allows him to posit a potentiality that isn't in itself anything concrete. Such a potentiality does not float separately; it exists **with** something concrete but is not that concrete thing. The transparent is on the thing's surface; the potential nous belongs to a person with memory and imagery; virtue involves at least ordinary living. But for Aristotle the potentiality for light is not a trait of the thing's surface; the potential nous is not some characteristic of memory or imagery; the potentiality for virtue is not something concrete added to ordinary living. **The potentiality for a function need not be an additional concrete thing.**

We can bring this home to ourselves if we think, for example, of Paul Revere saying that one light will mean the British are coming by land, and two lights that they are coming by sea. Thereby he set up a **function** for the lights. No one will say that the potentiality for conveying a message must be something concrete in addition to what torches and the lights already are. Similarly, if we generalize we can say that in past centuries torch lights had an important "signaling potentiality" which was nothing material at all beyond the usual characteristics of torches and lights.

I am trying to bring home the obvious fact that a functional connection can be added without adding something to the material conditions.

In II-5 Aristotle explained that a hexis can have two stages, the original potentiality which isn't anything real, and a second, learned habit, a developed potentiality which is a real power.

In my example, once Paul Revere has developed a function of the lights, they **are** a very real power to move the Americans and change world history.

The fact that all humans **can** learn to think is nothing before we think. But once we have learned some concepts, **the habit** is a real power with which we **can** think whenever we wish (of course with the active nous but that nous is always active).

The transparent in the air and water is only the colorless potentiality to take on a thing's color, or to be brightness. But in De Sensu Aristotle develops the transparent further:

2. The transparent within things has the potential color.

Aristotle's theory of the material side is presented in *De Sensu*. There he says that the transparent is also contained **in all bodies**, not only in air and water. The transparent inheres in the bodies whose color we see, not only in the medium which brings the color to the eyes.

He speaks of the transparent in three locations:

1) In delimited (horistos) bodies, i.e., solids. Such bodies have definite extremities (eschata) which have a definite potential color that is the same whether seen from far or up close.

2) In undelimited bodies (air or ocean water). These have indefinite extremities. Their color from afar differs from how it seems up close. They have no definite color. Rather, they have "brightness" or darkness. In them the transparent can have actual existence (i.e., light) without transmitting a thing's color. We look at them and see the brightness.

3) The unbounded ones (2), air or water, can be media. The transparent in them can take on the color **of things** and bring the color to the eyes.

The distinction between delimited and undelimited bodies enables Aristotle to go further. In delimited bodies there is not light, but there is a transparent also **within** them. **This** transparent has a potentially colored surface.

I already cited this passage in ENDNOTE 55:

"What we have called the transparent ... resides in all bodies to a greater or lesser extent. Hence just as every body must have some bound (ἔσχατον), so must this .. and it is plain from the facts that **this bound is color**. For color is either in the limit (πέρατι), or is the limit (πέρας) ..." (De Sensu III, 439a28-30)

On all delimited bodies, the potential color **is** the extremity (eschaton AND peras) **of the transparent** which inheres within them. With this assumption Aristotle can create his **theory of color**:

“Just as (hwsper) there is **bright or dark** in undelimited ones, so there is **white or black** in delimited bodies. (somasin),”

“**That which in the air causes light** [i.e., something fiery] may be present in the transparent [in the solid body] or not, the body being deprived of it. . . [This] in bodies produces **white or black**.” (439b15-20)

Fire is one of the four elements which are mixed in some proportions in all bodies (), so if there is something transparent in every body, then the fiery in every body can act to produce, not light of course, but a transparent that has its own color-form.

“The black is the privation of white **in the transparent**.”

καὶ ὥσπερ τὸ μέλαν στέρησις ἐν τῷ διαφανεῖ τοῦ λευκοῦ (De Sens 442a.25).

“The other colors . . . come from a **mixing of white and black** . . .” (De Sensu 442a11).

Note that the color of a mixture is not made by the proportion of the four elements but by the proportion of white and black. The resulting color depends on how much white is in the transparent within the ingredients, not on what the mixed elements are.

(In section 3 below I will say why this is important.)

In Aristotle’s concept of mixture the least possible part of a mixture is still the mixture. (See De Gen & Cor and my paper on Aristotle on Prime Matter and Mixture).

“But a mixture of bodies occurs, not merely, as some people think, by the alternation of their smallest particles, but by a complete interfusion of all their parts, as we have said in our discussion of mixtures in general.”

(εἰ δ’ ἔστι μίξις τῶν σωμάτων μὴ μόνον τὸν τρόπον τοῦτον ὄνπερ οἴονται τινες, παρ’ ἄλληλα τῶν ἐλαχίστων τιθεμένων, ἀδήλων δ’ ἡμῖν διὰ τὴν αἴσθησιν, ἀλλ’ ὅλως πάντη πάντως, ὥσπερ ἐν τοῖς περὶ μίξεως εἴρηται καθόλου περὶ πάντων.) (De Sensu III, 440a.31-b.4).

"In such a mixture the colors must obviously be mixed as well, and that is the reason why there are many colors.

(ἀλλ' ὅτι ἀνάγκη μίγνυμένων καὶ τὰς χροῶς μίγνυσθαι, δῆλον, καὶ ταύτην τὴν αἰτίαν εἶναι κυρίαν τοῦ πολλὰς εἶναι χροῶς, De Sens 440b.13).

"What we call "transparent" resides in ... all bodies, hence just as all bodies must have a bound (ἔσχατον), so must this. . . The transparent which inheres in bodies must have a bound and this bound is color. For color either **is in** the limit **or is** this limit."

(ὡσπερ οὖν καὶ τῶν σωμάτων ἀνάγκη τι εἶναι ἔσχατον, καὶ ταύτης ὅτι μὲν οὖν τοῦ φωτὸς φύσις ἐν ἀορίστῳ τῷ διαφανεῖ ἐστίν· τοῦ δ' ἐν τοῖς σώμασι διαφανοῦς τὸ ἔσχατον ὅτι μὲν εἴη ἄν τι, δῆλον, ὅτι δὲ τοῦτ' ἐστὶ τὸ χρῶμα, ἐκ τῶν συμβαινόντων φανερόν. τὸ γὰρ χρῶμα ἢ ἐν τῷ πέρατι ἐστὶν ἢ πέρας) De Sensu III-439a20-30)

"Color is the limit of the transparent **in a delimited body.**" (De Sensu III-439b10 ff.)

"But the limit is not a body; (DeSensu, III-439a32):

If we cut such a body open, it would have new surfaces, still with color.

The elemental composition of the body does not determine the color. The color is determined by how much white or black was in the transparent of the ingredients of a mixture.

