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Introduction

The following are detailed notes of Aristotle’s *Metaphysics*, which were part of a Summer Project Grant, approved by the Maricopa County Community College District. I would like to thank them for allowing me to spend time and effort on this research.

Please be aware that in what follows, these are actual sentences of Aristotle’s text in some cases, but this is not the whole text. More importantly, I have *deleted* many unnecessary words, phrases, sentences, and/or examples (when 3 would suffice), and *added* chapter headings (that should be very helpful), numbers, underlining, italicizing, and so on, to make the text easier to understand. I have also added any notes or objections I may have thought about along the way, which are underlined and highlighted in blue. I have also moved his examples nearer to when he describes a principle (sometimes he says, e.g., “X is Y and not-Y” and then gives an example of not-Y for several sentences, until finally getting to an example of Y; I moved the example to make it more easily accessible).

In addition, these notes are in no way to be thought of as being a substitute for reading all of the *Metaphysics* for oneself; these notes are merely what I thought was most important, and put into a form that I could more easily understand.

Lastly, despite all these disclaimers, I do sincerely hope that these notes are of some value to the reader.

BOOK I (A, or Alpha):

1. Knowledge, Experience, Art, Master-Workers, and Wisdom (979b-982a). All men by nature desire to know, because we delight in our senses. Even apart from the senses’ usefulness, they are loved for themselves; above all others the sense of sight, since we prefer it to almost everything else. Sight makes us know and brings many differences between things to light. Some animals are born with the faculty of sensation, and some have memory; the latter are more intelligent and apt at learning. (E.g., the bee cannot be taught because it doesn’t have memory.) Humans live by appearances, memories, and also art and reasonings. From memory, experiences produced in man; for many memories of the same thing produce finally the capacity for a single experience. Experience seems to be very similar to science and art, but really science and art come to men through experience (for experience made art but inexperience luck, says Polus). [DY: Compare Aristotle’s “Demonstrative Knowledge” reading in Cottingham’s *Western Philosophy: An Anthology*, 2/e, pp. 19-21.] And art arises, when from many notions gained by experience one universal judgment about similar objects is produced. For to have a judgment that when Callias was ill of this disease this did him good, and similarly in the case of Socrates and in many individual cases, as a matter of experience; but to judge that it has done good to all persons of a certain constitution, marked off in one class, when they were ill of this disease, this is a matter of art. Experience is knowledge of individuals, art of universals, and actions and productions are all concerned with the individual; for the physician does not cure a man, except an incidental way, but Callias or Socrates, who happens to be a man. If then, a man has theory without experience, and knows the universal but does not know the individual included in this, he will often fail to cure; for it is the individual that is to be cured. Knowledge and understanding belong to art rather than to experience; artists are wiser than men of experience, which implies that wisdom depends in all cases rather on knowledge, because artists know the cause and men of experience do not. For men of experience note that the thing is so, but do not know why, while the others know why and the cause.

Hence we think that the master workers in each craft are more honorable and know in a true sense and are wiser than the manual workers, because they know the causes of the things that are done. We think the manual workers are like certain lifeless things which act indeed, but act without knowing what they do, as fire burns - they perform their actions through habit. So master workers are wiser not in virtue of being able to act, but of having the theory for themselves and knowing the causes. It is a sign of the man who knows, that he can teach, and therefore we think that art is more truly knowledge than experience is; for artists can teach, and men of mere experience cannot.
None of the senses are wisdom, but these give the most authoritative knowledge of particulars. But they do not tell us of the “why” of anything; e.g., why fire is hot; they only say that it is hot. As arts developed, some aimed at utility or the necessities of life, while others aimed at recreation. The latter artists were regarded as wiser. The mathematical arts were founded in Egypt because the priestly caste was allowed to be at leisure.

All men suppose that wisdom deals with the first causes and the principles of things. This is why the man of experience is thought to be wiser than the possessors of any perception whatever. The artist wiser than the man of experience, the master worker than the mechanic, and the theoretical kinds of knowledge to be more of the nature of wisdom than the productive. Clearly then wisdom is knowledge about certain causes and principles.

2. Wisdom, Knowledge for Its Own Sake, Theoretical Knowledge, Theology, God (982a-983a). The wise man knows all things, as far as possible, although he has not knowledge of each of them individually; moreover, he who can learn things that are difficult, and not easy for men to know, is wise (sense perception is common to all and therefore easy and no mark of wisdom); again, he who is more exact and more capable of teaching the causes is wiser, in every branch of knowledge; and of the sciences, that which is desirable on its own account and for the sake of knowing it is more of the nature of wisdom than that which is desirable on account of its results, and the superior science is more of the nature of wisdom than the ancillary; for the wise man must not be ordered but must order, and he must not obey another, but the less wise must obey him.

Knowing all things must belong to him who has in the highest degree universal knowledge; for he knows in a sense all the subordinate objects. For the most universal things are on the whole the hardest for men to know; they are furthest from the senses. And the most exact of the sciences are those which deal most with first principles (those which deal with fewer principles are more exact than those which deal with additional principles - arithmetic than geometry). Understanding and knowledge pursued for their own sake are found most in the knowledge of that which is the most knowable; the first principles and causes are most knowable; for by reason of these, and from these, all other things are known, but these are not known by means of the things subordinate to them. And the science which knows to what end each thing must be done is the most authoritative of the sciences, and more authoritative than any ancillary science; and this and is the good in each class, and in general the supreme good in the whole of nature. So there must be a science that investigates the first principle and causes; for the good, that is, that for the sake of which, is one of the causes.

This is not a science of production as is clear from early philosophy. For it is owing to their wonder that men both now begin and at first began to philosophize; they wondered originally at the obvious difficulties [DY: compare Plato’s similar statement in the Theaetetus], then advanced little by little and stated difficulties about the greater matters (e.g. about the phenomena of the moon, the sun, and the stars, and the origin of the universe). Since they philosophized in order to escape from ignorance, evidently they were pursuing science in order to know, and not for any utilitarian end. For when almost all the necessities of life and comfort and recreation were present, such knowledge began to be sought. So we pursue this as the only free science, for it alone exists for itself.

Hence the possession of it might be justly regarded as beyond human power, because it is unfitting that man should not be content to seek the knowledge that is suited to him. Divine power cannot be jealous, nor should any science be thought more honorable than one of this sort. For the most divine science is also most honorable the science which it would be best for God to have is a divine science, and so is any science that deals with divine objects; and this science alone has both these qualities; for God is thought to be among the causes of all things and to be a first principle, and either God alone can have this science, or God above all others. All the sciences are more necessary than theology, but none is better.

So this is the nature of the science we are searching for, and the mark which our search and our whole investigation must reach.

3. Four Causes, Pre-Socratics (983a-984b). We have to acquire knowledge of the original causes, and causes are spoken of in four senses. First, we mean the substance; that is, the essence, or the why as a cause and principle (formal cause); second, the matter or substratum (material cause); third, the source of the change
(efficient cause); and fourth, the cause opposed to this, that for the sake of which and the good; for this is the end of all generation and change (final cause).

Now let’s review what other philosophers of said about principles and causes: of the first philosophers, most thought the principles which were of the nature of matter were the only principles of all things; that of which all things that are consist, and from which they first come to be, and into which they are finally resolved (the substance remaining, but changing in its modifications).

But they do not all agree as to the number in the nature of these principles. Thales says the principle is water. Anaximenes and Diogenes make air prior to water; Hippasus and Heraclitus make fire prior; Empedocles says earth, air, fire and water are the fundamental elements. Anaxagoras says the principles are infinite in number.

Thus, one might think that the only cause is the material cause; but as men advanced, the very facts showed them the way enjoined in forcing them to investigate the subject. For what causes change? For example, neither the woods nor the bronze causes the change of either of them nor does the wood manufacture a bed in the bronze a statue, but something else is the cause of the change. And to seek this is to seek a second cause, as we should say, that from which comes the beginning of movement (efficient cause).

4. Hesiod, Empedocles, Anaxagoras, Democritus, Only Two of the Four Causes (984b-985b).

Perhaps Hesiod was the first to look for such a thing, since he says "first of all things was chaos made, and then broad-breasted earth, and love that foremost is among all the immortals," which implies that among existing things there must be a cause which will move things and bring them together.

Empedocles in a sense both mentions, and is the first to mention, the bad and the good as principles, since the cause of all goods is the good itself. These thinkers evidently got up to a certain point of two of the four causes we hold: the material and efficient causes; but they speak vaguely and with no clearness, and do not seem to know what they say; for it is evident that, as a rule, they make no use of their causes except to a small extent. For instance, Anaxagoras uses reason as a deus ex machina for the making of the world, and when he is at a loss as to what causes what, then he drags reason in, but in all other cases he ascribes events to anything other than reason. And Empedocles, though he uses the causes to a greater extent than this, neither does so sufficiently nor attains consistency in their use. He was the first to speak of for material elements, but treats them as to only; he treats fire by itself, and its opposites (earth, air, and water) as one kind of thing. Leucippus and Democritus say that the full in the empty are the elements, calling the one being in the other nonbeing, and they make these the material causes of things. Thus, the early philosophers focused on two causes.

5. Pythagoreans, Parmenides, Xenophanes (985b-987a). Pythagoreans devoted themselves to mathematics; they were the first to advance the study and thought its principles were the principles of all things. Since of these principles numbers are by nature the first, and in numbers that they seemed to see many resemblances to the things that exist and come into being – more than in fire and earth and water (a certain modification of numbers being justice, another being soul and reason, etc.) – and similarly almost all other things being numerically expressible (e.g. the attributes and ratios of the musical scales), they suppose the elements of numbers to be the elements of all things, and the whole heaven to be a musical scale and a number. For instance, as the number 10 is thought to be perfect and to comprise the whole nature of numbers, the bodies which move through the heavens are 10, but as the visible bodies are only nine, they invent a tenth: the “counter-earth.” Moreover, they stated that the even is unlimited while the odd is limited. Others say there is a column of two opposite principles: limit and unlimited to, odd and even, one and many, right and left, male and female, resting and moving, straight and curved, light and darkness, good and bad, square and oblong. They have not stated clearly and articulately, however, how these principles can be brought together under the causes we have named. They seem to arrange the elements under the head of matter out of which they say substances composed and molded. Parmenides focuses on that which is one in formula, Melissus on that which is one in matter, and Xenophanes gives no clear statement on this, but contemplates the whole heaven and says that the One is God. Xenophanes and Melissus are naïve; Parmenides has more insight, because he claims that, besides the existent nothing nonexistent exists, he thinks that the existent is of necessity one and that nothing else exists, but being forced to follow the phenomena, and supposing that what is is one in formula but many according to
perception, he now posits to causes and two principles, calling them hot and cold (fire and Earth); and of these he ranges the hot with the existent, and the other with the nonexistent. [The rest of this chapter is a review.]

6. **Plato, Pythagoreans, Criticism of Plato’s Forms and Causes (987a-988a).** In his youth, Plato became familiar with Cratylus and Heraclitus (i.e., their view that all sensible things are ever in a state of flux and there is no knowledge about them), and agreed with these views even in his later years. Socrates, however, was busying himself about ethical matters and neglecting the world of nature as a whole but seeking the universal in these ethical matters, and fixed thought for the first time on definitions. Plato accepted his teaching, but held that the problem applied not to any sensible thing but to entities of another kind, because the common definition could not be a definition of any sensible thing, since these were always changing. Things of this other sort he called Ideas, and sensible things were apart from these, and were all called after these; for the multitude of things which have the same name as the Form exist by participation in it. Only the name "participation" was new; for the Pythagoreans save it things exist by imitation of numbers, and Plato says they exist by participation, changing the name. But what the participation or the imitation of the Forms could be they left an open question.

Besides sensible things and Forms he says there are objects of mathematics, which occupy in an intermediate position, differing from sensible things and being eternal and unchangeable, and from Forms in that there are many alike, while the Form itself is in each case unique.

Since the Forms are the causes of all other things, he thought their elements were the elements of all things. As matter, the great and the small were principles; as substance, the one; for from the great and the small, by participation in the One, come the numbers.

He agreed with the Pythagoreans and saying that the One is substance and not a predicate of something else, and that the numbers are the causes of the substance of other things. But unlike the Pythagoreans, Plato posited a dyad and constructed the infinite out of great and small, instead of treating the infinite as one, and that numbers exist apart from sensible things. Plato made the other entity besides the One a dyad because he believed that the numbers, except those which were prime, could be neatly produced out of the dyad as out of a plastic material.

His theory is not reasonable, because he makes many things out of the matter, in the form generates only once, but what we observe is that one table, for instance, is made from one matter, while the man who applies the form, though he is one, makes many tables. In the relation of the male to the female is similar; for the latter is impregnated by one calculation but the male impregnate its many females; yet these are imitations of those first principles.

Plato used only two causes: the efficient cause (for the Forms are the cause of the essence of all other things, and the One is the cause of the essence of the Forms) and the material cause (it is evident what the underlying matter is, of which the Forms are predicated in the case of sensible things, and that One in the case of Forms, namely, that this is a dyad, the great and the small.

7. **Review and Summary of Philosophers; We’ve only Discussed Two Causes, Leaving Final Cause Out, but All Philosophers Show There are Four Causes (988a-988b).** We've learned from all of these philosophers that none of them has mentioned any principle except material and efficient causes, but all evidently have some inkling of them, though only vaguely. Some speak of the first principle as matter (either one or many, or physical or incorporeal). These thinkers grasped this cause only; but certain others have mentioned the source of movement, for example, those who make friendship and strife (Empedocles), or reason (Anaxagoras), or love (Hesiod, Parmenides), a principle.

The essence, that is, the substance of things, no one has expressed distinctly. It is mentioned chiefly by those who believe in the Forms; for they do not suppose either that the Forms are the matter of sensible things, and the One the matter of the Forms, or that they are the source of movement (for they say these are causes rather of immobility and of being at rest), but they furnish the Forms as the essence of every other thing, and the One as the essence of the Forms.
That for the sake of which actions and changes and movements take place (the final cause), they assert to be a cause in a way, but not in the way in which it is its nature to be a cause. For example, those who speak of reason or friendship classify these causes as goods; they do not speak, however, as if anything that exists either existed or came into being for the sake of these, but as if movements started from these. Similarly, those who say the One is the good, say that it is the cause of substance, but not that substance either is or comes to be for the sake of this. So in a sense, they both say and do not say the good is a cause; for they do not call it a cause qua [as] good but only incidentally.

So all these philosophers seem to testify that we have determined rightly both how many and of what sort the causes are. [Now we will present difficulties for each of these thinkers’ views of the first principles.]

8. Criticism of Pre-Socratics (988b-990a). Those who posit only matter and physical substance are wrong because they do not posit incorporeal things, which exist. [DY Evaluation: I don’t know of another spot where Aristotle saying that incorporeal things exist]. OBJ1: They did away with the cause of movement; OBJ2: They didn’t posit the substance, the essence, as the cause of anything, calling only one element as a first principle (except earth), and not enquiring as to how each of them produced the other. Those who make fire the principle are in agreement with this argument (that the first principle is most likely a most fine-grained and subtle of body, the first thing they produce in combination); earth being coarse-grained is the least likely. So fire is the most likely, and is prior in nature; followed by earth, water, and air. Some of the same criticisms hold of Empedocles as well: the four elements are produced from one another, which implies the same body does not always remain fire or earth … Anaxagoras: we should think that he believed in two elements (presumably the One – Mind, simple and unmixed – and the Other – an indefinite; mentioned later at 989b15-16). These elements couldn’t have been mixed at first, because then they must have existed separately (because nature doesn’t allow any chance thing to be mixed with any chance thing) …. But these thinkers only argued about generation, destruction, and movement, and that sort of substance; they didn’t extend their view to everything that exists (to the imperceptible as well as the perceptible); so let’s study them. Pythagoreans used strange entities – mathematical ones – that did not move. They seem to believe only in the perceptible; however, they appeal to steps up to the higher realms of reality, and are more suited to these than theories about nature. OBJ1: How can there be movement if limit and unlimited, and odd and even are the only things assumed, or how there can be generation/destruction without process or change. …. They don’t say anything which applies peculiarly to particular things. OBJ2: Further, how can numbers or their modifications be the cause of what exists/happens in the heavens from the beginning and now. Plato supposes that both bodies and their causes are numbers, but that the intelligible numbers are causes, while the others are sensible.