In our modern theory also, the explanation of color is inherently related to the nature of light. Of course there must be a link between what color is and what light is. Aristotle's theory explains color as inherently a form of its medium, the transparent. In terms of the two stages of hexis, the transparent in bodies which already has potential color corresponds to the knower who has already learned some forms of thought.

For us the theory also clarifies Aristotle's concept of "form" and how form "travels." Things don't just have sensible forms which are somehow mysteriously picked up by a medium; rather what color **is** in the first place is inherently a form of that medium in things, so of course it can become the form of that medium between things.

3. Comparing the transparent and the potential nous:

The transparent and light are almost parallel to potential and actual nous (III-4 and III-5). I comment on the parallel in III-5 (ENDNOTE 114). I explain “hexis,” the having of the activity. What may or may not acquire the activity is no real thing alone. “The hexis” is the light.

The potential nous -- like the transparent -- is no real thing when it is only a potentiality. Once the potential nous has acquired the potential knowledge-forms (universals), it is analogous to the transparent whose surface is the potential color. Then the light can activate the potential color just as the active nous can activate our potential knowledge forms. Once the universal forms have been learned, the potential nous is somewhat like an internal “medium” in which the active nous can activate the forms of our thinking activity, just as light activates the forms of our seeing activity.

The active nous itself does not turn on and off since it is pure activity. It is analogous to the light which is always bright and active up there, near the sun. But down here the things can be in light or covered up. The active nous is always in act but it depends on us whether we want to think or not. The always active light does not determine whether any colors of things are transmitted, i.e. whether there is seeing or not.

The light activates the potential colors on things just as the active nous activates the potential understandables, the noeta (eidei, see III-6) in sense and imagery. **In both cases Aristotle makes a break:** The potential colors are not due to the elemental composition although in it. Similarly, the understandable forms are not what is sensed or imaged, although in sense and imagery. **The potential colors and the understandables are forms of a special potentiality of their own** (the transparent; the potential nous).

This question leads to the inherent relation between form and activity for Aristotle which is always difficult for us to understand. **We are accustomed by our science to think of forms and structures as just existing out there. We moderns tend to omit our own theorizing activity and see no need to think of forms as forms of activity.** For Aristotle all forms **are** the forms of their activity, *energeia*, which we can try to understand in English as an active organizing energy.

Forms don't exist alone. They are always forms of activity or forms of the potentiality for the activity. While we sleep our knowledge-forms are forms of our potential nous.

Light by itself has (is) its own color; similarly, the active nous by itself is a “knowledge in act” (III-5,). But light is not also itself a kind of seeing, whereas the active nous is not only the active side of the hexis which activates the forms, but also itself a kind of understanding.

But what in the case of understanding corresponds to the presence of fire in the transparent? Analogous to the coming of fire or the sun into the transparent is the cosmos from where nous “**comes into**” the soul (*Gen Animals*. II-3, 736b28).

59. On Empty Space

Aristotle does not share the modern classical assumption that “space,” i.e., relations between abstract mathematical points, exists as an absolute frame. David Hume similarly argued that the system of points in geometry is not the frame of events, but modern science has followed Kant into the conundrum that space is **both** absolute **and** subjective. As a result the picture presented by modern science is indeed a picture, something synthesized by us and presented before us.

For Aristotle there is only “place,” a **definite** location **determined by an actual contact or interaction between two bodies** each of which retains its limits.

Einstein rejected the empty classical Newtonian space. **In modern physics, space has characteristics, and indeed precisely those which the nature of light gives to it.**

The classical concept of empty “space” was current long before Aristotle, at least since Democritus. Aristotle presents it in great detail in order to criticize and reject it. He even has a theory of how the concept of empty space came about:

“But because the encircled content [of a container] may be taken out and replaced again and again, while the encircling container remains unchanged . . . the imagination pictures a kind of dimensional entity left there distinct from the body that has shifted away *Physics* IV-4, 211b15.

If such a thing should really exist, well might we contemplate it with wonder, capable as it must be of existing without anything else, whereas nothing else could exist without it” (*Physics* IV-1, 209a1).

Einstein’s characterization of the issue is nearly the same as Aristotle’s.

Einstein says:

"If ... one is led to the view that space (or place) is a sort of order **of material objects** and nothing else . . . then to speak of empty space has no meaning. . . .

It is also possible however, to think in a different way. Into a certain box we can place a definite number of grain of rice ... By a natural extension of "box space" one can arrive at the concept of an independent (absolute) space . . . Then a material object not situated in space is simply inconceivable; on the other hand . . . an empty space may exist.

These two concepts of space may be contrasted as follows:

- (a) space as positional quality of the world of material objects;
- (b) space as container of all material objects. . . .

[For] Newton . . . space must be introduced as the independent cause of the inertial behavior of bodies if one wishes to give the classical principle of inertia (and therewith the classical law of motion) an exact meaning. . . . But the subsequent development of the problems ...has shown that the resistance of Leibniz and Huygens, intuitively well founded but supported by inadequate arguments, was actually justified.

It seems to me that the atomic theory of the ancients, with its atoms existing separately from each other, necessarily presupposed a space of type (b), while **the more influential Aristotelian school tried to get along without the concept of independent (absolute) space.**

The victory over the concept of absolute space . . . became possible only because **the concept of the material object** was gradually replaced . . . by that of the field. . ." . . . If the laws of this field are . . . not dependent on a particular choice of coordinate system, then the introduction of an independent (absolute) space is no longer necessary. . . . There is then no "empty" space, that is, no space without a field."

Albert Einstein ("Foreword." In: Max Jammer, Concepts of Space Harper Torch books, NY: 1954/1960 xiv - xvi.)

For Aristotle there is matter everywhere, but matter does not consist of bodies. Rather, there is a field of continuous matter constantly varying in density and rarity (*Physics* ____). "Matter" is changeability. Only the change-proportions, not bodies, are conserved.

(See also next ENDNOTE)

60. On Comparison with Modern Physics:

The similarity between modern physics and Aristotle's physics is often remarked upon. Obviously Aristotle could not have known our theoretical problems and our vast array of empirical findings. But the similarity is not accidental nevertheless. Einstein says (see previous endnote) that when he needed to change Newton's basic approach, Aristotle's basic approach

was available as an alternative. It was deeply ingrained in the physics of Huygens and the others just before Newton.

In modern physics matter is energy, meaning roughly “matter stretched out.” What was classically thought of as “a body” is a local distortion in the field. Expressed in this simplified way, the similarity to Aristotle’s view is clear. Furthermore, for Einstein as for Aristotle, the nature of light involves visibility, i.e. its signaling properties. There are therefore many similarities, despite the primitive level of Aristotle’s observations.

Aristotle: Light is not a body.