9. Criticisms of Plato (990a-993a). [DY: Plato posits Ideas as causes, so Aristotle is referring to him here. NOTE: I have created replies to all of these criticisms, as well as those in the Nicomachean Ethics about the Good, in the Politics about the Ideal State, and others, in my manuscript Plato Meets His Critics: Volume I: Aristotle available upon request] (1) Plato posits an equal number of Forms to the amount of causes of the things around us. (2) But his main criticism here is that the Forms are separate from their instances (unlike universals – the universals only exist because the individuals exist). The Forms exist apart from substances (and this is mistaken, according to Aristotle). (3) None of the arguments for the Forms are convincing (some are invalid; some prove Forms that Plato didn’t want to think existed). (4) The ARGs FROM THE SCIENCES proves that there are Forms of negations and of perishable things. (5) Some Form-ARGS lead to Forms of relations (which we find implausible); some have the Third Man problem. (6) They make the relative prior to the absolute (e.g., number is first, the dyad is second). (7) There will be Forms not only of substances but of many other things. But according to the theory, there must be Ideas of substances only. (8) By the one-over-many principle, the many X’s must be substances just as much as the Form of X is a substance. But this leads to problems because the many X’s are perishable. They can’t just have the name in common. (9) How do Forms contribute to sensible things; for the Forms (?) cause neither movement nor any change in them. (10) Forms do not help towards gaining knowledge of nor to the being of the other things (because the Forms are not in the particulars as in my view). (11) Other things cannot come from the Forms in any of the usual senses of “from”. To say they are patterns is an empty/poetical metaphor. Anything can either be or become like another without being copied
(12) The Forms are patterns not only of sensible things, but of themselves too, e.g., the Form of genus will be a genus of Forms; therefore the same thing will be pattern and copy. (13) It is impossible that the substance and that of which it is the substance should exist apart; how, therefore, can the Ideas, being the substances of things, exist apart? (14) Re: Phaedo: Forms are causes of being and becoming. But things that come into being need an efficient cause; and some things come into being of which there are no Forms (houses and rings). (15) If there are Forms of numbers, how can they be causes? Are existing things other numbers – one number is man, another Socrates, another Callias? [Then he mentions Callias as being a ratio between the elements, v. his Idea being other certain underlying things.] (16) From many numbers, one number is produced, but how can one Form come from many Forms (e.g., the Form of Ten Thousand Itself, being made up of a bunch of One Itselfs)? (17) If numbers are intermediate, how do these exist or from what principles do they proceed? (18) The units in two must each come from a prior two, which is impossible. (19) Why is a number, taken all together, one? (20) Plato speaks as if the One were homogeneous like fire or water; and if this is so, the numbers will not be substances. If there is a One-in-Itself and this is a first principle, “one” is being used in more than one sense; otherwise the theory is impossible. (21) Lines come from the short and long (a kind of small and great), and the plane from the broad and narrow, and the solid from the deep and shallow. But how can a plane contain a line, or the solid a line or a plane? The class of broad and narrow is different from the deep and shallow. Therefore, just as number is not present in these, because the many and few are different from these, evidently no other higher classes will be present in the lower. [Plato used to object to a class of the presence of points on a line as geometrical fiction. He called the indivisible lines the principle of lines (he used to lay this down often).]

[Aristotle says “we” over and over, but he’s really saying that Plato believes these things, as he describes the view there – that they have a set of objects (Forms) that cause perceptible things, but “sharing” is an empty metaphor.] (22) The Forms have no connection with that which we see to be the cause in the case of the sciences, and for whose sake mind and nature produce all that they do produce; but math has come to be the whole of philosophy, though they say it should be studied for the sake of other things. (23) Skipping the matter/math/predicate/differentia/substance OBJ. (24) Regarding movement, if the great and small are to be movement, the Forms will be moved; but if they are not, whence did movement come? If we cannot answer this, the whole study of nature has been annihilated. (25) All things are one is not shown; though by exposition there comes to be a One-in-itself, if we grant all the assumptions (and this doesn’t follow if the universal is not a class). (26) It cannot be explained either how the lines, planes, and solids that come after the numbers exist or can exist, or what meaning they have. Lines, planes and solids cannot be Forms (for they’re not numbers), nor the intermediates (those are the objects of math), nor the perishable things. They must therefore be a distinct, fourth class. (27) Aristotle seems to deny recollection of Forms like math or elements of substances, and that a geometry student doesn’t know any of the things with which science deals and what he’s about to learn. So if there is a science of all things, he who is learning this will know nothing before. (Yet all learning is by means of premises which are (either all or some of them) are known before, whether the learning be by demonstration or by definitions; for the elements of the definition must be known before and be familiar; and learning by induction proceeds similarly. But if science is innate, it is wonderful that we are unaware of our possession of the greatest of sciences.

10. Summary (993a). So all men seem to seek the four causes and there aren’t any other causes, but they seek them vaguely; they’ve been sort of described and not described yet. The earliest philosophers are like those who lisp or like children (he then gives a specific criticism of Empedocles).

BOOK II (a, or small alpha):

1. Investigation of the Truth; Everyone Contributes to Truth; No One has the Whole Truth; Philosophy is Knowledge of the Truth; the Highest Quality Example of Something Causes Everything Of That Kind; and the more Being Something has, the More True it is (993a-993b).
The investigation of the truth is in one way hard, and another easy. It's a fact that no one is able to attain the truth adequately, on the one hand [DY: See Mill’s On Liberty for a similar point], while on the other, no one fails entirely, but everyone says something true about the nature of things. Individually they contribute little or nothing to the truth, but by the union of all a considerable amount is amassed. Therefore, since the truth seems to be like the proverbial door, which no one can fail to hit, in this way it is easy, but the fact that we can have a whole truth and not the particular part we aim at shows the difficulty of it. So we are grateful even to superficial thinkers, because these have also contributed something to our understanding of the truth.

It is right also that philosophy should be called knowledge of the truth. For the end of theoretical knowledge is truth, while that of practical knowledge is action (practical men do not study what is eternal but what stands in some relation at some time). We do not know a truth without its cause; and a thing has a quality in a higher degree than other things if in virtue of it the similar quality belongs to the other things (e.g. fire is the hottest of things; for it is the cause of the heat and all other things [DY: Aquinas uses this exact principle and example in his Degree/Gradation proof for the existence of God]); so that that which causes derivative truths to be true is most true. Therefore the principles of eternal things must always the most true; for they are not merely sometimes true, nor is there any cause of their being, but they themselves are the cause of the being of other things, so that as each thing is in respect of being, so it is an respect of truth [DY: Aquinas uses this principle in his Motion proof for the existence of God].

2. The First Principle and Causes; None of the Four Causes can go on Ad Infinitum; The First Cause Must be Eternal and Cannot be Destroyed, Final, Formal, Material Causes, Infinite does Not Exist (994a-994b). There is a first principle, and the causes of things are neither an infinite series nor infinitely various in kind. For, on the one hand, one thing cannot proceed from another, as from matter, _ad infinitum_ (e.g. flesh from Earth, Earth from air, air from fire, and so on without stopping); nor in the other hand can the efficient causes form an endless series, man for instance being acted on by air, air by the sun, the sun by Strife, and so on without limit. Similarly, the final causes cannot go on ad infinitum: walking for the sake of health, and health for the sake of happiness, happiness for the sake of something else, and so on. The same goes for the formal cause: For in the case of an intermediate, which has a last term in a prior term outside it, the prior must be the cause of the later terms. For if we had to say which of the three is the cause, we should say the first; surely not the last, for the final term as the cause of none; nor even the intermediate, for it is the cause only of one. It makes no difference whether there is one intermediate cause her more, nor whether they are infinite or finite in number. But of series which are infinite in this way, and of the infinite in general, all the parts down to that now present our alike intermediates; so that if there is no first cause, there is no cause at all [DY: This is exactly what Aquinas uses in his Argument from Cause for God’s existence]. Nor can there be an infinite process downwards, with the beginning in the upper direction, so that water should proceed from fire, earth from water, and so always some other kind should be produced. For one thing comes from another in two ways: (1) as the man comes from the boy, by the boys changing, or (2) as air comes from water.

It is impossible that the first cause, being eternal, should be destroyed. For while the process of becoming is not infinite in the upward direction, a first cause by whose destruction something came to be could not be eternal.

The final cause is an end - that for the sake of which everything else is (done); so if there is to be a last term of this sort, the process will not be infinite; but if there is no such term there will be no final cause. But those who maintain the infinite series destroy the good without knowing it. Yet no one would try to do anything if he were not going to come to a limit. Nor would there be reason in the world; the reasonable man, at least, always acts for a purpose; and this is a limit, for the end is a limit.

The formal cause also cannot be referred always to another definition which is fuller in expression. For the original definition is always more of a definition, and not the later one; in the series in which the first term is not correct, the next is not so either. Knowledge becomes impossible, because things cannot be infinite in this way (infinitely divisible).

The matter in a changeable thing must also be cognized.

Nothing infinite can exist; and if it could, at least being infinite is not infinite.
If the kinds of causes had been infinite in number, that also knowledge would have been impossible; for we think we know, only when we have ascertained the causes, but that which is infinite by addition cannot be gone through in a finite time.

3. Methods of Speaking and its Effects on Listeners; Mathematical Accuracy Not Demanded; We must Investigate Nature and the Purpose of Natural Sciences (995a-995b). The way in which the hearer is affected by a lecture, depends on his habits; the customary language is more intelligible. Some people do not listen to a speaker unless he speaks mathematically, others unless he gives instances, while others expect him to cite a poet as witness. And some want to have everything done accurately, while others are annoyed by accuracy, either because they cannot follow the connection of thought or because they regarded as sophistry. So one must be already trained to know how to take each sort of argument, since it is absurd to seek at the same time knowledge in the way of attaining knowledge; and neither is easy to get.

The accuracy of mathematics is not to be demanded in all cases, but only in the case of things which have no matter. Therefore its method is not that of natural science; for presumably all nature has matter. Hence we must inquire first what nature is: for thus we show also see what natural science treats of, and whether it belongs to one science or two more to investigate the causes and the principles of things.

BOOK III (B, or Beta):

1. We need to Know the Subjects to be Discussed and the Difficulties involved First; One or More Science to Study Causes? Are Unity and Being Attributes of Substances, or Substances Themselves? (995b-996a). First we must recount the subjects that first should be discussed. These include both the other opinions that some have held on certain points, and any points besides these that happened to have been overlooked. It is advantageous to state the difficulties well; for the subsequent free play of thought implies the solution of the previous difficulties, and it is not possible to untie a knot that one does not know. One should have surveyed all the difficulties before hand, both for the reasons we have stated and because people who inquire without first stating the difficulties are like those who do not know where they have two go; besides, a man does not otherwise know even whether he has found what he is looking for or not; for the end is not clear to such a man, while to him who has first discussed the difficulties it is clear.

The first problem: whether the investigation of the causes belongs to one or two more sciences, and if one science, whether this should survey only the first principles of substance, or also the principles on which all men base their proofs (e.g. whether it is possible at the same time to assert and deny one and the same thing or not, and all other such questions). If the science in question deals with substances, does one science deal with all substances, or more than one, and if more, whether all are akin or must some of them be called forms of wisdom and others something else? And we must discuss whether sensible substances alone should be said to exist or others also besides them, and whether these are of one kind, or there are several classes of substances, as is supposed by those who believe both in Forms and in mathematical objects intermediate between these and sensible things [DY: i.e., Plato]. Further, we must discuss the essential attributes of sameness and difference and other such concepts. Aristotle then lists many other questions.] Is there something apart from the concrete thing by which I mean the matter with something predicated of it, or is there nothing apart, or is there something in some cases though not in others, and what sort of cases are these? The most difficult and perplexing question is whether unity and being, as the Pythagoreans and Plato said, are not attributes of something else but are the substance of existing things, or is this not the case, but the substratum is something else (as Empedocles says, love; as Heraclitus says, fire; Thales water, and so on). Are the principles universal or like individual things; do they exist potentially or actually; and are they potential or actual in any other sense than in reference to movement? With regard to all these matters not only is it hard to get possession of the truth, but it is not easy even to think out the difficulties well.
2. Options for the Questions just Posed: One or More Sciences to Study All Causes? One or More Sciences of the Starting Points of Demonstrations, or of Substances, or of Their Attributes? Do Only Sensible Substances Exist? More Criticisms of Plato’s Forms and Intermediates (996a-998a). First question: does it belong to one or more sciences to investigate all the kinds of causes? How could it belong to one science to know the principles if these are not contrary?

There are many things to which not all the principles pertain. How can a principle of change in the nature of the good be present in unchangeable things, since everything that in itself and by its own nature is good is an end, and a cause in this sense that for its sake the other things both come to be and are, and since an end or purpose is the end of some action, and all actions imply change; so that in unchangeable things this principle could not exist nor could there be a good-in-itself. This is why an math no one proves anything due to goodness (because it is better or worse); indeed no one mentions anything of the kind. Aristippos ridiculed mathematics because in crafts, one always did what they did because it is better, but math takes no account of goods and evils.

But if there are several sciences of the causes, and a different science for each different principle, which of these sciences is the one that we seek, or which of the people who possess them has the most scientific knowledge of the object in question? The same thing may have all kinds of causes, e.g. the moving cause of a house is the art or the builder, the final cause is the function it fulfills, the matter is earth and stones, and the form is the definitive formula. We could apply the term wisdom to each of the four causes. On one hand, the most architectonic and authoritative science of the end and of the good is of the nature of wisdom, for the other things are for the sake of the end. On the other, dealing with the first causes and that which is in the highest sense knowable, the science of substance must be of the nature of wisdom. For as men may know the same thing in many ways, we say that he who knows what a thing is by the characteristics it has knows more fully than he who knows it by the characteristics it has not, and he knows most fully who knows what a thing is, not he who knows its quantity or quality or what it can by nature do or have done to it; and further in all other cases also, we think that the knowledge of each thing is present when we know what it is, e.g. what squaring a rectangle is. We know about becomings and actions and about every change when we know the source of the movement; and this is other than and opposed to the end. Therefore it would seem to belong to different sciences to investigate these causes severally.

Concerning the starting points of a demonstration, it is also a disputable question whether they are the object of one science or of more. Starting points of demonstration our common beliefs, on which all men base their proofs (e.g. that everything must be either affirmed or denied, and that a thing cannot at the same time be and not be, and all other such propositions). The question is whether the same science that deals with them as with substance, or a different science, and if it is not one science, which of the two must be identified with that which we now seek. It is not reasonable that these topics should be the object of one science; for why should it be peculiarly appropriate to geometry or to any other science to understand these matters? If then it belongs to every science alike, and cannot belong to all, it is not peculiar to the sciences which investigate substances, any more than to any other science, to know about these topics. Moreover, in what way can there be a science of the first principles? For we are aware even now what each of them is; at least even other sciences use them as familiar. If the science of substance in the science which deals with the axioms of demonstrations are different, which of them is more authoritative and prior? The axioms are most universal and are the principles of all things. And if it is not the business of the philosopher, to whom else will belong to inquire what is true and what is untrue about them?

In general, do all substances fall under one science or under more than one? If more than one, to what sort of substance as the present science to be assigned? On the other hand, it is not reasonable that one science should deal with all. For then there would be one demonstrative science dealing with all attributes. To investigate the essential attributes of one subject, starting from one set of beliefs, is the business of one science. For the subject belongs to one science, and the premises belonged to one, whether to the same or to another; so that the attributes also are investigated either by the sciences or by one derived from them.

Does our investigation deal of substances alone or also with her attributes? Example: if the solid is a substance and so our lines and planes, is it the business of the same science to know these and to know the attributes of each of these classes, or of a different science? There are problems either way.
Must we say the sensible substances alone exist, or that there are others besides these? [DY: the rest of this chapter is a series of criticisms of Plato's Forms] (1) The most paradoxical thing about the forms is the statement that there are certain things besides those in the material universe, and that these are the same as sensible things except that they are eternal while the latter are perishable. For they say there is a man-in-himself and a horse-in-itself and the health-in-itself, with no further qualification, which is a procedure like that of the people who said there are gods, but in human form. For they were positing nothing but eternal men, nor are they making the Forms anything other than eternal sensible things. (2) If we are to posit besides the Forms and the sensibles the intermediates between them, we shall have many difficulties: for then there will be lines besides the lines-in-themselves, and the sensible lines, and so with each of the other classes of things; so that since astronomy is one of these mathematical sciences there'll also be a heaven besides the sensible heaven, and a son in a move, and so on, besides the sensible ones. It is not reasonable even to suppose these bodies immovable, but to suppose their moving is quite impossible. And similarly with optics and mathematical harmonics: for these also cannot exist apart from the sensible things, for the same reasons. If there are intermediates, there will also be animals intermediate between animals-in-themselves, and the perishable animals. (3) With reference to which kind of existing things must we look for these additional sciences? If geometry is to differ from measurement only in this, that the latter of these deals with things that we perceive, and the former with things that are not perceptible, evidently there will be a science other than medicine, intermediate between medical-science-in-itself and this individual medical science, and so with each of the other sciences. Yet how is this possible? There would have to be also healthy things besides the perceptible healthy things and the healthy-in-itself. If measurement deals with the perceptible imperishable magnitudes, it would itself have perished, when they perished. In astronomy also cannot be dealing with perceptible magnitudes nor with this heaven above us. For neither are perceptible lines such lines as the geometers speaks of, nor are the movements an complex orbits in the heavens like those of which astronomy treats, nor have geometrical points the same nature as the actual stars. (4) Others say that these so-called intermediates between the Forms in the perceptible things exist, not apart from the perceptible things, but in these. The impossible results of this view would take too long to a numerate, but it is enough to consider that it is not reasonable that they should be so only in the case of these intermediates, but clearly the Forms also might be in the perceptible things; for the same account applies to both. Further it follows from this theory that there are two solids in the same place, and that the intermediates are not immovable, since they are in the moving perceptible things. And in general to what purpose would one suppose them to exist, but to exist in perceptible things? For the same paradoxical results will follow which we party mentioned; there will be a heaven besides the heaven, only it will be not apart but in the same place; which is still more impossible.

3. Are Genera (the Kinds of Thing) or the Species, or the Primary Constituents/Elements of a Thing to be Taken as Elements and Principles? Arguments Against All of These Options (998a-999a). It is also difficult to say with regard to the first principles, whether it is the genera that should be taken as elements and principles, or rather the primary constituents of a thing. For example, it is the primary parts of which all articulate sounds consist that are thought to be elements and principles of articulate sound, not the common genus – the articulate sound; and we give the name of elements to those geometrical propositions, the proofs of which are implied in the proofs of others, either of all core of most. Further, both those who say there are several elements of corporeal things and those who say there is one, say the parts of which bodies consist and are compounded our principles (e.g. Empedocles says fire in water and the rest are constituent elements of things, but does not describe these as genera of existing things). So we seem to need to know the elements, which are not identical to the genera. But in so far as we know each thing by its definition, and the genera are the principles of definitions, the genera must also be the principles of definable things. And some who say unity and being, or the great and the small, are elements of things, seem to treat them as genera. But it is not possible to describe the principles in both ways. For the formula of the substance is one; but definition by genera will be different from that which states the constituent parts of a thing.

Even if the genera are in the highest degree principles, should we regard the highest genera the principle, or those predicated directly of the individuals? For if the universal is always more of a principal, evidently the uppermost of the genera are the principles; for these are predicated of all things. There will, then, he has many
principles of things as there are primary genera, so that both being in unity will be principles and substances; for these are most of all predicated of all things. But it's not possible that either unity or being should be a genus of things; further differentiae [essential differences] of any genus must each of them both have being and be one, but it is not possible for the genus to be predicated of the differentiae taken apart from the species; so if unity or being is a genus, no differentia will either be one or have being. But if unity and being are not genera, neither will they be principles, if the genera are the principles. [DY: Aristotle here goes through the difficulty if unity is more of the nature of a principle, it seems that the individual is more the principle] Further, there are problems in the case of things in which the distinction of prior and posterior is present, since that which is predicable of these things cannot be something apart from them. For example, if two is the first of numbers there will not be a number apart from the kinds of numbers. And if the genera of these things do not exist apart from the species, the genera of other things will scarcely do so. Perhaps then the species predicated of individuals seem to be principles rather than the genera; but this is not true because the principle or the cause must exist alongside of the things of which it is the principle, and must be capable of existing and separation from them; and for what reason should we suppose any such thing to exist alongside of the individual, except that is predicated universally and of all? But if this is the reason, the more universal must be supposed to be more of a principal; so the highest genera would be the principles.

4. How Do We Gain Knowledge if There is Nothing Apart from Individual Things? The Necessity of Eternal Things. Are First Principles One in Kind or Different, (Im)Perishable? Are Being and Unity the Substances of Things, or Something Else? Problems Whether Being-Itself and Unity-Itself Exist or Not. (999a-1001b). The hardest and most necessary difficulty to examine is this: if, on the one hand, there is nothing apart from individual things, and the individuals are infinite in number, how is it possible to get knowledge of the infinite individuals? For all things that we know, we know in so far as they have some unity and identity, and in so far as some attribute belongs to them universally. But if this is necessary, and there must be something apart from the individuals, it will be necessary that the genera exist apart from individuals, but we just found this impossible. If there is nothing apart from individuals, on the other hand, there will be no object of thought, but all things will be objects of sense, and there will not be knowledge of anything, unless we say that sensation is knowledge. Further, nothing will be eternal or unmovable; for all perceptible things perish and are in movement. But if there is nothing eternal, neither can there be a process of coming to be; for that which comes to be, and that from which it comes to be, must be something, and the ultimate term in this series cannot have come to be, since the series has a limit and nothing can come to be out of that which is not. [DY: This is similar to what Aquinas argues in his Way of Necessity argument for God's existence]. Next, if generation and movement exist there must also be a limit [argument given]. Next, since matter exists, because it is on generated, it is a fortiori reasonable that the substance, that which the matter is at any time coming to be, should exist [argument given]. But it is difficult to say this is true. Will the substance of all the individuals, e.g. of all men, be one? This is paradoxical, for all the things whose substance is on this view one would be one. But are they many and different? This is also unreasonable. At the same time, how does the matter become each of the individuals, and how is the concrete thing these two elements?

Further if the first principles are one in kind only, nothing will be numerically one, not even unity-itself and being-itself. And how will it be possible to know, if there is not to be something common to a whole set of individuals? But if there is a common element which is numerically one, and each of the principles is one, there will be nothing else besides the elements; for there is no difference of meeting between “numerically one” and “individual.” The individual is the numerically one, and the universal is that which is predicatable of the individuals.

Another difficulty: Are the principles of perishable and imperishable things the same or different? If the same, how are some things imperishable and others perishable, and for what reason? Hesiod is of no help to us here, because he asserts that the first principles our gods and born of God's and says that the beings which did not taste of nectar and ambrosia became mortal. We will not spend too much time on Hesiod. Even Empedocles makes the same mistake; that is, he maintains that Strife is a principle that causes destruction, but strife would seem nonetheless to produce everything, except the One; for all things excepting God proceed from strife. [DY: he discusses passages here . . .]
Thus, we have proven that the principles cannot be the same. But if there are different principles, one difficulty is whether these themselves will be imperishable or perishable. For if they are perishable, evidently these also must consist of certain elements; for all things that perish, perish by being resolved into the elements of which they consist; so that it follows that prior to the principles there are other principles. But if the principles are imperishable, why will things composed of some imperishable principles be perishable, while those composed of the others are imperishable?

The hardest inquiry of all the most necessary for knowledge of the truth, is whether being and unity are the substances of things, and whether each of them, without being anything else, is being or unity respectively, or whether we must inquire what being and unity are, with the implication that they have some other underlying nature. [Plato in the Pythagoreans thought being and unity were nothing else, but this was their nature, their substance being just unity and being. But the natural philosophers, e.g. Empedocles, says that unity his love or is at least for all things the cause of there being one.] If we do not suppose unity and being to be substances, it follows that none of the other universals is a substance; for these are most universal of all. If there is no unity-itself or being-itself, there will scarcely be in any other case anything apart from what are called individuals. But if there is a unity-itself and a being-itself, substance must be unity and being; for it is not something else that is predicated universally of them but just unity and being. But then how were the anything else besides these; I mean, how will things be more than one in number? Their objections either way: for whether unity is not a substance or there is a unity-itself, number cannot be a substance. If the unity-itself is indivisible, according to Zeno's doctrine it will be nothing. [More Zeno analysis.]

5. Are Numbers, Bodies, Planes, and Points Substances or Not? (1001b-1002b). Are numbers, bodies, planes, and points substances or not? If they are not, it baffles us to say what being is and what the substances of things are. For modifications and movements and relations and dispositions and ratios do not seem to indicate the substance of anything; for all are predicated of one subject, and none is a "this". Heat and cold and the like are modifications and not substances, and the body which is thus modified alone persists as something real and as a substance. But on the other hand, a body is surely less of a substance that a surface, and a surface less than a line, and align less than a unit and a point. For a body is bounded by these; and they are thought to be capable of existing without body, but a body cannot exist without these. So, if on the one hand, body is in the highest degree substance, and on the other hand these things are so more than body, but these are not even instances of substance, it baffles us to say what being is and what the substance of things is. Moreover, the questions of generation and destruction have further paradoxes: first substance, not having existed before, afterwards does not exist, this change is thought to be accompanied by a process of becoming or perishing; but points and lines and surfaces cannot be in process of becoming nor of perishing, though they at one time exist and at another do not. Another EX: the “now” in time: for this also cannot be in process of coming into being or of ceasing to be, but yet seems to be always different, which shows that it is not a substance.

6. Why posit Forms? Problems if One Does So. Do Elements Exist Potentially or in Some Other Way (Problems Either Way)? Are the First Principles Universal or Individuals (Universals Implied)? Suches v. Thises. (1002b-1003a). We can ask why, besides perceptible things and the intermediates, we have to look for another class of things such as the Forms, which we posit. [DY: Aristotle doesn’t believe in Forms, so it is strange that he says, “Forms, which we posit.”] Suppose it is for this reason, because the objects of mathematics, while they differ from the things in this world and some other respect, differ not at all in that there are many of the same kind, so that their first principles cannot be limited a number, so that if there are not (besides perceptible and mathematical objects) others such as some maintain the Forms to be, there will be no substance which is one in number as well as in kind, nor will the first principles of things be determined in number, but only in kind – if then this must be so, the Forms also must therefore be held to exist. They implicitly hold that the Forms are substances. But if we are to suppose that the Forms exist and the principles are one in number, not in kind, the impossible results that we have mentioned necessarily follow.

Do the elements exist potentially or in some other way? If the latter, there will be something else prior to the first principles; for the potency is prior to the actual cause, and it is not necessary for everything potential to be actual. But if the elements exist potentially, it’s possible that everything that is should not be. For even that
which is not yet is capable of being; for that which is not comes to be, but nothing that is incapable of being comes to be.

Lastly, are the first principles universal or what we call individuals? [DY: Note that Aristotle has already asked this question above.] If they are universal, they will not be substances; for everything that is common indicates not a "this" but a "such", but substance is a "this". And if we can actually posit the common predicate as a single "this", Socrates will be several animals: himself and man an animal, if each of these indicates a "this" and a single thing. If then, the principles are not universals but are of the nature of individuals, they will not be knowable; further knowledge of anything is universal. Therefore if there is to be knowledge of the principles there must be other principles prior to them, which are universally predicated of them.

BOOK IV (G, or Gamma):

1. The Science of Being (1003a). There is a science that investigates being as being and the attributes which belong to this in virtue of its own nature. The science is not the same as any of the so-called special sciences, since none of these deal generally with being as being. They cut off a part of being and investigate the attributes of this part; e.g. math. Now since we are seeking the first principles on the highest causes, clearly there must be something to which these belong in virtue of its own nature. It is necessary that the elements must be elements of being not by accident that just because it is being. Therefore it is of being as being that we also must grasp the first causes.

2. Focal Meaning of “Being”; One Science that Studies Being as Being and Unity as Unity, Dialecticians v. Sophists v. Philosophers (1003a-1005a). There are many senses [DY: ten senses or categories of being, according to Aristotle] in which anything may be said to “be”, but they are related to one central point, one definite kind of thing, and are not homonymous. For example, everything which is healthy is related to health, one thing in the sense that it preserves health, another in the sense that it produces it, another in the sense that it is a symptom of health, and other because it is capable of it. And that which is medical is related to the medical art, one thing in the sense that it possesses it, another in the sense that it is naturally adapted to it, another in the sense that it is a function of the medical art. And we shall find other words used similarly to these. All senses of being refer to one starting-point; some things are said to be because there substances, others because they are affections of substance, others because they are a process towards substance, or destructions or private nations are qualities of substance, or productive or generative of substance, or of things which are relative to substance, or negations of some of these things or of substance itself. It is for this reason that we say even of non-being that it is non-being. As then, there is one science that deals with all healthy things, the same applies in the other cases also. So it is clear that it is the work of one science also to study all things that are, as being. But everywhere science deals chiefly with what is primary and on which the other things depend; if then this is substance, it is of substances that the philosopher must grasp the principles and the causes.

For every single class of things, as there is one perception, so there is one science (the one science grammar investigates all articulate sounds). So, there is one generically one science to investigate all the species of being as being.

If, now, being in unity are the same and are one thing in the sense that they are implied in one another as principal and cause are, not in the sense that they are explained by the same formula; for one man and a man are the same thing an existent man and a man are the same thing, and the doubling of the words in "one man" and "one existent man" does not give any new meaning; and similarly with "one", so that it is obvious that the addition in these cases means the same thing, and unity is nothing apart from being; and if further, the essence of each thing is one in no merely accidental way, and similarly is from its very nature something that is; all this being so, there must be exactly as many species of being as of unity. And to investigate the essence of these is the work of a science that is generically one. And there are as many parts of philosophy as there are kinds of substance, so that there must necessarily be among them a first philosophy and one that follows this.
Since it is the work of one science to investigate opposites, and plurality is opposite to unity, and it belongs to one science to investigate the negation and the privation to which the negation or the privation refers, the contraries of the concepts we named above, the other and the dissimilar and the unequal, and everything else which is derived either from these or from plurality and unity, must fall within the province of the science above-named. So, since there are many senses in which a thing is said to be one, these terms also will have many senses, but yet it belongs to one science to consider them all; for a term belongs to different sciences not if it has different senses, but if its definitions neither are identical nor can be referred to one central meaning. Since all things are referred to that which is primary, as for instance all things which are one I referred to the primary one, we must say that this holds good also of the same and the other and of contraries in general [DY: Compare what Aristotle says in Nicomachean Ethics 1.6, that Good has as many senses as Being does, so we can’t study it; but here he is saying that there is a focal meaning of Being, we can study it, and Oneness, AND all contraries, of which Good and Bad would seem to be one]. So that after distinguishing the various senses of each, we must then explained by reference to what is primary in each term, saying how they are related to it; some in the sense that they possess it, others in the sense that they produce it, and others in other such ways. So one science should be able to give an account of these concepts as well as of substance.