Currently: Although the photon is considered a “particle,” it has “zero rest mass,” no weight, and any number of them can be in one place.

Aristotle: The entelecheia (actuality, existence) of the transparent **is** light (entelecheia tou diaphanous phws estin 419a12). Light is the transparent’s actuality. Hence the transparent is nothing but potential light. Light is an activity of what is nothing but potential light.

Currently: Light is a wave form **of nothing** (oscillations in an electromagnetic field), unlike sound which is the wave oscillation of something).

It was in the name of Aristotle that there was a long search for an “ether” as a material medium of light, but for Aristotle the medium is rather the transparent. And this, when it actually exists, is only the light itself. He did think that the potential transparency inhered in air, water, and crystals, but he considered it to be a “hexis” not a body. In the dark it is nothing other than the potentiality for light.

Aristotle: Light is not a motion, rather the transparent becomes active all over, section by section.

Currently: Diffraction is a wave phenomenon.

Aristotle: One activity (like sensing) unites object, medium, and organ with one form. The activity of light is **in many places at once**.

Currently: One photon presented with two slots, goes through both. If a beam of photons is split so that two photons travel from there in different directions, even when they have gone far apart, if something affects one of them this has an effect on the other. Light is **in many places at once**. A wave unites many places. A single particle is often considered to be "smeared out" over infinite space. In certain equations it has to be considered to be all over.

Aristotle: One activity organizing motions under it is not bothersome to him. It is his usual model. With him light activates a field all at once and also **moves**.

Currently: In modern science there is supposed to be only one level of theory. Like him we have "both" waves and photons but this duality seems troublesome to us.

Aristotle: The "activity" of light simultaneously all over (like our wave theory) is the functional organization, whereas motions (refraction) are organized by the activity, (as in digestion, see my comment in II-4 and ENDNOTE 57).

Currently: Light is understood both as waves and as particles.

Aristotle: The fire in the outer cosmos is the source.

Currently: All energy comes to us from the sun.

Aristotle: Euclidian space is not the space of real events. Real events are interactions, and only an interaction determines a location (topos). Aristotle's theory is not dependent on location. It does not assume a space-time frame.

Currently: If momentum is calculated, space-location is indeterminate. If one needs to determine a location in an antecedent space-location system, one cannot measure momentum.

In quantum mechanics many available solutions cannot be employed because the relativity theory cannot be made consistent with them. The findings could be written more simply if the theory permitted space, time, and particles to be determined **by the interaction**, which would mean that when calculated backwards from an interaction they are not always the same as they were coming into the interaction. In quantum there is no absolute scheme of space-time points.

Aristotle: Space is not the same all over, not just a system of location-points. Up and down are not the same.

Currently: "Curved" space is a field with properties of its own, not just mathematical points.

But it has not been realized what was lost when physics was first reduced to mathematics. Therefore the full significance of this change back has not been discussable.

Aristotle: The colors of things are transmitted by light, but light can also exist on its own, with only brightness.

Currently: If light waves carry a message (signaling properties), light has only one speed, but without any message light can exceed this speed.

Aristotle: Empty space does not exist. A location or place is determined only where two solids touch their extremities so they are together (hama) - and only this also determines a single moment of time.

Currently: In quantum mechanics location has become indeterminate. Where a particle will be found is on a probability-curve, and only actual interaction determines where it is-was.

There are already findings in which time symmetry is violated, i.e., time is re-determined retroactively.

See also the previous ENDNOTE.

61. On "Impossible to Be Affected by the Color That Is Seen" 419a15-22

What does Aristotle mean here, in this link in midst of his argument?

"For seeing takes place when that which can perceive is affected by something. Now it is impossible for it to be affected by the [*actual* " is sometimes wrongly inserted here] color which is seen; it remains for it to be affected by what is intervening, **so that there must be something intervening**. But ..."

Hamlyn and Hett (Loeb) mistranslate by adding the crucial word "*actual*" here where Aristotle did not use it. (ὅτι αὐτοῦ μὲν οὖν τοῦ ὁρωμένου χρώματος ἀδύνατον)

Aristotle says that the "seen color" cannot be what affects our organ because it is **the result** of being affected. Something has to affect the eyes and this cannot be what comes as a result of being affected.

Or, he may be referring back to having shown that putting the colored thing on the eye produces no vision.

62. On the Order in and between the Chapters on the Senses

Aristotle's order here and in each of the other sense chapters moves **from** the thing (the **potential** sense-object -- the potential color (the "material cause"), **to** a compressed definition containing the cause which he expands from then on. In each chapter he next turns to the means, (the "moving cause,") what first activates the medium, which in turn activates the organ. Then (but not in our chapter) he takes up the different colors, pitches, or tastes which are the forms ("formal cause") that are created by the proportioning activity in the organ. Then he usually discusses briefly how this sense is adaptive ("final cause") for a species that has it.

In discussing the medium he usually first takes up the **potential** medium, then **what activates the medium**, then how the medium can take up the thing's form because it has no such form of its own.

Like the other chapters this one has this order, but it only goes as far the medium reaching the organ. The eye is only just mentioned (419a6-14). The different colors are taken up in the next chapter along with different pitches of sound (420a26). Aristotle does not know every aspect of each sense. When he does not know something about a sense, he **can** discuss

it **only** as having a function analogous to the function of something he does know in one of the other senses. He does not know how light vibrations are proportioned. So he will derive it by comparison with the sound-pitches because he does know how those are proportioned in musical instruments.

Similarly, why does Aristotle discuss the medium of smelling in chapter II-7 on vision. It is because he does not know what the medium of smell is. Therefore he can define it only in a proportion to another sense. And since fish sense smells, the medium is not air itself, or water, but rather “just as” color is to its medium, “so” smell must be to its medium. But unlike the transparent, the medium of smell is always ready to transmit, so he does not say that it is a hexis.

Now let us consider the order of the chapters on the senses. Why does he take up seeing and color before the other senses? Aristotle often discusses the most complex thing first. That lets him make concepts which he can easily simplify in simpler cases. But if that is so then one could ask: Why in the *De Anima* does he take up the least complex function (nutrition) first? It is because it can be studied alone, since it does not presuppose the others. But in that case one could ask: Should not the sense of touch have come before the other senses, since it is the one that can occur alone, as nutrition does in plants? Instead touch is the last of the five senses to be discussed.

I think there are two reasons why touch comes last: Although touch (i.e. contact) is the “contact sense,” (it’s the same word in Greek), Aristotle will argue that touch, too, requires a medium. Since this is not at all obvious, he must first create the concept of a medium and explain why there cannot be any sensations without a medium.

Secondly, touch provides the meeting of all five senses.