It is the function of the philosopher to be able to investigate all things. Who else will inquire whether Socrates and Socrates seated are the same thing, or whether one thing has one contrary or what contrariety is, or how many meetings it has? And similarly with all other such questions. People make mistakes here because they forget that substance of which they have no correct idea, is prior two properties. For a number as number has peculiar attributes, such as oddness and evenness, commensurability and inequality, excess and defect, and these belong to numbers either in themselves or in relation to one another. Dialecticians and sophists assume the same guise as the philosopher; for sophistic his philosophy which exists only in semblance (and appears to be philosophy but is not), and dialectic, though it embraces all things and being is common to all things, is merely critical where philosophy claims to know.

Nearly all thinkers agree that being and substance are composed of contraries; at least all name contraries as their first principles (some name on an even, others hot and cold, some limit and unlimited, some love and strife). Everything else is evidently referred to unity and plurality, and the principle stated by other thinkers fall entirely under these as their genera. So again it belongs to one science to examine being as being. For all things are either contraries are composed of contraries, and unity and plurality are the starting-points of all contraries. All these belong to one science, whether they have or have not one common notion. Probably they have not; yet even if "one" has several meanings, the other meanings will be related to the primary meaning, and similarly in the case of the contraries. Therefore, it is the work of one science to examine being as being, and the attributes which belong to it as being, in the same science will examine not only substances, but also their attributes, both those above-named and what is prior and posterior, genus and species, whole and part, and the others of this sort.

3. Philosophers will Inquire into Mathematical Axioms; Natural Philosophers are Not Ultimate Philosophers, the Principle of Non-Contradiction (PNC) is the Most Certain and Non-Hypothetical Principle (1005a-b). It belongs to one science to inquire into the truths of mathematical axioms, and into substance. This science is called philosophy; for these truths hold good for everything that is, and not for some special genus apart from others. And all men use them (to the level of their own purposes), for they are true of being as being, and each genus has being. So, since these truths clearly holds good for all things as being, he who studies being as being will inquire into them too. There is one kind of thinker who was even above the natural philosopher (for nature is only one particular genus of being), the discussion of these truths will also belong to him whose inquiry is universal and deals with primary substance. Natural science is also a kind of wisdom, but it is not the first kind. So the philosopher, who is studying the nature of all substance, must inquire also into the principles of deduction.

But he who knows best about each genus must be able to state the most certain principles of his subject so that he whose subject is being as being must be able to state the most certain principles of all things. This is the philosopher. The most certain principle of all is that regarding which it is impossible to be mistaken; for such a principle must be both the best-known and non-hypothetical. For principle which everyone must have knows
anything about being, is not a hypothesis; and that which everyone must know who knows anything, he must already have when he comes to a special study. This principle is the Principle of Non-Contradiction (PNC): The same attribute cannot at the same time belong and not belong to the same subject in the same respect. This is the most certain of all principles, since it answers to the definition given above. For it is impossible for anyone to believe the same thing to be and not to be, as some think Heraclitus says; for what a man says he does not necessarily believe. This principle is naturally the starting-point even for all the other axioms.

4. Some State PNC is Possible, but We can Prove Them Wrong; it’s Self-Refuting and Meaningless to Deny PNC; There is Still More or Less in the Nature of Things (1005b-1009a). As just stated, some both themselves assert and write that it is possible for the same thing to be a not to be, and say that people can judge this to be the case. But we claimed that it is impossible for anything at the same time to be and not to be, and by this means them shown that this is the most indisputable of all principles. Some even demand that this shall be demonstrated, but they do this through a want of education, for to not know of what things one may demand demonstration and have one may not proves their want of education. These persons cannot say what principle they regard as more in demonstrable than the present one.

We can, however, demonstrate negatively even that this view is impossible, if our opponent will only say something; and if he says nothing, it is absurd to attempt to reason with one who will not reason about anything, in so far as he refuses to reason. For such a man, as such, is seen already to be no better than a mere plant. [DY: Here, Aristotle is almost certainly referring to Plato’s joke about the philosopher Protagoras in his dialogue Theaetetus – a fun inside joke.] Negative proof is not the same thing from positive demonstration, because in a demonstration one might be thought to be assuming what is at issue; but if another person is responsible for the assumption, we shall have negative proof, not a demonstration. We shall not demand that our opponent shall say that something either is or is not, but that he shall say something which is significant both for himself and for another; for this is necessary, if he really is to say anything. For, if he means nothing, such a man will not be capable of reasoning, either with himself or with another. By saying something definite, he proves himself wrong. The person responsible for the proof, however, is not he who demonstrates but he who listens; for while disowning reason he listens to reason.

So at least this is obviously true, that the word “be” or “not be” has a definite meaning, so that not everything will be so and not so. Even if a word has several definite meanings, the principle will hold. However, if the word has an infinite number of meanings, obviously reasoning would be impossible; for not to have one meaning is to have no meaning, and if words have no meaning reasoning with other people, and indeed with oneself has been annihilated; for it is impossible to think of anything if we do not think of one thing; but if this is possible, one name might be assigned to this thing. [DY OB: I’m not sure why having an infinite number of meanings implies that a word has NO meaning; and why can’t I know that when I use the word “X” (that has infinite meanings) that I intend meaning B?]

It’s impossible for the same thing to be and not to be, except in virtue of an ambiguity, just as one whom we call “man,” others might call “not-man”; but the point in question is not this, whether the same thing can at the same time be and not be a man in name, but whether it can in fact. Now if “man” and not-man mean nothing different, obviously “not being a man” will mean nothing different from “being a man”; so that being a man will be not being a man; for they will be one. But it was shown earlier that they mean different things. Therefore, if it is true to say of anything that is a man, it must be a two footed animal; for this is what “man” means; and if this is necessary, it is impossible the same thing should not be a two footed animal; for this is what being necessary means – that it is impossible for the same thing not to be. The same account holds good with regard to not being man, and if your opponent adds contradictories to either man or not-man.

Those who use this argument do away with substance and essence. For they must say that all attributes are accidents, and that there is no such thing as being a sensually man or animal. For if there is to be any such thing as being essentially man, this will not be being non-man or not being man (yet these are negations of it); for there was some one thing which it meant, and this was the substance of something. And denoting the substance of the thing means that the essence of the thing is nothing else. But if it’s being essentially man is to be the same as either being essentially non-man or essentially not being man, then it’s essence will be of something
else. Therefore our opponents must say that there cannot be such a definition of anything; but that all attributes are accidental; for this is the distinction between substance and accident – white is accidental to man, because though he is white, whiteness is not his essence. But if all statements are accidental, there will be nothing primary about which they are made, if the accidental always implies predication about a subject. This predication would have to go on ad infinitum. But this is impossible; for not even more than two terms can be combined: For an accident is not an accident of an accident, unless it be because both are accidents of the same subject. For example, the white is musical and the latter is white, only because both are accidental to man. But Socrates is musical, not in this sense, that both terms are accidental to something else. There must, then, even in this case be something which denotes substance. And it is been shown that, if this is so, contradicteories cannot be predicated at the same time.

If all contradicteories are true of the same subject of the same time, evidently all things will be one. For the same thing will be a trireme, a wall, and a man, if it is equally possible to affirm and to deny anything of anything, and this premise must be accepted by those who share the views of Protagoras. For if anyone thinks that the man is not a trireme, evidently he is not a trireme; so that if he also is a trireme, if, as they say, the contradictory is true. And we thus get the doctrine of Anaxagoras, that all things are mixed together; so that nothing really exists. These philosophers fancy themselves to be speaking of being, while they are speaking about non-being; for that which exists potentially and not actually is the indeterminate. My opponents must predicate of every subject every attribute in the negation of it indifferently. Also, if it is true that a thing is man and not-man, evidently also it will be neither man nor not-man.

Either the theory is true in all cases, and a thing is both white and non-white, and being and not-being, and all other contradictories are similarly compatible, or the theory is true of some statements and not of others. And if not of all, the exceptions will be agreed upon; but if of all, again either the negation will be true wherever the assertion is, and the assertion true wherever the negation is, or the negation will be true where the assertion is, but the assertion not always true where the negation is. If contradictories can be predicated alike of each subject, one thing will in no wise differ from another; for if it differ, this difference will be something true and peculiar to it. And if one may with truth apply the predicate separately, the above-mentioned result follows nonetheless.

It follows that all would then be right and all would be in error, and our opponent himself confesses himself to be in error. And, our discussion with him is evidently about nothing at all, because he says nothing. For he says neither ‘yes’ nor ‘no’, but both ‘yes’ and ‘no’; but he denies both of these and says ‘neither yes nor no’; otherwise there would already be something definite.

Is he in error who judges either that the thing is so or that it is not so, and is he right who judges both? If he is not right, what can my opponents mean by saying that the nature of existing things is of this kind? And if he is not right, but more right than he who judges in the other way, being will already be of a definite nature, and this will be true, and not at the same time also not true. But if everyone is both right and wrong, one who believes this can neither speak nor say anything intelligible; for he says at the same time both ‘yes’ and ‘no’. And if he makes no judgment but thinks and does not think, indifferently, what difference will there be between him and the plants? Evidently people judge one thing to be better and another worse. And if this is so, one must judge one thing to be man and another to be not-man, one thing to be sweet and another to be not-sweet. For one does not aim at and judge all things alike, when, thinking it desirable to drink water or to see a man, one proceeds to aim at these things; yet one should, if the same thing were equally man and not-man.

However much all things may be so and not so, there is still a more and a less in the nature of things; for we should not say that two and three are equally even, nor is he who thinks four things are five equally wrong with him who thinks they are a thousand. If then they are not equally wrong, there must be some truth to which the more true is nearer. And even if there is not, still there is already something more certain and true, and we shall have got rid of the unqualified doctrine that would prevent us from determining anything in our thought.

5 Protagoras Denies PNC so his Doctrine is Wrong; Some Hold Appearances are Always True; Others Say There is No Truth of the Matter; but Both are Wrong; There is Both Relativity and Objectivity, and Truth and Falsity in Appearances (1009a-1011a). From the same opinion proceeds the doctrine of Protagoras, and both doctrines must be both equally true or untrue. On one hand, if all opinions
and appearances are true, all statements must be at the same time true and false. For many men hold conflicting beliefs with one another, and all think those mistaken who have different opinions than themselves; so that the same thing must be and not be. But then all opinions must be true; for those who are mistaken and those who are right are opposed to one another in their opinions; if, then, reality is such as the view in question supposes, everyone will be right in their beliefs. Thus both doctrines proceed from the same way of thinking.

Those who really feel the difficulties have been led to this opinion by observation of the sensible world. They think that contradictions or contraries are true at the same time, because they see contraries coming into existence out of the same thing. To these opponents, we shall say that they are both, in a sense, right and wrong. For “that which is” has two meanings, so that in some sense a thing can come to be out of that which is not, while in some sense it cannot, and the same thing can at the same time be and not be – but not in the same respect. For the same thing can be potentially at the same time two contraries, but it cannot be both actually.

But some have inferred from the sensible world the truth of appearances. For they think that the truth should not be determined by the number of people who hold a belief, and that the same thing is thought sweet by some who taste it, and bitter by others, so that if all were ill or mad, and only two or three were well or sane, these would be thought ill and mad, and not the others. [DY OBJ: This doesn’t make sense, because Aristotle states that the truth is NOT determined by the number of people, but the majority in the example WILL think the healthy perceivers are ill/mad.] Moreover, many nonhuman animals receive impressions contrary to ours; and even to the senses of each individual, things do not always seem the same. Which, then, of these impressions are true and which are false is not obvious; for the one set is no more true than the other, but both are alike.

[DY: Compare Sextus Empiricus’ Outlines of Pyrrhonism Modes of Skepticism arguments. For instance, Democritus claims that either there is no truth or at least it is not evident to us. These thinkers (including Empedocles) suppose knowledge to be sensation so they say that what appears to our senses must be true. [He gives examples from Empedocles, Parmenides, Anaxagoras, Homer, and the most extreme examples: Heraclitus, and Cratylus: “Cratylus, who finally did not think it right to say anything but only moved his finger, and criticized Heraclitus for saying that it is impossible to step twice into the same river; for he thought one could not do it even once.”]

While these thinkers were inquiring into the truth of that which is, they thought that which is was identical with the sensible world; there is, however, a large amount of the nature of the indeterminate of being in the peculiar sense explained above, in the sensible world; so, while they speak plausibly, they do not say what is true.

We state that they are correct that the changing, when it is changing, does not exist. Yet it is disputable; for that which is losing a quality has something of that which is being lost, and in that which is coming to be, something must already be. Also, if a thing is perishing, there will be present something that exists; and if a thing is coming to be, there must be something from which it comes to be and something by which it is generated, and this process cannot be ad infinitum. But we insist that to change in quantity and quality are not the same thing. Indeed, from denying PNC, it follows that all things are at rest rather than that they are in movement; for there is nothing into which they can change, since all attributes already belong to all subjects.

Regarding the nature of truth, we must maintain that not everything which appears to be true is true. First, even if sensation is true, appearance is not the same as sensation. Our opponents can raise questions about magnitudes being as great or colors being the same, as they appear to people near or at a distance, and whether they are such as they appear to the sick or to the healthy, and whether heavy things which appear heavy to the weak or strong are really heavy, and whether truth is what appears to the sleeping or to the waking. With regard to the future, as Plato claims, surely the opinion of the physician and that of the ignorant man are not equally weighty (e.g., on whether a man will get well or not). Further, among sensations themselves, they are not equally authoritative; in the case of color, sight, not taste, has the authority; in flavor, taste, not sight; each sense never says at the same time of the same object that it is so and not so. Actually not even at different times does one sense disagree about the quality, but only about that to which the quality belongs. E.g., the same wine might seem, if either it or one’s body changed, at one time sweet and at another time not sweet; but at least the sweet, when it exists, has never yet changed, but one is always right about it, and that which is to be sweet must of necessity be of such and such a nature. [DY: Proof that Aristotle accepts the incorrigibility thesis with respect to appearances – if I seem to sense sweetness, I am indeed sensing sweetness. Yet all these views destroy the
distinction between appearances and sensations, because if there is no substance of anything, nothing is of necessity; for the necessary cannot be in this way and also in that.

Lastly, if only the sensible exists, there would be nothing if living things didn’t exist; for there would be no faculty of sense in that case. The view that the substrata which cause the sensation should not exist even apart from sensation is impossible. For sensation is surely not the sensation of itself, but there is something beyond the sensation, which must be prior to the sensation; for that which moves is prior in nature to that which is moved.

6 My Opponents Demand a Reason Where None is Possible; Refuting Protagorean Relativism (1011a-1011b). Some of my opponents ask, who is the judge of the healthy man, and in general who is likely to judge rightly on each class of questions? But this is like puzzling over the question whether we are now asleep or awake. They demand that a reason shall be given for everything; for they seek a starting-point by a demonstration, while having themselves no conviction. But their mistake is that they seek a reason for which no reason can be given; for the starting-point of demonstration is not demonstration.

These people might be easily persuaded of this easily graspable truth; but those who demand to be made to contradict themselves seek what is impossible, because they are contradicting themselves from the very first. But if everything is not relative, but some exist in their own right, not everything that appears will be true; for that which appears appears to some one; so that he who says all things that appear are true, makes all things relative. So those who ask for an irresistible argument, and simultaneously demand to be defend their views, must guard themselves by saying that the truth is not that what appears to exist, but that what appears to exist for him to whom it appears, and when and in the way in which it appears. To those who say that what appears is true, and therefore that all things are equally false and true, because things do not appear either the same to all men or always the same to the same man, but often have contrary appearances at the same time – we say “Yes, but not at the same time in the same respect,” so that what appears is under these qualifications true. What if my opponent say that this is not true, but true for this man? [DY: As Protagoras states.] And already stated, they must make everything relative to thought and perception, so that nothing either has come to be or will be without someone's first thinking it. But if this is true, not all things will be relative to opinion. Again, if the same thing is both half and equal, still the equal is not identical to the double. In relation to that which thinks, then, if the same thing is a man, and is that which is thought, that which thinks will not be a man, but only that which is thought. [DY: I don’t understand this example.]

We have now shown that the most indisputable of all beliefs is that contradictory statements are not at the same time true, and what consequences follow from the denial of this belief, and why people do deny it. Now since this is impossible, obviously contraries also cannot belong at the same time to the same thing.

7 No Intermediates of Contradictories; One Subject Must Possess nor Not Possess a Predicate; Truth/Falsity Defined; Tri-Valence Logic? Endorsing a Platonic View? Refuting Heraclitus and Anaxagoras (1011b-1012a). There cannot be an intermediate between contradictories; of one subject we must either affirm or deny any one predicate. First, let us define what the true and the false are. To say of what is that it is not, or of what is not that it is, is false; to say of what is that it is, and of what is not that it is not, is true; so he who says of anything that it is, or that it is not, says either what is true or what is false; but neither what is nor what is not is said to be or not to be.

Either the intermediate between the contradictories will be so in the way in which gray is between black and white, or as that which is neither man nor horse is between man and horse. If it were of the latter kind, it could not change, for change is from not-good to good, or from good to not-good [DY: Why only good/not-good? I believe, based on the next paragraph, that Aristotle has in mind refuting Anaxagoras.]; but things always change, since there is no change except to opposites and to their intermediate. But if it is really intermediate, in this way too there is a difficulty – there would have to be a change to white, which was not from not-white; but this is never seen. But there must be an intermediate between all contradictories, so that it will be possible for a man to say what is neither true nor untrue. [DY: Aristotle appears to be arguing for tri-valence logic here – true, false, and neither are possible values of statements.] And there will be an intermediate between that which is and that which is not, so that there will also be a kind of change intermediate between generation.
and destruction. [DY: Compare Plato’s Republic Book V, where he says opinion is of what rolls around between being and non-being; that is, of things that sort of exist and sort of do not exist.] Again, there will be an intermediate even in cases where the negation of an attribute means the assertion of its contrary; e.g. in the sphere of numbers there will be number which is neither odd nor not-odd. But this is impossible, as is obvious from the definition. [DY OBJ: This is incoherent – Aristotle has just stated that an intermediate is possible and impossible in a certain case.] Again, the process will go on ad infinitum, and the number of realities will be made both half as great AND even greater: It will be possible to deny this intermediate with reference both to its assertion and to its negation, and this new term will be some definite thing; for its substance is something distinct. Next, when a man is asked whether a thing is white and says “No,” he has denied nothing except that it is; and its not being is a negation.

The starting-point in dealing with these people is definition, which rests on the necessity of their meaning something. Heraclitus’ view (all things are and are not) seems to make everything true; Anaxagoras’ view (there is an intermediate between the terms of a contradiction) seems to make everything false [ARG: when things are mixed, the mixture is neither good nor not-good, so that one cannot say anything that is true.]

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8 Everything Can’t Be Always True and False Simultaneously; It Is Self-Refuting, Even to Deny Truth to Others While Only Affirming it of One’s Own Statements; It Is Not True That All Things Are in Motion or That All Things Are at Rest; First Mover Mentioned (1012a-b).

Therefore, obviously the theory that nothing is true (my opponents ask why every statement can’t be like the statement “the diagonal of a square is commensurate with the side”), and the theory that everything is true at the same time, is false. First, there are obviously contradictories that cannot be true at the same time. But all statements cannot be false either. However, if that which it is true to affirm is nothing other than that which it is false to deny, it is impossible that all statements should be false; for one side of the contradiction must be true. Again, if we must necessary either assert or deny everything, it is impossible that both should be false; for one side of the contradiction is false. Further, all such arguments are self-refuting: He who says that everything is true makes the statement contrary to his own also true, so that his own statement is not true (for the contrary statement denies that it is true), while he who says everything is false makes his own statement also false. And if the former person excepts the contrary statement, saying it alone is not true, while the latter excepts his own as being alone not false, nonetheless they are driven to postulate the truth or falsehood of an infinite number of statements; for that which says the true statement is true, is true, and this process will go on to infinity.

The claim that all things are at rest is not correct, nor is the claim that all things are in motion. If all things are at rest, the same statements will always be true and always false, but they obviously are not; for he who makes a statement himself at one time was not in the past and again will not be in the future. And if all things are in motion, nothing will be true; everything therefore will be false (but this is impossible). Again, it must be that which is that changes; for change is from something to something. But it is not the case that all things are at rest or in motion sometimes, and nothing forever; for there is something that always moves the things that are in motion, and the first mover must itself be unmoved. [DY: Implication about God here.]

BOOK V (D, or Delta)

1 Definitions of Origin (1012b-1013a). An origin is: (1) That part of a thing from which one would start first (e.g. a line or a road has an origin in either of the contrary directions). (2) That from which each thing would best be originated (e.g. we must sometimes begin to learn not from the first point and the origin of the thing, but from the point from which we should learn most easily) [DY OBJ: Odd definition of origin]. (3) That from which (as an immanent part) a thing first arises (e.g. as the keel of a ship and the foundation of a house, while in animals the heart, the brain, or some other part). (4) That from which (not as an immanent part) a thing first arises, and from which the movement or the change naturally first proceeds (as a child comes from the father and the mother, and a fight from abusive language). (5) That by whose choice that which is moved is moved and that which changes changes, [e.g. the
kingships (or other forms of government) in cities, and the arts (especially the architectonic arts)]. (6) That from which a thing can first be known (e.g. the hypotheses are the origins of demonstrations). (Causes are spoken of in an equal number of senses; for all causes are origins. [DY OBJ: Aristotle only claims that there are four causes in his *Physics* and here, earlier, in the *Metaphysics*, and see in the next chapter below; so this is a puzzling statement.] The nature and elements of a thing are origins, and so are thought and choice, substance, and that for the sake of which – for the good and the beautiful are the origin both of the knowledge and of the movement of many things.

2 Definitions of Cause (4, then 9 causes, but other numbers of causes stated and implied!) (1013a-1014a). A cause is (1) that from which (as immanent material) a thing comes into being (Material cause; e.g. the bronze of the statue and the silver of the saucer, and the classes which include these). (2) The form or pattern, i.e. the formula of the essence, and the classes which include this (Formal Cause; e.g. the ratio 2:1 and number in general are causes of the octave) and the parts of the formula. (3) That from which the change or the freedom from change first begins (Efficient Cause; e.g. the man who has deliberated is a cause, and the father a cause of the child, and in general the maker of the thing made and/or changed). (4) The end or purpose or function, i.e. that for the sake of which a thing is (Final Cause; e.g. health is the cause of walking. Why does one walk? In order that one may be healthy; we have given the cause.) The same is true of all the means (instruments or actions) that intervene before the end (e.g. thinning or purging or drugs or instruments intervene before health is reached).

These, then, are practically all the senses in which causes are spoken of [DY OBJ: Again, see above for the claim that cause is said of in 6 ways, and elsewhere (e.g., first sentence of the next paragraph, underlined) that there are only four causes; note that Aristotle criticized Plato and the Pre-Socratics for only addressing two of his four causes, but he himself states there are six here as well. But, see below, when Aristotle actually multiplies the number of causes well above 6, and not in the same way as he claimed above with “origins”], so it follows that there are several essential causes of the same thing (e.g. both the art of sculpture and the bronze are causes of the statue not in virtue of anything else but as a statue; the one as matter and the other as the source of the movement). Things can also be causes of one another (e.g. exercise of good condition, and the latter of exercise; the one as end and the other as source of movement). The same thing is also sometimes the cause of contraries (e.g. we impute the shipwreck to the absence of the captain, whose presence was the cause of safety; and both – the presence and the privation – are causes as sources of movement.

All the causes now mentioned fall under four senses: Letters are the causes of syllables, material is the cause of manufactured things, fire and earth and all such things are the causes of bodies, the parts are causes of the whole, and the hypotheses are causes of the conclusion, in the sense that they are that out of which these respectively are made. Of these, some are cause as substratum (e.g. the parts), others cause as essence (the whole, the synthesis, and the form). The semen, the physician, the man who has deliberated, and in general the agent, are all sources of change or of rest. The remainder are causes as the end and the good of the other things; for that, for the sake of which other things are, is naturally the best and the end of the other things; it makes no difference whether we call it good or apparent good [DY: Note that here Aristotle differs with Plato, who would claim that we all want what is really best and cannot desire what is apparently best or not really best for ourselves].

There are also (1) causes in a prior and a posterior sense (e.g. both the physician and that man are causes of health, and the ratio 2:1 and number are causes of the octave, and the classes that include any particular cause are always causes of the particular effect). Further, (2) there are accidental causes and the classes which include these (e.g. while in one sense the sculptor causes the statue, in another sense Polyclitus causes it, because the sculptor happens to be Polyclitus); (3) the classes that include the accidental cause are also causes (e.g. a man or an animal is the cause of the statue, because Polyclitus is a man, and a man is an animal). (4) Of accidental causes also some are more remote or nearer than others (e.g. if the white and the musical were called causes of the statue, and not only Polyclitus or a man). But, some proper or accidental causes are called (5) causes as being able to act (e.g. the cause of the house’s being built is the builder); and (6) causes as acting (e.g. the cause of the house’s being built is the builder when building). (7) The same goes with the effects of causes (e.g. a thing may be called the cause of this statue or of a statue in general of an image, and of this bronze or of bronze or of matter in general); and (8) similarly in the case of accidental effects. Lastly, (9) both accidental and proper causes may be spoken of in combination (e.g. we may say “Polyclitus the sculptor” and not “Polyclitus” nor “the
sculptor”. [DY OB]: Aristotle said above, when discussing origins, that there were causes in the same kinds of ways, but all of these are different from the “origin” senses, AND on my count, there are not 6, but 9 causes here, which are in addition to the original four causes. Multiple problems here!

Yet all these are but six in number, while each is spoken of in two ways [DY: Note that we are back to six causes here]; for (1) they are causes either as the individual, or as the class that includes the individual, or as the accidental, or as the class that includes the accidental, and these either as combined, or as taken simply [DY OB]: All of these don’t seem like one kind of way of speaking, but 5 or 6 or more! And some of these are explicitly mentioned in the last paragraph; very confusing]; and (2) all may be taken as acting or as having a capacity [DY OB]: Isn’t this repeating 5 and 6 above?]. But they differ inasmuch as the acting causes and the individuals exist, or do not exist, simultaneously with the things of which they are causes (e.g. this particular doctor with this patient becoming healthy, and this particular builder with this house; but this is not always so with potential causes; for the house does not perish at the same time as the builder).

3 Definition of Element (1014a-b). An element is the primary component immanent in a thing, and indivisible in kind into other kinds [EX1: The elements of speech are the parts of which speech consists and into which it is ultimately divided, while they are no longer divided into different kinds of forms of speech]. If they are divided, their parts are of the same kind, as a part of water is water (while a part of the syllable is not a syllable). EX2: The elements of geometrical proofs and demonstrations have a similar character; for the primary demonstrations are called elements of demonstrations (as are primary deductions].

The most universal things are elements (because each of them is one, simple, and present in a plurality of things, either in all or in as many as possible). Since the genera are universal and indivisible (for there is no formula of them), some say the genera are elements.

4 Definitions of Nature (1014b-1015a). Nature is (1) the genesis of growing things; (2) The primary immanent element in a thing, from which its growth proceeds. (3) The source from which the primary movement in each natural object is present in it in virtue of its own essence. Those things said to grow which derive increase from something else by contact and organic unity, or organic adhesion as in the case of embryos. (4) The primary matter of which any non-natural object consists or out of which it is made, which cannot be modified or changed from its own potency (e.g. bronze is said to be the nature of a statue and of bronze utensils, and wood the nature of wooden things; and so in all other cases; for when a product is made out of these materials, the first matter is preserved throughout). In this way people call the elements of natural objects also their nature, some fire, others earth, air, water, something else (including more than one or all of them). (5) The substance of natural objects, as with those [Empedocles] who say the nature is the primary mode of composition.

Hence as regards the things that are or come to be by nature, though that from which they naturally come to be or are is already present, we say they do not have their nature yet, unless they have their form or shape. That which comprises both of these exists by nature (e.g. the animals and their parts); and nature is both the first matter and the form or substance, which is the end of the process of becoming. And from this sense of “nature,” every substance in general is in fact, by an extension of meaning, called a “nature,” because the nature of a thing is one kind of substance. [DY: So secondary substances, or Aristotelian universals, are natures; note that Plato would say that Forms are natures as well, so they agree on this principle, though not that Forms exist.]

So it is plain that nature in the primary and strict sense is the substance of things which have in themselves a source of movement; the matter is called nature because it is qualified to receive this, and processes of becoming and growing are called nature because they are movements proceeding from this, being present in them somehow, either potentially or actually.

5 Definitions of Necessary (1015-b). The necessary is (1) that without which, as a condition, a thing cannot live (e.g. breathing and food are necessary for an animal). (2) The conditions without which good cannot be or come to be, or without which we cannot get rid or be freed of evil (e.g. drinking the medicine is necessary to be cured; sailing to Aegina is necessary to be paid). (3) The compulsory and compulsion, i.e. that which impedes and hinders contrary to impulse and choice. The compulsory is necessary; this is why the necessary is painful (e.g. Evenus: “For every necessary thing is ever irksome”). And compulsion is necessary (e.g. Sophocles: “Force makes this action a necessity”). And necessity
cannot be persuaded – it is contrary to the movement that agrees with choice and with reasoning. Why is this necessarily so? (pardon the pun) Wouldn’t a God who is necessary, use God’s reasoning in accordance with reason, or how is this impossible? [4] That which cannot be otherwise is necessarily so. [5] Demonstration, because the conclusion cannot be otherwise in a true demonstration.

The necessary in the primary and strict sense is the simple; for this does not admit of more states than one. If, then, there are certain eternal and unmoving things, nothing compulsory or against their nature attaches to them. [DY: Aristotle seems to be referring to God here; but why can’t God be a necessary being, and/or necessarily act according to necessity?]

6 Definitions of One (1015b-1017a). One is: (1) that which is one by accident (e.g., Coriscus and musical, and musical Coriscus, musical and just, and musical Coriscus and just Coriscus. For all these are called one by accident, just and musical because they are accidents of one substance, musical and Coriscus because the one is an accident of the other). One is also (2) that which is one by its own nature: (2a) because they are continuous (e.g., a bundle is made one by a band, and pieces of wood are made one by glue; and a line, even if it is bent, is called one if it is continuous, as each part of the body is, e.g., the leg or the arm). The continuous by nature are more one than the continuous by art. Things, then, that are continuous in any way are called one, even if they admit of being bent, and still more those which cannot be bent (e.g., the shin or the thigh is more one than the leg, because the movement of the leg need not be one). And the straight line is more one than the bent. (2b) because the substratum does not differ in kind; it does not differ in the case of things whose kind is indivisible to the sense. E.g., wine is said to be one and water is said to be one, qua indivisible in kind; and all juices, e.g., oil and wine, are said to be one. (2c) whose genus is one though distinguished by opposite differentiae; and these are all called one because the genus which underlies the differentiae is one (EX1: horse, man, and dog are one, because all are animals. EX2: the isosceles and the equilateral are one and the same figure because both are triangles, but they are not the same triangles). (2d) when the formula which states the essence of one is indivisible from another formula which shows the essence of the other (though in itself every formula is divisible). In general those things, whose essence is indivisible and cannot be thought to be separated either in time or in place or in formula, are most of all one, and of these especially those which are substances. Those things that do not admit of division are one in so far as they do not admit of it (e.g. if something as man is indivisible, it is one man; if as animal, one animal; if as magnitude, one magnitude). Now most things are called one because they do, have, suffer, or are related to something else that is one, but the things that are primarily called one are those whose substance is one either in continuity, form or formula; [we count as more than one either things that are not continuous, or those whose form is not one, or those whose formula is not one]. (2e) if it is a quantity and continuous, in a sense we do not unless it is a whole, i.e. unless it has one form (e.g., if the parts of a shoe are put together, we should not call them one all the same (unless because of their continuity); we do this only if they are put together as a shoe and so have some one form).

What it is to be one is to be a beginning of number; for the first measure is the beginning, for that by which we first know each class is the first measure of the class; the one, then, is the beginning of the knowable regarding each class. But the one is not the same in all classes.