63/64. On What Is Form and How Does IT Travel?

One of the difficulties in reading Aristotle is that one can become accustomed to his main assertions without really grasping what they mean. Then one repeats familiar formulae without being able to think with them. Sensible things just somehow have sensible “forms,” and these somehow travel to us through a medium. In this chapter what he really means by “sensible form” can be thought through.

How can there be a sensible form **apart from the thing**? This can seem mysterious. A separate form first becomes separate by becoming the form of a medium. **The medium provides an activity which things can affect in their different characteristic ways.** The sense-form are separate only as **form of the medium's activity**. The medium is not only something **through** which a mysterious thing called "form" travels; rather, because the medium is active, each kind of thing puts its own character onto this activity.

It is the function of a medium not only to intervene, but **to provide** an activity whose forms are the sensible forms apart from their things. Because of this function of a medium Aristotle can say in III-5 that the active nous is like light. Nous is the medium-activity because it makes, enacts the understandable forms as form of our understanding activity.

So it is not that things have forms and these somehow mysteriously detach themselves from the things and travel in an equally mysterious way through a medium. The sensible form does not first exist and then travel. A "form" **is inherently** something that travels, because it is first generated as the form-of a medium's ongoing activity. So **of course** the form of the medium's activity "travels," since the medium's activity occurs also at the organ.

Now we can understand why Aristotle can say that the characteristic sensible **form** of the **thing** is also the **form** of the reverberating air in between and hence also the form of the reverberating air in the **ear**. **One form** is common to the thing and our sensing. The form is thing's effect on the medium-activity which reaches the organ.

The "potential" form in the things is only a trait such as hardness or a smooth surface. Something about the thing **which is not its sensible form** generates a certain "profile" (as we would say) on the activity of the medium, and only this is its separate sensible form.

We need to pay special attention to the fact that, for Aristotle, color and sound forms are not in act in or on the things. Only if the medium is already in activity can the things give some character to the medium. **Only** because hitting bronze or wood creates a reverberating mass of air can bronze or wood give it their different audible forms.

The different sound pitches (**forms-of** the air's vibrating) have different mathematical ratios (as in music). Aristotle explains the ratios as different **amounts of motion per unit time**. This lays the basis for his later explanation of sensations as proportions.

But the proportion of the medium-activity is not yet the sensible form. Only when the characteristic medium-activity reaches the organ, does the motion/time ratio become a certain

sound pitch or a certain color between white and black. As Aristotle will argue in III-2, the sense receives proportions and **is** itself a proportion.

Throughout Aristotle's works one of his key concepts is that **proportions are "separable,"** i.e. can travel, can be moved from this to that. For example, a melody is a cluster of proportional relations. The same melody (the proportional relations) can be had in many different tones. A face can appear on a picture because it consists of proportional relations of eyes, nose, mouth, etc. A cake can't travel but its recipe can.

Sensation, we will find as we go on, is part of nature's ordering and proportioning. Sensing is an interaction, not a picturing of something that is already there and is only copied. See also ENDNOTE 74 for quotations from Aristotle on ratios.

65. On Comparison of the Sound and Light Chapters

Color on things is only potential.

Sound in things is only potential.

All extended things have potential color.

Only some extended things have potential sound.

The transparency in air, water, or crystals may transmit or not.

The air may be a reverberating unit or not.

Transparency is no actual thing; its actuality is light.

The air is always an existing thing.

Air is actual, whether sounding or not.

Transparency is made active and actual **by fire.**

The air is activated by a move that **strikes** some thing in it.

Without an object, alone, light is a sort of color.

Without an object there can be whip-noise just of air.

color gives its form to the light
(= to the activity of the transparent).

The struck thing gives its form to the reverberating of the single mass of air.

The medium is actual and continuous to the eye. The medium is actual and continuous to the ear.

66. *Is Sound the Activity Like Light, or Is It the Object Like Color?*

It can be confusing whether what is analogous to the word "**sound**" is "**light**" (the activated medium) or "**color**" (the object, the visible). To clarify this is valuable because it lets us examine the precise roles of the various factors Aristotle employs to explain an activity, in this case the activity of sensing.

The variety in sound-pitch is parallel to the variety of colors. In that respect, **sound is the "object,"** like color. But as the activity of the medium (the vibrating of a single mass of air reaching the ear) **sound is the active medium,** like light.

So "sound" is sometimes parallel to color and sometimes to light. Why is this? First because the word "light" is already available to name the activity of the medium, whereas there is no word for "air which is a single reverberating mass continuous as far as the organ of hearing." If the air-activity had its own name, we would not use "sound" both for the activity and for the object we hear.

67. *On Entelecheia vs. Energeia*

Our chapter offers a chance to see clearly the difference in Aristotle's use of the words entelecheia and energeia. (Based on the Latin: "actuality" usually translates "entelecheia" while "activity" translates "energeia."). The two words have two very different meanings. By no means can they be just interchanged, as some translators do.

In the chapter on light both words appeared. In contrast, in this chapter "energeia" is used 13 times while entelecheia never comes up. Why is that? It is because the sound-activity of air is not **the actuality** (complete existence, entelecheia) **of** air (as light is the actuality of the transparent). **The air is always actual and complete, whether it is vibrating or not.** Therefore no question about its entelecheia ever arises. Sounding concerns only the activity. The air is **actual** whether it **actively** vibrates or not.

Although light is both the activity and the actuality of the transparent, these are two very different considerations. In regard to entelecheia the roles of the transparent and air are different, but in regard to energeia they are alike, since both require something else (fire, a strike) to make them an **active** (energeian) medium.

68. On the Order in the Sensation Chapters

In each chapter on the senses Aristotle begins with the potential object (“Every color **is capable of** ...” and “anything solid and smooth . . . **can** make a sound.” He moves from the thing (the **potential** sense-object -- the color on things is only potential) (“material cause”), to a compressed definition which he expands from then on.

He next turns to the means, (moving cause) which is first the medium. The medium qua potential can take on a sensible form because it has no such form of its own. (Air and water have no color, smell, or taste if nothing is mixed with them.) He then explains **what activates the medium**. Only on an active medium can the things have a form. The medium is continuous from the sensed thing to the sense organ.

In the organ the sense creates the proportions which are the pitches, sounds, etc. (formal cause). Then he usually discusses briefly how this sense is adaptive (“final cause”) for the species that have it. We will see this order in the coming chapters.

These chapters include many comparisons and analogies between the senses, so that quite a lot about each is said in the other chapters. One reason for this is that Aristotle **cannot** take up certain concerns about a sense **other than** by analogy with another sense. Sometimes he knows the detail how something works in one sense, but can only say that it must be something analogous in the other sense. Another reason is that he often makes a new concept from proportional relations between two things. He compares “**just as** this is to this in this case, **so** that is to that in the other case.” Then, if he knows something about each of them, he can go on from them to make a general concept and also specify how they differ.

For example: Why does the section about the striker, the struck, and the single surface (420a19-26) come here, after the organ and before the proportions which the organ provides?

This passage comes here at a spot analogous to the previous chapter where he argued

against Democritus (419a15) right after he had the medium reaching the eye. The point was that **without an active medium** nothing would be seen. So here, after getting to the organ he shows that even when there is striker, struck, and organ, nothing will be heard if there is no “rebounding air . . . as a mass” -- **the active medium** -- to reach to the air chamber in the ear, so that it vibrates..

69. On Comparing the Senses and Their Relation to Thinking.

II-9 is the best chapter in which to discuss why Aristotle derives his concepts about each sense so largely by comparisons between the senses. The chapter relies largely on comparisons and also says that the superiority of human thought depends on the organ of the sense of touch. Later in the book we see that comparison of the senses depends on touch. To compare them one must have the senses (or images from them) present **together**. They can be present together only because they join at the touch (contact) center.

Although Aristotle emphasizes that thinking (noein) has no organ **of its own**, the connections made by thought (dianoia) arise from and in the togetherness of the senses at the “sense-mean” (III-7, 431a10) which is located in the touch **organ**. Aristotle compares “touch” in some way in every chapter on the other senses.

For Aristotle the material organ does not explain the togetherness of the five senses. The materials are only necessary, not sufficient conditions. The senses join together not because they meet in one material organ. Rather, the necessary function of their unity determines that there must be a material organ where they terminate together.

For Aristotle the matter individualizes. He did not need to tell us that the **universal** human superiority of the sense of touch (the function) **requires (is not due to)** a superior flesh (the material). We discover the role of the flesh only as he turns to **individual** variations which **are due to** differences in the material, the degree of softness of the flesh of the **touch organ**.

In a treatise coming after the *De Anima, Memory and Recollection*, he argues that images are memories, and that they are an “affection” (pathos) of the common organ, the “**koine**” which is again the touch organ. So the fineness of touch determines the sharpness not only of what is jointly sensed but also of the memories and images from which all thinking arises (III-8).

Why is this crucial assertion about the reason for the accuracy of human thought here in the discussion of another sense rather than in the chapter on touch? It is because assertions of **more and less** accuracy arise from comparison. But why smell? The question of accuracy comes up with the least accurate in humans, compared to the most accurate.

In the West we are accustomed to consider abstract thinking so utterly separate from sensing, that a blind person could create a good theory of color, and someone who cannot smell could devise a good theory of smell. Aristotle denies this. Such a person could only rearrange the words of someone else's theory.

For example, to say that smells are analogous to tastes is possible only if you are able to bring the memory-images (for example) of the taste of honey as well as its smell, so that you could follow him when he says that they are both "sweet."

We have to be aware that in these chapters we are thinking, making concepts about the senses and the sense-objects, understanding them. We will need to remember doing this here when Aristotle comes in Book III to discuss the ways in which thinking depends on joint sensing and sense-images. We will need to remember how we generated **concepts** by means **comparing** the sense-images, so that we will be able to follow him when he discusses how **understanding** arises. With the matterless nous we grasp the first concepts and the final principles in and from sensing. All the rest of human thinking depends on both nous and connections made by dianoia.

70. On the Medium of Smell

Why does Aristotle not accept the theory prevalent then as now, that we smell little floating bits of the thing we smell? It is because that would be just like placing the thing directly on the nose. According to Aristotle we could not smell it. To sense a sensible form we have to receive it **without the thing**. The sensible form must first become separate by becoming the form of a medium activity. The medium activity must take on (and thereby enact) **the sensible form without the material thing**.¹

1 In modern science there is a similar "current debate over the mechanism of primary olfaction, which has split into two camps, those who assume that the olfactory epithelium reads the shape of odorant molecules, and those who suggest that the electronic or vibratory aspect of the scent is crucial (See *Frontier Perspectives*, 13, 1, 2004, p.13, and Turin L., A spectroscopic mechanism for primary olfactory reception, *Chemical Senses* 21(06) 773-791. 1997).

For example, Aristotle calls light the maker (poietikon) because it makes the separate color form. In act color is a form of the light activity. Similarly, the sound-form of bronze is the form of vibrating air. From the bronze alone no sound can be heard. A potential form becomes sensible in act only because it becomes the form of a medium-activity. But in the case of smell Aristotle does not know the medium activity.

At the end of II-7 Aristotle said: “The medium for sound is air, **that for smell has no name.** For there is an affection (πάθος) common to air and water, and this, which is present in both, is to that which has smell as the transparent is to color.” The medium of smell is inferred by the comparison. Aristotle does not know the medium-activity of smell which corresponds to the activity of the transparent, i.e., light.

In De Sensu he takes up **the material side of** smell. To look in De Sensu is often clarifying but we do not need do so. Or, more exactly, according to Aristotle we need not, because he put just the soul-functions into the De Anima and it is basic for him that these can be understood without the material detail. We can be misled by looking in De Sensu. We are so accustomed to material explanations that we can miss the fact that for Aristotle the material does not explain the activities and functions. They determine what the material has to be, if the activities and functions are to happen.

On the other hand, when what he says in the De Anima is compared with what he offers in De Sensu, we can see exactly how Aristotle distinguishes between the two books, which is to say how he relates the function and the material.

In De Sensu Aristotle considers taste first, and only then smell, because materially he explains the smellable as a further effect of something that is already tasteable. He offers many examples to show that nothing smells if it doesn't already have a taste. He says that taste and smell are two kinds of solutions. The tasteable is a solution in water and then the smellable is a further solution in air or water. This is consistent with the De Anima. In the next chapter (II-10 on taste, 422a11-15) he says explicitly that the solution in the fluid is a mixture, a tasteable thing, not the medium and not the sense-form in act. In the fluid on the tongue there is not the medium but the matter for the dry. Similarly for smell, the solution (mixture) of the smellable in the air or water is just the smellable thing. Aristotle doesn't know what medium activity for smell inheres in air and water like the transparent. the activity which “makes” and transmits the color-form without the matter.

I comment further on the difference between “medium” and “mixture” in ENDNOTE 73 on taste.

Aristotle says in *De Sensu* (445a7) that smell is a middle (meson) between the distance senses and the contact senses (taste and touch) because the smell-form travels through air and water like color and sound, but it is related to the tasteable which is a kind of tangible. This middle position is probably why our chapter comes after sight and hearing in the *De Anima*, but before taste and touch.

71/72. On "Potentially of Such a Kind."