Some things are one in number, others in species, genus, or by analogy: in number those whose matter is one, in species those whose formula is one, in genus those to which the same figure of predication applies, by analogy those which are related as a third thing is to a fourth.

Lastly, “many” will have uses corresponding to those of “one”.

7 Definitions of Accidental Being v. Being by Nature v. Being in Statements v. Potential/Actual Being (1017a-b). Things are: (1) in an accidental sense, (2) by their own nature (or in their own right). EXs of (1): The just is musical, and the man is musical and the musical is a man, just as we say the musical builds, because the builder happens to be musical or the musical happens to be a builder. The not-white is said to be, because that of which it is an accident exists.

EXs of (2): The ten categories (“figures of predication”); for the senses of 'being' are just as many as these figures.
(3) “Being” and “is” mean that a statement is true, and “not being” that it is not true but false.
(4) “Being” and “that which is,” sometimes mean being potentially or actually.

8 Definitions of Substance (1017b). Substances are: (1) the simple bodies, i.e. earth, fire, water, & everything of the sort, and in general bodies and the things composed of them, both animals and divine beings, and the parts of these. Substances are not predicated of a subject but everything else is predicated of them. (2) That which, being present in such things as are not predicated of a subject, is the cause of their being (e.g. the soul is the cause of the being of animals). (3) The parts which are present in such things, limiting them and marking them as individuals, and by whose destruction the whole is destroyed (e.g. the body is destroyed by the destruction of the plane). (4) The essence, the formula of which is a definition of each thing.

Lastly, substance has two senses: (a) the ultimate substratum, which is no longer predicated of anything else, and (b) that which is a “this” and separable (a particular) and of this nature is the shape or form of each thing [DY OB]: This is puzzling, because he seems to be conflating a primary substance as being identical to its shape or function, which I would think is its qualities, and not its (primary) substance.

9 Definitions of Same, Different, and Like (1017b-1018a). The same is: (1) that which is the same in an accidental sense (e.g. white and musical are the same because they are accidents of the same thing; man and musical because the latter is an accident of the former; the musical is man because it is an accident of man).

The same is also (2) those which are the same by their own nature in as many ways as they are said to be one; for both the things whose matter is one either in kind or in number, and those whose substance is one, are said to be the same.

The different is: (1) those things which though other are the same in some respect, only not in number but either in species or in genus or by analogy; (2) those whose genus is other, and contraries, and all things that have their otherness in their substance.

Things are like when they have the same attributes in every respect, and those which have more attributes the same than different, and those with one quality.

10 Definitions of Contraries (and related terms) (1018a-b). Opposites are contradictories, and contraries, and relative terms, and privation and possession, and the extremes from which and into which generation and dissolution take place; and the attributes that cannot be present at the same time in that which is receptive of both, are “opposed” (e.g., gray and white do not belong at the same time to the same thing, and so are opposed.

Contraries are: (1) those attributes that differ in genus, which cannot belong at the same time to the same subject, (2) the most different of the things in the same genus, (3) the most different of the attributes in the same receptive material, (4) the most different of the things that fall under the same capacity, (5) the things whose difference is greatest either absolutely or in genus or in species.

11 Definitions of Prior and Posterior (1018b-1019a). Things are prior and posterior: (1) because they are nearer some beginning determined either absolutely and by nature, or by reference to something or in some place or by certain people [EX1: things are prior in place because they are nearer either to some place determined by nature, e.g. the middle or the last place, or to some chance object; and that which is further is posterior. EX2” things are prior in time; some by being further in the past from the present, others by being nearer the present (in the future). EX3: prior in movement. EX4: prior in power (that which exceeds in power, i.e. the more powerful, is prior; and the posterior must follow, so that if the prior does not set it in motion the other does not move, and if it sets it in motion it does move). EX5: prior in arrangement (e.g. the second member of the chorus is prior to the third, and the second-lowest string is prior to the lowest].

(2) That which is prior for knowledge is treated as absolutely prior; of these, the things that are prior in formula are different from those that are prior in perception. For in formula universals are prior, in perception individuals. And in formula also the accident is prior to the whole, e.g. musical to musical man, for the formula cannot exist as a whole without the part; yet musicalness cannot exist unless there is someone who is musical.

(3) The attributes of prior things are called prior (e.g. straightness is prior to smoothness; for one is an attribute of a line, and the other of a surface).
Some things are prior and posterior in respect of nature and substance, i.e. those which can be without other things, while the others cannot be without them (a la Plato). EX1: the subject is prior (so that substance is prior); EX2: as capacity or actuality go, different things are prior, for some things are prior in respect of capacity, others in respect of actuality, e.g. in capacity the half line is prior to the whole line and the part to the whole and the matter to the substance, but in actuality these are posterior; for it is only when the whole is dissolved that they will exist in actuality.

12 Definitions of (In)Capacity [Potency/Dunamis] (1019a-1020a). A capacity is: (1) a source of movement or change, which is in another thing or in the same thing as other (e.g. the art of building is a capacity which is not in the thing built, while the art of healing, which is a capacity, might be in the man healed, but not in him as healed). (2) The capacity of performing this well or according to choice (e.g. those who merely can walk or speak but not well or not as they choose cannot speak or walk). (3) The states in virtue of which things are absolutely impassive or unchangeable, or not easily changed for the worse (e.g. things are destroyed not by having a capacity but by lacking one/something, and things are impassive if they are scarcely/slightly affected by them, because of some capacity.

Incapacity is privation of capacity--i.e. where something that would naturally have the capacity does not; e.g., a boy, a man, and a cununch are incapable of begetting in distinct ways.

Impossible incapacity: that of which the contrary is of necessity true (e.g. that the diagonal of a square is commensurate with the side is impossible, because such a statement is a falsity such that not only is the contrary true but it is necessary; that it is commensurate, then, is not only false but of necessity false). Possible capacity: when it is not necessary that the contrary is false (e.g. that a man should be seated is possible; for that he is not seated is not of necessity false).

13 Definition of Quantity (1020a). A quantity is that which is divisible into two or more constituent parts of which each is by nature a one and a “this”; it is a plurality if it is numerable, a magnitude if it is measurable.

There are quantities (a) in virtue of their own nature (e.g. the line is a quantity by its own nature; can be substances or qualities thereof too) and (b) accidentally (e.g. the musical).

14 Definitions of Quality (1020a-b). A quality is: (1) the differentia of the substance (e.g. man is an animal of a certain quality because he is two-footed, and the horse is so because it is four-footed; and a circle is a quality of particular quality because it is without angles); (2) the unmovable objects of mathematics; i.e. the numbers have a certain quality (e.g. the composite numbers which are not in one dimension only, but of which the plane and the solid are copies; that which exists in the substance of numbers besides quantity is quality. (3) All the attributes of substances in motion (e.g. heat and cold, whiteness and blackness, heaviness and lightness, and so on), in virtue of which, when they change, bodies are said to alter. (4) excellence and badness and, in general, of good and bad.

Primary/proper quality is the differentia of substance, and of this the quality in numbers is a part; for it is a differentia of substances, but either not of things in motion or not of them as in motion. Secondly, there are the modifications of things in motion as in motion, and the differentiae of movements. (E.g., excellence and badness indicate quality especially in living things that have choice).

15 Definitions of Relative (1020b-1021b). The relative is: (1) that which contains something else many times to that which is contained many times in something else, and that which exceeds to that which is exceeded (e.g. as double to half); (2) that which can heat to that which can be heated, and that which can cut to that which can be cut, and in general the active to the passive; (3) the measurable to the measure and the knowable to knowledge and the perceptible to perception.

1. Relative terms of the first kind are numerically related either indefinitely or definitely.

2. The active and the passive imply an active and a passive capacity and the actualization of the capacities.

A relative term’s very essence includes in its nature a reference to something else, not because something else is related to it; but (3) that which is measurable or knowable or thinkable is called relative because something else is related to it.
16 Definitions of Complete (1021b-1022a). The complete is: (1) that outside which it is not possible to find even one of the parts proper to it (e.g. the complete time of each thing is that outside which it is not possible to find any time which is a part proper to it). (2) That which in respect of excellence and goodness cannot be excelled in its kind (e.g. a doctor is complete and a flute-player is complete, when they lack nothing in respect of their proper kind of excellence). We even transfer the word to bad things, and speak of, say, a complete thief; and we even call them a good thief. And excellence is a completion; for each complete thing lacks no part of its natural magnitude. (3) The things which have attained a good end are called complete. Also, since the end is an ultimate, we transfer the word to bad things and say a thing has been completely destroyed, when it fully attains badness’ last point.

17 Definition of Limit (1022a). A limit is the last point of each thing, i.e. the first point beyond which it is not possible to find any part, and the first point within which every part is; can be applied to (a) the form of a spatial magnitude or of a thing that has magnitude; and (b) the substance of each thing, and the essence of each; for this is the limit of knowledge; and if of knowledge, of the thing also. Lastly, “limit” has as many senses as “beginning”, and yet more; for the beginning is a limit, but not every limit is a beginning.

18 Definitions of “That in Virtue Of Which” and “In Virtue Of Itself” (1022a). “That in virtue of which” is: (1) the form or substance of each thing (e.g. that in virtue of which a man is good is the good itself) – the primary sense, (2) the proximate subject in which an attribute is naturally found (e.g. color in a surface) – the secondary sense. (3) A reference to position (e.g. “in which he stands” or “in which he walks”).

“In virtue of itself” is (1) the essence of each thing (e.g. Callias is in virtue of himself Callias and the essence of Callias); (2) whatever is present in the “what” (e.g. Callias is in virtue of himself an animal – “animal” is present in the formula that defines him); (3) Whatever attribute a thing receives in itself directly or in one of its parts (e.g. a surface is white in virtue of itself, and a man is alive in virtue of himself, since the soul, in which life directly resides, is a part of the man); (4) That which has no cause other than itself (e.g. man has more than one cause – animal, two-footed – but man is man in virtue of himself); and (5) Whatever attributes belong to a thing alone and qua alone; hence also that which exists separately is “in virtue of itself”.

19 Definition of Disposition [Hexis] (1022b). A disposition is the arrangement of that which has parts, in respect either of place or of capacity or of kind.

20 Definitions of Having (1022b). Having is (1) a kind of activity of the haver and the had – something like an action or movement (e.g. between him who has a garment and the garment which he has there is a having). We cannot have this sort of having, though, since the process will go on to infinity (if we can have the having of what we have). (DY: Aristotle, you trickster.) (2) “Having” means a disposition according to which that which is disposed is either well or ill disposed, either in itself or with reference to something else (e.g. health); (3) A portion of such a disposition [in 2]; therefore the excellence of the parts is a having.

21 Definitions of Affection (1022b). An affection is: (1) a quality in respect of which a thing can be altered (e.g. white and black, sweet and bitter, heaviness and lightness, etc.); (2) The already actualized alterations; (3) Injurious alterations and movements, and, above all, painful injuries; (4) Experiences pleasant or painful when on a large scale.

22 Definitions of Privation (1022b-1023a). A privation is: (1) if something has not one of the attributes which a thing might naturally have, even if this thing itself would not naturally have it (e.g. a plant is deprived of eyes); (2) If either the thing itself or its genus would naturally have an attribute but it lacks it (e.g. a blind man); (3) If a thing would naturally have the attribute, and when it would naturally have it, it doesn’t have it (e.g. blindness is a privation in this sense only if one lacks sight at the age at which one would naturally have it); and (4) The violent taking away of anything.

There are just as many kinds of privations as there are of words with negative prefixes.

23 Definitions of “To Have” (1023a-b). “To have” is: (1) To treat a thing according to one’s own nature or according to one’s own impulse (e.g. fever is said to have a man; tyrants to have their cities; and people to have the clothes they wear); (2) That in which a thing is present as in something receptive is said to have the thing (e.g. the bronze has
the form of the statue, and the body has the disease; (3) that which contains has that which is contained (e.g. the vessel has the liquid, the city has men, and the ship sailors); (4) That which hinders a thing from moving or acting according to its own impulse is said to have it (e.g. pillars have the incumbent weights, the poets make Atlas have the heavens, implying that otherwise they would collapse on the earth.

24 Definitions of “To Come from Something” (1023a-b). “To come from something” is: (1) to come from something as from matter, either in respect of the highest genus or in respect of the lowest species (e.g. all things that can be melted come from water, but the statue also comes from bronze); (2) As from the first moving principle (e.g. what does the fight stem from? from abusive language, because this is the source of the fight); (3) From the compound of matter and shape (e.g. the parts come from the whole, the verse from the Iliad, and the stones from the house); (4) As the form from its part (e.g. man from two-footed and syllable from letter); (5) Only to part of a whole (e.g. the child comes from its father and mother, and plants come from the earth); (6) It means coming after a thing in time (e.g. night comes from day and storm from fine weather, because the one comes after the other).

25 Definitions of Part (1023b). A part is: (1) that into which a quantity can in any way be divided (e.g. two is a part of three); (2) Of the parts in the first sense, only those which measure the whole; (e.g. two is and in another sense is not a part of three). (3) The elements into which the kind might be divided apart from the quantity (e.g. the species are parts of the genus); (4) The elements into which the whole is divided, or of which it consists (“the whole” meaning either the form or that which has the form (e.g. of the bronze sphere, the bronze); and (5) The elements in the formula which explains a thing are parts of the whole (e.g. the genus is a part of the species even though the species is also part of the genus).

26 Definitions of Whole (1023b-1024a). A whole is: (1) that from which is absent none of the parts of which it is said to be naturally a whole, and (2) that which so contains the things it contains that they form a unity either as each and all one, or as making up the unity between them. For (a) that which is true of a whole class and is said to hold good as a whole contains many things by being predicated of each (e.g. man, horse, god, are one), because all are living things. But (b) the continuous and limited is a whole, when there is a unity consisting of several parts present in it.

Quantities have a beginning, a middle, and an end; those to which the position does not make a difference are called totals (e.g. water and all liquids and number); and those to which it does, wholes, and those which admit of both descriptions are both wholes and totals (e.g. wax or a coat).

27 Criteria of Mutilate-able Quantitative Things (1024a). Quantitative things can be mutilated only if they are both divisible and a whole. For two is not mutilated if one of the two ones is taken away (for the part removed by mutilation is never equal to the remainder), nor in general is any number thus mutilated; for it is also necessary that the substance remain; if a cup is mutilated, it must still be a cup. [DY OBJ: Elsewhere Aristotle states that a thing is not that thing unless it can perform its function; if I smash a plastic cup, I’ve mutilated it and it doesn’t hold water any longer so it’s not a cup; this is inconsistent]; but the number is no longer the same. A man is mutilated not if the flesh or the spleen is removed, but if an extremity is; baldness is not a mutilation.

28 Definition of Kind (1024a). A kind is: (1) if there is continuous generation of things which have the same form (e.g. “while humanity lasts” means “while they are continuously generated”). (2) that which first brought things into existence (e.g. Hellenes, descendants of Helen; Ionians, descendants of Ion). (3) that to which the differentia or quality belongs is the substratum, which we call matter (e.g. in the sense in which plane is the kind of plane figures and solid of solids).

29 Definitions of False (1024b-1025a). The false is: (1) a thing that (a) is not put together or cannot be put together (e.g. “that the diagonal of a square is commensurate with the side” – false always; or “that you are sitting” – false sometimes; or (b) exists, but whose nature it is to appear either not to be such as they are or to be things that do not exist (e.g. a sketch or a dream). (2) A formula of non-existent objects (e.g. the formula of a circle is false when applied to a triangle). (3) A man is one who uses and is fond of such formulae for their own sake, and one who is good at impressing such formulae on other people to produce a false appearance. [E.g., the proof in Plato’s Hippas that the same man is false and true is misleading: it assumes that he is false who can deceive (i.e. the man who knows and is wise); and that he who is willingly bad is better. This is a false induction; for a man who limps willingly is better than one who does
so unwillingly; by “limping” Plato means “mimicking a limp”, for if the man were actually lame willingly, he would perhaps be worse in this case as in the corresponding case of character.]