This formula applies to all five senses: The sense is **potentially all** its objects. In act the sense becomes like the **one** object that is being sensed.

In the case of smell, taste and touch there is a special problem that doesn't arise with sight and hearing. Since the flesh of the nose is itself a mix of hot and cold, fluid **and dry**, how can it become "like" the many different dry things it can smell, without drying and changing? Here we have only the formula: **Somehow** the sense-organ is potentially the dry of the many different things we can smell. If the sense organ didn't maintain its own composition, we would no longer have the same nose after smelling something.

This question does not apply to sight and hearing because although the eyes and ears are made of flesh, the flesh is not itself composed of color or sound. The eyes contain transparent water; the ears contain a closed column of air. These take on the form of the motion in the medium without the problem about the flesh posed by sensing the dry, the fluid, and the tangible qualities.

In II-11 Aristotle will tell his theory of how the hot/cold fluid/dry composition of something else can be sensed without any change in the organ's own composition.

73. Why the Fluid Mixture Is Not a Medium

One might have wrongly predicted that Aristotle would consider the saliva fluid in the mouth as the medium of taste. Why is the saliva not the medium? Could he not have said that the saliva takes the taste-form from the dry? In the *De Anima* we are not concerned with the bodily mechanics of sensing, but in *De Sensu* (V, 442b28) he says that the elements (the dry, fluid, hot, and cold) have neither taste nor smell; only their mixture tastes and smells. So the

dry has no taste; the mixture is the **thing** we taste. We contact the mixture (the dry in the fluid) directly; There is nothing between the mixture and the tongue. It is the tongue which must be the medium that takes the form off from the tasteable thing.

In our passage Aristotle explains the sharp distinction between a medium and a mixture: The mixture is a form in a matter, a thing which we contact directly, not a medium activity that takes on a form apart from the thing. The mixture is a "**body** in which the tasteable resides." The dry is "**in liquid as matter**" (422a8-15).

In the next chapter Aristotle will argue that the medium of touch (contact) is the flesh. Like all flesh, the tongue is the medium for all the touch qualities, hot and cold, rough and smooth, etc. He explains that the tongue is a special case of flesh since it is also the medium of taste (423b17-20). The **separated taste-form travels through the tongue** to an interior taste organ.

In the contact senses (taste and touch) the role of the medium is somewhat different from how it functions in the distance senses. Color first moves the medium which then, in turn, moves the eyes. But in the case of touch and taste, the medium is "struck together with the organ" (II-11, 423b12-17). The man is not hit by his shield. Rather, the active impact comes from the matter-and-form thing and travels through the shield to the organ. The flesh and the tongue are like a shield through which an impact passes. Aristotle thinks of taste as a special kind of touch-impact. The mixture made on the tongue is active, like an impact or like the roughness of a surface which affects us through the flesh (and would also affect a pencil that one might run along the rough surface). So, in De Sensu he says that the tasteable which is "produced in the liquid by the dry is **active** and can activate the sense of taste" (441b20). The effect travels through the tongue to an interior organ.

The statement(422a34) that the taste organ "must neither actually be fluid nor incapable of being made moist," must belong to his earlier view since it cannot apply to the interior taste organ. The eyes contain water and the ears contains air, water and air being the media through which color and sound travel. But the taste-form travels through the flesh of the tongue, not through the fluid saliva. Hence the organ needs to be flesh and does not need to become fluid. So it must have been the tongue (not the interior organ) which was meant when Aristotle says that "**the organ**" of taste must become "actually liquid" without itself dissolving (422a34-422b9). This is obviously what the tongue does. The statement must have been written when he thought of the tongue as the organ. He must have changed only just enough to avoid a flat

contradiction with the next chapter.

My reading, although uncertain, is supported by statements about the tongue in Aristotle's other books. In the *De Anima* (II-11) and in *De Sensu* he is explicit that the flesh and the tongue are the media, not the organs. In *De Sensu* he says: "That which can taste (the sense) is a kind of touch. For this reason the organ of taste and that of touch are near the heart" (439a1).

In *Historia Animalium* he lists the tongue as an organ: "With regard to the senses and their **organs**, eyes, nostrils, tongue . . ." and later "the **organ** of taste, the tongue" (533a25 and a28).

In *Generation of Animals* again the tongue is an organ: "The sense **organ** of touch and of taste is just the animal's body or **some portion of the body** ..." (744a1)

But later in the same book: "The tongue we should consider as being as it were one of the external parts of the body like the hand or the foot . . ." (786a26). Considering the tongue as an exterior surface is consistent with the view that it is not the organ, that the organ of taste is rather somewhere inside.

In *Parts of Animals* he first says about hot and cold, dry and fluid, that for them flesh is the organ: "The sense **organ** which deals with these, – viz the flesh ..." (καὶ τὸ τούτων αἰσθητήριον, ἡ σὰρξ, PA 647a.19). This would apply also to the tongue. But later he says "two of the senses, touch and taste, are evidently connected to the heart" (PA 656a29).

But most interesting for our chapter, a little later in the same book (PA) he says about touch: "The flesh is **either** its primary **organ** (comparable to the pupil in the case of sight) **or** else the flesh is **the organ and the medium combined** (comparable to the pupil plus the whole of the transparent medium)" (PA 653b23-31). This "either/or" shows that Aristotle kept several hypotheses in play.

αὕτη δ' ἐστὶν ἀφή, ταύτης δ' αἰσθητήριον τὸ τοιοῦτον μόνιον ἐστίν, ἥτοι τὸ πρῶτον, ὅσπερ ἡ κόρη τῆς ὄψεως, ἢ τὸ δι' οὗ συνειλημμένον, ὅσπερ ἂν εἴ τις προσλάβοι τῇ κόρῃ τὸ διαφανὲς πᾶν. Ἐπὶ μὲν οὖν τῶν ἄλλων αἰσθήσεων ἀδύνατόν τε καὶ οὐδὲν προὔργου τοῦτ' ἦν ποιῆσαι τῇ φύσει, τὸ δ' ἀπτικὸν ἐξ ἀνάγκης· μόνον γὰρ ἢ μάλιστα τοῦτ' ἔστι **σωματώδες** τῶν αἰσθητηρίων. (PA 653b.23-30)

The flesh is surely at least the medium through which the sensation travels. The possibility of a combination of medium and organ would best account for our passage 422a34-422b9 where Aristotle says that "the organ" of taste must become actually liquified without dissolving, which is exactly what the tongue does, and yet he does not say that the tongue is the

organ.

74. On Many Touch Contrarities

What in the case of touch is analogous to “sound,” i.e. that **one** underlying thing which can be loud/soft, high-pitched/low-pitched, and also sharp/flat? Aristotle says that we don’t know. But why doesn’t he say that the one underlying quality is the basic set of tangible qualities, the hot/cold, fluid/dry? Why is that not what underlies the hard/soft, the rough/smooth, etc.?

In another book Aristotle does seem to say this, but he does not mean it as we might think. After discussing the hot-cold and fluid-dry he says: “fine and coarse, viscous and brittle, hard and soft and the other differentia **are from** (ἐκ) these” (*De Gen* II-2, 329b33-35). But for Aristotle this “from” is not reductive. He regularly derives more complex things “from” simpler ones, but considers them new forms not explained by the simpler. The proportion of the mixture of elements determines the fine, viscous, and hard, but we must know: **For Aristotle a ratio or proportion is a different thing with its own more complex form, not a combination of the simpler ingredients.** Let us understand this.

For Aristotle all solid bodies are mixtures, but a mixture is a new more complicated thing. He says: But the essence [of a mixture] is **the proportion of** one quantity **to** another in the mixture; no longer a number, but a ratio of the mixture of numbers [μίξεως ἀριθμῶν]. (*Metaph.* XIV-5, 1092b24).

A body (a mixture) is not the kind of combination in which the ingredients are still there. In what Aristotle means by a “mixture” even the smallest bit is the mixture. The ingredients are no longer there, next to each other. Rather, the proportion is an internal interaction. For example, 3/2 does not have the quantity “3” in it. 3/2 is much less than 3, and different. In 3/2 the quantity three does not exist; rather it is 3 **to** 2.

“. . .the ratios of mixtures are expressed by the relation of numbers, and not simply by numbers; e.g., it is 3 **to** 2, not (3)(2).” (ἔτι οἱ λόγοι ἐν προσθέσει ἀριθμῶν εἰσὶν οἱ τῶν μίξεων, οὐκ ἐν ἀριθμοῖς, οἷον τρία **πρὸς** δύο ἀλλ’ οὐ τρὶς δύο. (*Metaph* xiv-6, 1092b30-32).

The ingredients are only the material of “fine or coarse, viscous or brittle, hard or soft, and other differentia “from” (ἐκ) hot/cold, fluid/dry. Each mixture-body is defined by its own more complex ratio. Each is a new thing, not a combination.

Of course modern science also finds that molecules act differently than the constituent atoms alone would. What is really different is how Aristotle thinks. For him the simpler things do not explain the resulting complexities.

Aristotle's view of mixture is brought home when he says that the elements alone have no taste and no smell (443a11); only mixtures do. If the mixture consisted of elementary particles, it would have no taste or smell since they do not. Aristotle does not define the complex by the simpler. If he did, he would not have said that we don't know what underlies all touch qualities. He would have said that hot/cold fluid/dry is what underlies the other tangible qualities.

75. On Hama

The word "simultaneously" is not a correct translation of "hama" here, and in many other places. Rather, man and shield are hit "**together,**" (**hama**).

Hamlyn is wrong to translate "hama" as "simultaneously" on his pages 39, 41 twice, and similar issues arise as well on pages 46, 46-47, 48, 49 twice). Aristotle carefully defines the word "hama" as meaning "together" (*Physics* V-3 and VI-1, *DeGen* (I-6, 323a3) and *Meta*). Aristotle regularly argues that a defined time is determined only by two solid, delimited bodies touching each other, and that only their touch determines a definite place, and that this **togetherness** defines a definite unit of time. Aristotle always **derives** the unity of a moment of time. Defined moments don't exist in advance, so that one could just assume them, as one does in saying "simultaneously."

SEE COMMENT AT III-1 AND III-2 WHERE THIS ERROR MATTERS MOST.

Aristotle does not say that the contact through the shield takes no time. He does not say that the man is hit "**at the same instant**" as the shield is hit. Quite the contrary, Aristotle's point is that the contact **travels**. He says that the impact would travel through the shield "**even more quickly**" if the shield were an attached medium. "Even more quickly" shows that this travel takes time.

76. *On Solid = Touchable Bodies*

In *De Gen and Cor* Aristotle says that solid bodies are mixtures of all four contraries. He calls the elements “simple bodies,” but they are not bodies strictly speaking, or not “corporeal” bodies which are solid, i.e., cohere (*De Sensu* V, 445a23). Air, water, and fire are not solid, of course, and dry earth is a powder (335a1). A powder holds no shape of its own. In nature the elements are not **at** but **only near** the extremes (330b23). Pure elements do not hold a shape. Only a mixture can be a solid body that holds its own shape. So the flesh must be a mixture.

Another reason the touch-medium has to be solid, is because air and water are each made of only two of the four tangible qualities (air = hot and fluid, water = cold and fluid). **Air or water could not take on the proportion of all four tangible qualities of bodies.** Such a proportion could not travel in them.

The **solidity** which Western classical physics assumed in matter or bodies is for Aristotle **a result** of interaction. A mixture is the product of the hot and cold continuing to **act on** the fluid and dry **within** any solid body. When they stop being active, the body no longer coheres; it becomes fluid or totally dry and comes apart.

For Aristotle, matter is not something solid that just lies there, filling time and space. For him, nothing is just there. Everything that exists is a result of an interaction which continues inside the thing. How the four qualities continue to act on each other explains how something remains a solid body that holds its own shape.

What can touch something else must have “distinct” limits or surfaces. Only solid bodies have distinct limits, and only those **can** possibly touch (*Physics* V-3, *De Sensu* III and *De Gen and Cor* I-6). **What makes something be a body is also what enables it to touch another body, and this is also what the touch-sense senses, and what enables it to touch.**

So he says that the organ of touch is “the most corporeal (swmatwdestaton) of all the sense organs” (*Parts of An*, II, 647a20).

77. *On Medium and Mean and Broad Mean*

Aristotle uses these three terms: “mean,” “medium,” and “broad mean” (**μέσον, μεταξύ, μεσότης**) throughout. They run through his works like a spine from *De Gen and Cor* 334b8-31 (see quotation below) through our spot here in II-11, through the use of “mesotes” in III-7

(431a12 and 19), to the *Ethics* (especially at the start of Book VI where all three words appear), and on into the *Politics* concerning justice and also 1295a.31- b5, as well as where Aristotle says that “the law is the mean” (1287b4). But the English reader has to be alerted to this continuity in Aristotle’s works, since these same Greek words are translated differently in different contexts. The three concepts are closely tied to the idea of proportion which is so central throughout Aristotle’s works. Proportions are separable from that of which they are the proportions, like recipes and melodies.

All other proportions (in our case, of the four qualities) can be expressed in terms of the deviation from their mean. A **mean** (*meson*, μέσον) becomes to each extreme in turn the other extreme. **The flesh** is at the mean of all bodily compositions. But **the sense is** a mesotetos (μεσότητος), **a broad mean**, not the exact mean but rather a range (424a4-7).