30 Definition of Accident (1025a). An accident is (1) that which attaches to something and can be truly asserted neither of necessity nor usually (e.g. if one in digging a hole for a plant found treasure); or (2) what attaches to each thing in virtue of itself but is not in its substance (e.g. a triangle’s having its angles equal to two right angles). Accidents of this sort may be eternal, but no accident of the other sort is. [DY: This is a very interesting example because Descartes in the Fifth Meditation states as part of his proof for God’s existence that, just as the sum of the interior angles of a triangle is 180 degrees is the essence of a triangle, existence is part of God’s essence.]

BOOK VI [E, or Epsilon]

1 Principles/Causes of Being As Being; Natural Science, Math, and Theology are Theoretical; First Philosophy (1025b-1026a). We seek the principles and the causes of the things that are, and obviously of things as being. For there is a cause of health and of good condition, and the objects of mathematics have principles and elements and causes, and in general every; but all these sciences mark off some particular being, but not into being simply nor qua being, nor do they discuss the essence of their object; they begin from the essence (via senses or a hypothesis) and demonstrate the essential attributes of the genus with which they deal. So sciences make no demonstration of substance or of the essence and do not ask whether their end/genus exists or does not exist.

Natural science is neither practical nor productive: The principle of production is in the producer – either reason or art or some capacity; the principle of action (choice) is in the doer (that which is done and that which is chosen are the same). Natural science must then be theoretical (inquiry requires noticing the nature of the essence and of its formula). Some essences are like snub, and some like concave; snub is bound up with matter (for what is snub is a concave nose); concavity is independent of perceptible matter. Since all natural things are analogous to the snub in their nature [e.g. nose, eye, face, flesh, bone, animal; leaf, root, bark, and, in general, plant (for these involve movement and have matter)], we must seek and define the essence in each case of natural objects, including soul, since so much of soul is not independent of matter.

Mathematics also is theoretical; it considers some mathematical objects as immovable and as separable from matter.

If something is eternal, immovable, and separable, clearly the knowledge of it belongs to a theoretical science, not natural science (deals with movables) nor to mathematics (deals with things immovable but not separable, embodied in matter), but to a science prior to both. All causes must be eternal, but especially of the divine as appears to us. So there must be three theoretical philosophies: natural science, math, and theology; if the divine is present anywhere, it is present in eternal, immovable, and separable things. The highest science must deal with the highest genus, so that the theoretical sciences are superior to the other sciences, and this to the other theoretical sciences. Is first philosophy universal, and does it deal with one genus (some one kind of being)? Answer: If only natural substances exist, natural science will be the first science; but if immovable substance exists, the science of this must be prior and must be first philosophy, and universal because it is first. It belongs to first philosophy to consider being as being – both what it is and the attributes that belong to it as being.

2 There is No Science of Accidents (Non-Essential Properties) (1025b-1027a). Since “being” has ten categories or senses, one of which is the accidental, and another the true (non-being being the false) [not to mention that which is potentially or actually], there can be no scientific treatment of the accidental. No science – practical, productive, or theoretical – concerns itself with it. EX: he who produces a house does not produce all the attributes that come into being along with the house; for these are innumerable; the accidental is obviously akin to non-being. [Plato was in a sense not wrong in saying that sophistic deals with that which is not.
DY: This is an allusion to Plato’s *Sophist*. | Still we must try to determine what the accidental’s nature is and what causes it so we can become clear why there is no science of it.

Since some things are not of necessity nor always, but for the most part, this is the principle/cause of the existence of the accidental. EX1: If in the dog-days there is wintry and cold weather, we say this is an accident, but not if there is sultry heat, because heat is always or for the most part so, but not cold. EX2: A man is white by accident (it is not by accident that he is an animal). EX3: The builder produces health is an accident, because it is the nature not of the builder but of the doctor to do this; say the builder happened to be a doctor. If there were nothing accidental, everything would be of necessity.

3 Generable and Destructible Principles/Causes (1027a-b). There are principles and causes that are generable and destructible without ever being generated or destroyed. Otherwise all things will be of necessity, since that which is being generated or destroyed must have a cause that is not accidentally its cause. Will X be or not? Yes, if X happens; and if not, not. And Y will happen if something else does. EX: This man will die by violence if he goes out; he will do this if he is thirsty; and he will be thirsty if something else happens; and thus we arrive to the present, or to some past event.

4 Let us Ignore That Which Is (the True) or Is Not (the False), in Combination and Separation, and Accidents, and Seek the Principles/Causes of Being As Being (1027b-1028a). Since that which is in the sense of being true, or is not in the sense of being false, depends on combination and separation (we can also ask how it happens that we think things together or apart and how they become a unity), we must consider later what has to be discussed with regard to that which is or is not in this sense; but since the combination and the separation are in thought and not in the things, and *that which is* in this sense is a different sort of being from the things that are in the full sense (for the thought attaches or removes either the “what” or quality or quantity or one of the other categories), that which is accidentally and that which is in the sense of being true must be dismissed. For the cause of the former is indeterminate, and that of the latter is some affection of the thought, and both are related to the remaining genus of being, and do not indicate any separate class of being. Therefore let us consider the causes and the principles of being itself, as being.

BOOK VII [Z, or Zeta]

1 Primary Being = Substance, Upon Which All Other Categories of Being is Based (1028a-b). Several senses of being: (1) what a thing is or a “this”; (2) a certain quality; (3) quantity, and so on. Primary being is the “what”, which indicates the substance of the thing. For when we say of what *quality* a thing is (e.g. good or beautiful), we don’t say that it is three cubits long or that it is a man; when we say *what* it is, we do not say “white” or “hot” or “three cubits long”, but “man” or “God”. And all other non-substances are said to be because they are some other determination of it (i.e., the other nine categories). So, do “to walk” and “to be healthy” and “to sit” each signify something that is? None of them is either self-subsistent (capable of being separated from substance); it is rather that which walks, is seated, or is healthy that is an existent thing; there is something definite which underlies qualities, actions, etc., and this is the substance or individual. So that which is primarily and simply must be substance.

Substance is primary in every sense: in [*formula*] (for in the formula of each term the formula of its substance must be present), in [*order of knowledge*] we know each thing most fully when we know what *it* is (e.g. what man is or what fire is), rather than when we know its quality, quantity, or where it is], and in [*time*]. Only substance (of all the categories) can exist independently.

The chief, perennial question of what being is, is just the question, what is substance? Some assert substance to be one, others many, limited, and/or unlimited. And so we also must consider chiefly and primarily and almost exclusively what that is which is in this sense.
2 Substances are bodies; Are There Non-Sensible Substances? Plato & Speussipus’ Views, and Further Questions (1028b). Substance is thought to belong most obviously to bodies; and so we say that both animals and plants and their parts are substances, and so are natural bodies (e.g. fire, water, earth, all things that are parts of these or composed of these, the heaven and its parts, stars and moon and sun). But whether these alone are substances, or there are also others, or only some of these, or none of these, must be considered. Some do not think there is anything substantial besides sensible things, but others think there are eternal substances that are more in number and more real (e.g. Plato’s Forms (eternal), objects of mathematics (eternal), and sensible bodies). [Speusippus claimed more kinds of substance exist, beginning with the One, and making principles for each kind of substance, one for numbers, another for spatial magnitudes, and then another for the soul.]

We must inquire which of the common statements are right and wrong, and what things are substances, and whether there are or are not any besides sensible substances, and how sensible substances exist, and whether there is a separable substance (and if so why and how) or there is no substance separable from sensible substances; and we must first sketch the nature of substance.

3 Substance Defined; Four Senses Thereof; Substance As Substratum Most Important; Unformed Matter, Matter, and Form-Matter Compound Are Rejected as Being Substance; Substance as Form (1028b-1029b). “Substance” is applied at least to four main objects: (1) the essence; (2) the universal; (3) the genus; and (4) the substratum (i.e. that of which other things are predicated, while it is itself not predicated of anything else). We must first determine the nature of the substratum because that which underlies a thing primarily is thought to be in the truest sense its substance. Matter is said to be of the nature of (a) substratum (e.g. bronze), (b) shape (e.g. the plan of the matter’s form), and (c) the compound of both (e.g. the statue). If the form is prior to the matter and more real, the form will be prior to the compound also.

Substance (that which is) is not predicated of a subject, all else is predicated of it. But this is obscure; on this view, matter becomes substance (if matter is not substance, it is beyond us to say what else is). When all else is taken away (e.g. affections, products, qualities, quantities, etc., which are all non-substances in the strict sense), nothing but matter remains. Matter is that which in itself is neither a particular thing nor of a certain quantity nor assigned to any other of the eight categories. [DY: This is aka Prime Matter]. Predicates other than substance are predicated of substance, while substance is predicated of matter. So the ultimate substratum is neither a particular thing nor of a particular quantity nor otherwise positively or negatively (negations are accidents) characterized.

However, the view that matter is substance (as construed at the end of the last paragraph) is impossible, since both separability and individuality are thought to belong chiefly to substance. So form and the compound of form and matter would be thought to be substance, rather than matter. The substance compounded of both, i.e. of matter and shape, may be dismissed; for it is posterior and its nature is obvious. (Matter also is in a sense manifest.) So we must seek the third, most difficult, kind of substance (form).

There are some substances among sensible things, so let us look there first and advance to that which is more intelligible. (One must start from that which is barely intelligible but intelligible to oneself, and try to understand what is intelligible in itself.)

4 Substance as Essence; Essence Defined, Formulae of Non-Substance Categories and Combinations Thereof, Definition Defined; Primary v. Secondary Essences; “Medical” Analogy to “Being” (1029b-1030b). We must investigate substance as essence. First, abstractly, the essence of each thing is what it is said to be in virtue of itself (e.g. being you is not being musical; for you are not musical in virtue of yourself; what you are in virtue of yourself is your essence).

But it is not that which something is in virtue of itself in the way in which a surface is white, because being a surface is not being white. And the combination of both – being a white surface – is not the essence of surface, because “surface” itself is repeated. [So the formula in which the term itself is not present but its meaning is expressed, this is the formula of the essence of each thing. [DY: Like definitions]. Thus, if to be a white surface is to be a smooth surface, to be white and to be smooth are one and the same.]
Since there are compounds of substance with the other categories (e.g. white man; for there is a substrate for each category, e.g. for quality, quantity, time, place, and motion), we must inquire whether there is a formula of the essence of each of them. Take the compound “cloak”. What is being a cloak? Is being a cloak an essence at all? Probably not. For the essence is what something is; but when one thing is said of another, that is not what a “this” is, e.g. white man is not what a “this” is since being a “this” belongs only to substances. So there is an essence only of those things whose formula is a definition. A definition is not a word and a formula identical in meaning (for in that case all formulae would be definitions; even the Iliad would be a definition), but a formula of something primary (i.e. those which do not involve one thing’s being said of another). Only species will have an essence (not genera), for in these the subject is not thought to participate in the attribute and to have it as an affection or by accident; everything that has a name will have a formula of its meaning (“this attribute belongs to this subject”); or instead of a simple formula we can give a more accurate one; but there will be no definition nor essence.

“Definition” has several meanings as applied to being; as “is” is predicable of all things (in ten different ways), of one sort of thing (substance) primarily and of others (other nine categories) in a secondary way, so too the “what” belongs simply to substance, but in a limited sense to the other categories. [DY: Substance is primary being, but the other nine categories are secondary substances.] E.g. we might ask what a quality is, so quality also is a “what” in a way.

Essence will belong, just as the “what” does, primarily and in the simple sense to substance, and in a secondary way to the other categories also (e.g. the essence of a quality or of a quantity is). We use the word “is” neither homonymously nor in the same sense, but just as we apply the word “medical” when there is a reference to one and the same thing, not meaning one and the same thing, nor yet speaking homonymously; for a patient, an operation, and an instrument are called medical neither homonymously nor in virtue of one thing, but with reference to one thing. Definition and essence in the primary and simple sense belong to substances (and to others in a secondary sense, since “that which is” in one sense denotes an individual, in another a quantity, in another a quality). So there can be a formula or definition of white man, but not in the sense in which there is a definition either of white or of a substance.

5 Formula and Definition; Snub/Concave Nose; Definition is the Formula of the Essence, which Belongs to Substances (1030b-1031a). If one denies that a formula with an addition is a definition, will any of the things that are not simple but coupled be definable? Because we must explain them by an addition. E.g. the nose, and concavity, and snubness (compounded out of the two by the presence of the one in the other); the nose has concavity or snubness in virtue of its nature (and not by accident); nor do they attach to it as whiteness does to Callias, or to man (because Callias, who happens to be a man, is white), but rather as “male” attaches to animal and “equal” to quantity, and as everything else which is said of something in its own right. Such attributes are those in which is involved either the formula or the name of the subject of the particular attribute, and which cannot be explained without this (e.g. white can be explained apart from man, but not female apart from animal). So there is either no essence and definition of any of these things or it is in another sense.

The second difficulty: if snub nose and concave nose are the same thing, snub and concave will be the same thing; but if snub and concave are not the same (because it is impossible to speak of snubness apart from the thing of which, in its own right, it is an attribute, for snubness is concavity in the nose), either it is impossible properly to say “snub nose” or the same thing will have been said twice, concave nose nose. It is absurd that such things should have an essence; if they have, there will be an infinite regress; for in snub nose another nose will be involved.

So only substance is definable. If the other categories also are definable, it must be by addition (e.g. odd cannot be defined apart from number; female cannot be defined apart from animal). (“By addition” = the expressions in which we have to say the same thing twice, as in these instances.) If this is true, coupled terms (“odd number”) will not be definable. But if they are definable, either it is in some other way or in another sense. So in one sense nothing will have a definition or an essence, except substances; but in another sense other things will have them. So definition is the formula of the essence, and essence must belong to substances either alone or chiefly, primarily, and in the unqualified sense.
6 Is a Thing Identical to Its Essence? Not in Things with Accidents but Yes, in Self-Subsistent Things (Ideas, if they existed), Necessarily (1031a-1032a). Is each thing and its essence the same or different (since each thing is its substance, and the essence is its substance)?

In things with accidental attributes, the thing and its essence are generally different (e.g. white man would be thought to be different from the essence of white man). For if they are the same, the essence of man and that of white man are also the same; for a man and a white man are the same; but this is not actually thought to be the case.

In self-subsistent things, is a thing necessarily the same as its essence? [DY: Note that the rest of this paragraph is an exploration of Plato’s Ideas, which Aristotle denies exist; but Aristotle agrees with the underlined statements.] E.g. Take substances which have no other substances nor entities prior to them (e.g. Plato’s Ideas): If the essence of good is to be different from the Idea of good, and the essence of animal from the Idea of animal, and the essence of being from the Idea of being, first, there will be other substances and entities and Ideas besides those which are asserted; second, these others will be prior substances if the essence is substance. And if the posterior substances are severed from one another (i.e. if the Idea of good has not the essence of good, and the essence doesn’t have the property of being good), there will be no knowledge of the ones and the others will have no being. For there is knowledge of each thing only when we know its essence. The same goes for other things: if the essence of good is not good, neither will the essence of being be, nor the essence of unity be one. But if the essence of being is not, neither will any of the others be. On the other hand, that which has not the property of being good is not good. The good, then, must be one with the essence of good, and the beautiful with the essence of beauty, as it is for all self-subsistent and primary things. However, if there are Ideas, the substratum of them will not be substance; for these must be substances, and not predicable of a substratum; for if they were they would exist only by being participated in. Each thing then and its essence are one and the same in no merely accidental way.

The absurdity of the separation [of a thing from its essence] is shown if one assigns a name to each of the essences; then there would be another essence besides the original one (e.g. to the essence of horse there will belong a second essence). Why should not some things be their essences from the start, since essence is substance? Not only are a thing and its essence one, but the formula of them is also the same; as stated, e.g., it is not by accident that the essence of one, and the one, are one. If they were different, the process would go on to infinity. So each primary and self-subsistent thing is one and the same as its essence.