“Mesotes” (μεσότης) has very pervasive functions in the *De Anima* since it is where the five senses terminate together, where the common sensibles arise, as well as memory, imagination, and “pleasuring” and “paining,” desire and action. In III-7 (431a16-20) Aristotle says that the five senses move to “one last thing, (τὸ δὲ ἕσχατον ἔν,) a single mean (καὶ **μία μεσότης**). In III-2 and III-7 Aristotle explains how this active, jointly sensitive touch-mean also performs a central role in thinking.

“Mesotes” (μεσότης) is variously translated as “broad mean,” “sensitive mean,” “active mean,” “a sort of mean,” “being in a mean condition”). It is **a range**.

Here is the quotation from *De Gen & Cor*, where the three concepts apply to mixtures:

“Neither their matter nor the contraries actually exist, but **an intermediate** (μεταξύ) (*De Gen* II-7 334b12) “...flesh and bones and such come from these, the hot becoming cold, and the cold hot when they approach the **mean** (μέσον) for here they are neither one thing nor the other, and the **mean** (μέσον) **is many** (πολὸν), **and not indivisible**. Similarly dry and fluid and such produce flesh and bone and the rest **in the middle range** (κατὰ μεσότητα) (*De Gen* II-7, 334b25-30).

This “middle range” is a very interesting concept.

The flesh is at the exact mean, Aristotle thinks, but bones and tendons are also within the range of the mean. In its application to sense, the term denotes the range within which the sense-proportion is not violated, not pained.”

How does Aristotle imagine a body’s composition-ratio as separable from the body? The basic idea is again the fact that a ratio or proportion can be separated. To see this in the case of hot/cold, we can think about our own thermometer. Suppose it measures the temperature of water in a bowl at 25 degrees Centigrade. This means the water is a quarter of the way from freezing to boiling. The thermometer measures **only** this ratio: three times as far from boiling as from freezing. This is a ratio of boiling to freezing but these two constituents of the ratio are not actually present. The thermometer measures neither “the hot” nor “the cold” but **only the ratio** (1/3) between them. Similarly, Aristotle thinks the flesh can have the hot/cold ratio without the heat and the cold.

With flesh as the mean, Aristotle has built perception into nature. This not only includes animals as part of nature, but more intimately: All solid bodies **are** the **perceptible** hot, cold, fluid, and dry mixed in proportions defined by their deviation from the flesh.

78. On Logos

Here the word “principle” does not help us to grasp how a thing’s form can be taken on by a sense organ. Nor does it explain why “the principle” in the organ is destroyed if the sound or the light is too strong. Here the translation of “logos” needs to be “proportion.” But the reading of the sense as a proportion does not depend on the use of the word “logos.” Aristotle makes this reading clear throughout the chapter.

“The sense is a logos.” Aristotle likens the sense to the power of a lyre to play any tune due to the tuning proportions of its strings. He also tells us that **“this is why”** too strong a motion destroys the proportions. “If the movement is too violent for the sense-organ, its proportion (λόγος) is destroyed - and we just said that this is what sensing is - **just as** the consonance (συμφωνία) and pitch of the strings are destroyed when they are struck too violently” 424a28-31).

In III-2 he argues the same relation in the other direction: because we can hear a chord which is a proportion, therefore hearing must be a proportion. Again he follows this with “that is why” excessive sensations are destructive (III-2, 426a27-b7).

In II-4, 416a17 Aristotle says that fire burns as long as there is fuel, but living things have a logos i.e., a proportion that stops their growth at their mature size. "Logos" appears twice there; Hamlyn once says "proportion" and once "principle."

In our chapter, between 424a25 and 33 "logos" appears three times (424a25, 28, 32) and must be translated "proportion" or "ratio" each time. Although Hamlyn usually prefers the vague word "principle," here fortunately he cannot even try to say "since the object is a principle, the sense must also be a principle."

Yes, "logos" has many uses not only "proportion." We must include "saying," "explaining," "accounting for," and "defining," because all are implicit in its use. We must keep them together even in the forms "legei" and "legetai" ("says" or "asserts") which can also mean the **activity of proportioning**, as when the thermometer "says" 50 degrees (compare III-2 26b20). Where "logos" and "legei" appear, it must at least be tried out, whether the text around it suddenly makes sense with "proportion" (or ratio) or often with "proportioning." Here anything but "proportion" would hide the argument.

In every language a word has a cluster of connotations. One cannot divide such a cluster into a fixed set of separable meanings. So it is impossible to "decide" on one. The whole cluster crosses with each context, and works there as it can, to produce the meaning that happens. The reader cannot learn the word's use unless the translator uses the same English word in all contexts. But this is almost impossible with "logos."

Hamlyn does very well by using an "L" subscript to the many English words he sometimes uses for "logos." But "principle" is better used to translate the word "arche" (source, origin). Hamlyn does consistently render "arche" as "**first** principle." But the Latin word "principle" is too vague to help one understand the text. Here it makes the whole argument vague. The word sounds like a deus ex machina, which invites a common misreading according to which Aristotle names something a "principle" to cover up what he cannot explain. ("We sleep due to a dormitive principle," someone famously joked.) "Principle" does not explain, but "proportion" does explain how a form is possible apart from its matter. This lays the ground for the role of proportions in III-2, III-4, and III-7. (See also ENDNOTE 64 on form.)

But we do also need the additional meaning of "logos" since when Aristotle says "the sense is a proportion" he means not just a set of mathematical relationships but an active "what it is."

79. On Aistheterion:

Versions of the word sensing:

24a17 katholou **aistheseos** (universal assertions about all sense)
Καθόλου . . . αἰσθήσεως

aisthesis esti to dektikon (**the sense** is the receiver)
αἴσθησις

ton **aistheton** eidon (of the sensible form)
τῶν αἰσθητῶν

24a25 **aistheterion** (the sense organ) is that by means
of which (w) there is such a dynamis.
αἰσθητήριον

24a27 **aisthanomenon** the tool of sense is a megethos
αἰσθανόμενον

14a5 **aisthanometha**, II-2 that by which we sense.
αἰσθανόμεθα

Compare "kinoumenon" III-10 33b17 the ball-joint body-tool of motion.

Compare 418a.16 κεχρωσμένον kechrwsmenon, colored thing, II-6.

Aristotle usually says, as he does in II-2, that "the means" (the moving cause) is dual, either the soul alone or soul and body. The distinction between organ and sense-power is that distinction.

It needs to be clear that **sensing** is an activity, not a proportion but an active proportion**ing**. The sense is a proportion**ion** in the organ which is its instrument.