7 How Things Come To Be (Nature, Art, Spontaneously); Productions (Art, Capacity, or Thought); Art comes from the Form in the Soul; Productions are Of their Matter (1032a-1033a). Things come to be either (1) by nature, (2) art, or (3) spontaneously. Everything comes to be by the agency of something, from something (and comes to be something (i.e. a “this,” quantity, etc.).

Regarding things that come to be by nature: they come to be by/from matter and from something which exists naturally; and the something which they come to be is a man or a plant, e.g., substances. All things that come to be either by nature or by art have matter, since they are capable of being and of not being, and this capacity is the matter in each. Both that from which they are produced and the type according to which they are produced is nature, and so is that by which they are produced (“formal” nature), which is the same as the nature of the thing produced (though it is in another individual; e.g. man begets man).

All other non-natural productions are called “makings.” All makings proceed either from (a) art or (b) a capacity or (c) thought, spontaneously or by chance. From (a) art proceed the things of which the form is in the soul. (form = the essence of each thing and its primary substance.) For even contraries have in a sense the same form; for the substance of a privation is the opposite substance, e.g. health is the substance of disease; for it is by its absence that disease exists; and health is the formula and the knowledge in the soul. The process towards health that the medical art uses is called a “making”. So in a sense health comes from health and house from house, that with matter from that without matter; for the medical art and the building art are the form of health and of the house; and the essence is substance without matter. One part of productions and movements is thinking (that which proceeds from the starting-point and the form) and the other making (that which proceeds from the final step of the thinking). [What is present potentially is already in the physician’s power.]
The active principle/starting-point for the process of becoming healthy is, if it happens by art, the form in the soul, and if spontaneously, it is whatever is the starting-point of his making for the man who makes by art, as in healing the starting-point is perhaps the production of warmth (by the physician rubbing). **Warmth** in the body, then, is either a part of health or is followed by something which is a part of health.

So it is impossible that anything should be produced if there were nothing before. Obviously then some part of the result (e.g. matter, since it is present in the process and becomes something) will pre-exist of necessity. But do some of the elements in the formula also pre-exist? Yes (e.g. the bronze circle has its matter in its formula).

As for that out of which as matter they are produced, some productions are said to be not *it* but of *it* (e.g. the statue is not stone but of stone). What becomes healthy is a man; a man is not what the healthy product is said to come from. [E.g., though a thing comes both from its privation and from its substratum, which we call its matter (e.g. what becomes healthy is both a man and an invalid), it is said to come rather from its privation (e.g. it is from an invalid rather than from a man that a healthy subject is produced). And so the healthy subject is not said to be an invalid, but to be a man, and a healthy man]. E.g. the statue is not said to be wood but wooden, of bronze, or of stone, and the house is of bricks.

8 Productions (Bronze Sphere); We do Not Make Forms or Essences; Matter and Form; Criticism of Plato’s Forms as Causes (1033a-1034a). Since productions are produced by something (i.e. the starting-point), and from something (not the privation but the matter), and since something is produced (say a [bronze] sphere), just as we do not make the substratum (the bronze), so we do not make the sphere, except incidentally, because we make a bronze sphere (to make a “this” is to make a “this” out of the general substratum). That is, to make the bronze round is not to make the round or the sphere, but something else, i.e. to produce this form in something else (we do not make the form). We do not make the essence either, since that is made to be in something else by art or by nature or by some capacity as well. But we do make a bronze sphere (out of bronze and the sphere; we bring the form into this particular matter). If the essence of sphere in general is produced, something must be produced out of something. For the product is always divisible into matter and form. The thing, in the sense of form or substance, is not produced, but the concrete thing which gets its name from this is produced, and that in everything which comes to be matter is present, and one part of the thing is matter and the other form.

Is there then a sphere apart from the individual spheres or a house apart from the bricks? No “this” would ever have come to be, if this had been so. The “form” is the “such”, and is not a “this” (a definite thing); but the artist makes a “such” out of a “this”; and when it has been generated, it is a “this such”. The whole “this”, Callias or Socrates, is analogous to this bronze sphere, but man and animal to bronze sphere in general. [The cause that consists of the Platonic Forms (if they are something apart from the individuals) is useless both to comings-to-be and to substances; and the Forms need not, for this reason at least, be self-subsistent substances. In some cases the producer is of the same kind as the produced {e.g. in the case of natural products (for man produces man}); in others not (e.g. the production of a mule by a horse). Even then, that which would be found to be common to horse and ass, the genus next above them, has not received a name, but it would doubtless be both, as the mule is both. So it is quite unnecessary to set up a Form as a pattern (for we should have looked for Forms in these cases if any; for these are substances if anything is); the begetter is adequate to the making of the product and to the causing of the form in the matter. When we have the whole, such and such a form in this flesh and in these bones, this is Callias or Socrates; and they are different in virtue of their matter (for that is different), but the same in form; for their form is indivisible.]

9 Spontaneous Productions; Substance is the Starting-Point of Art and Natural Things; The Other Nine Categories Do Not Come To Be (1034a-b). Why are some things produced spontaneously as well as by art (e.g. health), while others are not (e.g. a house)? In some cases, the matter that determines the production in the making and producing of any work of art (and in the production) can set itself in motion and sometimes cannot; many things can set themselves in motion but not in some particular way (e.g. dancing). The things then whose matter is of this sort (e.g. stones), cannot be moved in the particular way required, except by something else, but in another way they can move themselves; and so it is with fire. So some things cannot exist
apart from their artist, while others can; for motion can be started by these non-art Possessing things but can move of themselves (either by other non-art possessing things or by a part of the product itself).

In a sense, everything is produced from another individual that shares its name (e.g. natural products), or a part of itself that shares its name (e.g. the house produced by reason is produced from a house; for the art of building is the form of the house), or something which contains a part of it (excluding things produced by accident). What directly and of itself causes the production is a part of the product (e.g. the heat in the movement causes heat in the body, and this is either health, or a part of health, or is followed by a part of health or by health itself, which it causes).

So substance (the “what”) is the starting-point of all production (as of deduction), including natural things. For the seed produces them as the artist produces the works of art; for it has the form potentially, and that from which the seed comes has in a sense the same name as the offspring; only in a sense, for we must not expect all cases to have exactly the same name (e.g. a woman also can be produced by a man). The natural things that (like some artificial objects) can be produced spontaneously are those whose matter can be moved even by themselves (like a seed); but those things that have not such matter cannot be produced except by parents.

Regarding substance, not only does its form [and its essence] not come to be, but also all the primary classes (quantity, quality, and the other categories) do not come to be. For as the bronze sphere comes to be, but not the sphere nor the bronze (for the quality does not come to be, but the wood of that quality, and the quantity does not come to be, but the wood or the animal of that size). Here is a peculiarity of substance: there must exist beforehand another actual substance which produces it (e.g. an animal if an animal is produced); but it is not necessary that a quality or quantity should pre-exist otherwise than potentially. [DY: But Aristotle also believes that universals can potentially as well as actually exist.]

10 Definitions, Formulae, and Their Parts; Priority and Posteriority of Parts and Wholes of Formulæ and Substances; Sensible and Intelligible Matter (1034b-1036a). Since a definition is a formula, and every formula has parts, and as the formula is to the thing (so is the part of the formula to the part of the thing), we must ask: Must the formula of the parts be present in the formula of the whole or not? In some cases, the formulæ of the parts are seen to be present, and in some not. E.g. the formula of the circle does not include that of the segments, but that of the syllable includes that of the letters; yet the circle is divided into segments as the syllable is into letters. Problem: if the parts are prior to the whole (e.g. the acute angle is a part of the right angle and the finger a part of the animal), then the acute angle will be prior to the right angle and the finger to the man. But the wholes are thought to be prior; for in formula the parts are explained by reference to the wholes, and in virtue also of their power of existing apart from the parts the wholes are prior.

Re: the parts of which substance consists. If matter is one thing, form another, the compound of these a third, then each are substances; even the matter is in a sense called part of a thing, while in a sense it is not, but only the elements of which the formula of the form consists. E.g. flesh (for this is the matter in which it is produced) is not a part of concavity, but it is of snubness; and the bronze is a part of the particular statue, but not of the statue as form. Even if the line when divided passes away into its halves, or the man into bones and muscles and flesh, it does not follow that they are composed of these as parts of their substance, but rather as matter; and these are parts of the concrete thing, but not of the form, i.e. of that to which the formula refers; and therefore they will not be in the formulæ either. So of some things the formula of such parts will be present, but in others it must not be present, where the formula does not refer to the concrete object (because some things have as their constituent principles parts into which they pass away, while some have not). Those things in which the form and the matter are taken together, e.g. the snub, or the bronze circle, pass away into these material parts, and the matter is a part of them; but those things which do not involve matter but are without matter, and whose formulæ are formulæ of the form only, do not pass away, either not at all or at any rate not in this way. [DY: Sometimes the matter matters, as it were, and sometimes it does not.] So these materials are principles and parts of the concrete things but not of the form. So the clay statue is resolved into clay, the ball into bronze, Callias into flesh and bones, and the circle into its segments.

The parts of the formula, into which the formula is divided, are prior to it, either all or some of them. EX1: The formula of the right (90 degrees) angle, however, does not include the formula of the acute (<90
degrees), but the formula of the acute includes that of the right angle. EX2: the semicircle is defined by the circle; EX3: the finger by the whole body, for a finger is part of a man. So the parts which are of the nature of matter and into which as its matter a thing is divided, are posterior. Since the soul (the substance of living beings) of animals is their substance according to the formula (i.e. the form and the essence of a body of a certain kind), the parts of soul are prior, either all or some of them, to the concrete animal. For certain concrete wholes cannot even exist if severed from the whole (e.g. it is not a finger in any state that is the finger of a living thing, but the dead finger is a finger only homonymously). Some parts are neither prior nor posterior to the whole, i.e. those which are most important and in which the formula, i.e. the substance, is immediately present (e.g. perhaps the heart or the brain). But man, horse, and universally applied terms to individuals are not [primary] substance but something composed of this particular formula and this particular matter treated as universal; but when we come to the individual, e.g. Socrates is composed of ultimate individual matter.

A part may be a part either of the form (i.e. the essence), or of the compound of the form and the matter, or of the matter itself. But only the parts of the form are parts of the formula, and the formula is of the universal; for being a circle is the same as the circle, and being a soul is the same as the soul. But there is no definition of a concrete thing, e.g. this circle (i.e. one of the individual circles, whether sensible – those of bronze and of wood; or intelligible – mathematical), but they are known by the aid of thought or perception; and when they go out of our actual consciousness it is not clear whether they exist or not; but they are always stated and cognized by means of the universal formula. But matter is unknowable in itself. Some matter is sensible (e.g. bronze, wood, and all changeable matter) and some intelligible (that which is present in sensible things not as sensible; i.e. in the objects of mathematics).

We cannot simply answer whether the right angle and the circle and the animal are prior to that into which they are divided or of which they consist, i.e. the parts. For if the soul is the animal, the living thing, or the individual itself (and being a circle is the circle, and being a right angle and the essence of the right angle is the right angle), then the whole in one sense must be called posterior to the part in one sense (e.g. both the material right angle which is made of bronze, and that which is formed by individual lines, are posterior to their parts); but the immaterial right angle is posterior to the parts included in the formula, but prior to those included in the particular instance. If, however, the soul is something different and is not identical with the animal, even so some parts must be called prior and others must not, as has been said.

11 What Parts Belong to the Form and Which Not? Matter in Formulae (or Not); Natural Science is Second Philosophy; Primary Substance defined (1036a-1037b). What sort of parts belong to the form and what sort not to the form, but to the concrete thing? Without answering this, it is impossible to define anything; for definition is of the universal and of the form. If then it is not evident which of the parts are of the nature of matter and which are not, neither will the formula of the thing be evident. In the case of things that are found to occur in specifically different materials, as a circle may exist in bronze or stone or wood, it seems plain that these, the bronze or the stone, are no part of the essence of the circle, since it is found apart from them. Even if all circles that had ever been seen were of bronze (for nonetheless the bronze would be no part of the form). EX2: the form of man is always found in flesh and bones and parts of this kind; are these then also parts of the form and the formula? No, they are matter; but because man is not found also in other matters we are unable to effect the severance.

So the question of definitions contains some difficulty. So [based on arguments not here] to bring all things thus to Forms and to eliminate the matter is useless labor; for some things surely are a particular form in a particular matter, or particular things in a particular state. And Socrates’ case of animal is not good because it leads away from the truth, and makes one suppose that man can possibly exist without his parts, as the circle can without the bronze. But an animal is something perceptible (unlike an intelligible circle), and it is not possible to define it without reference to movement nor to parts and to their being in a certain state. For it is not a hand in any state that is a part of man, but the hand that can fulfill its work, which therefore must be alive; if it is not alive it is not a part. [DY: ‘To be X, something must be able to fulfill the function of X’].

Re: objects of mathematics: why are the formulae of the parts not parts of the formulae of the wholes, e.g. why are not the formulae of the semicircles parts of the formula of the circle? It cannot be said, “Because these parts are perceptible things”; for they are not. But perhaps this makes no difference; for even some things
that are not perceptible must have matter; for there is some matter in everything that is not an essence and a bare form but a “this”. The semicircles, then, will be parts, not of the universal circle, but of the individual circles, as has been said before; for while one kind of matter is perceptible, there is another that is intelligible. The soul is the primary substance and the body is matter, and man (or animal) is the compound of both taken universally; if Socrates is simply this particular soul and this particular body, the individual is analogous to the universal.

In a sense the inquiry about perceptible substances is the work of natural science, i.e. of second philosophy; for the natural scientist must not only know about the matter, but also about the substance in the sense of the formula, and even more about the formula.

In the formula of the substance the material parts will not be present but in the concrete substance (e.g. a snub nose or Callias), the matter also will be present. The essence and the individual thing are in some cases the same; i.e. in the case of primary substances (e.g. curvature and the essence of curvature). (A primary substance = one that does not imply the presence of something in something else, i.e. in a substrate which acts as matter.) But things which are of the nature of matter or of wholes which include matter, are not the same as their essences, nor are accidental unities like that of Socrates and musical; for these are the same only by accident.

12 Definitions that Arise Out of Divisions, and Substance (1037b-1038a). A problem of definition and substance: E.g. the definition and formula of man is a two-footed animal, and it is a unity. Why is this one, though, and not many (e.g. animal and two-footed)? For in the case of “man” and “white” there is a plurality when one term does not belong to the other, but a unity when it does belong and the subject, man, has a certain attribute; for then a unity is produced and we have the white man. In the present case, however, the genus does not share in its differentiae; for then the same thing would share in contraries; for the differentiae by which the genus is divided are contrary. And even if the genus does share in them, the same argument applies, since the differentiae present in man are many, e.g. endowed with feet, two-footed, featherless. Why are these one and not many? Not because they are present in one thing; for on this principle a unity can be made out of any set of attributes. But surely all the attributes in the definition must be one; for the definition is a single formula and a formula of substance, so that it must be a formula of some one thing; for substance means a “one” and a “this”, as we maintain.

There is nothing in the definition except the first-named genus and the differentiae. E.g., man is two-footed animal, two-footed is the differentia, and animal is the genus. If the genus absolutely does not exist apart from the species which it as genus includes, or if it exists but exists as matter (for the voice is genus and matter, but its differentiae make the species, i.e. the letters, out of it), then the definition is the formula that comprises the differentiae.

It is also necessary in division to take the differentia of the differentia (e.g. endowed with feet is a differentia of animal; again we must know the differentia of animal endowed with feet as endowed with feet). The last differentia will be the substance of the thing and its definition, its form, and the substance.

The definition is the formula that contains the (last) differentiae.

13 Substance is the Substrate, Essence, Compound and the Universal; The Universal is not Substance as the Essence is; it is a “Such” and not a “This”; A Difficulty if No Substance can consist of Universals (1038b-1039a). Let us return to substance. As the substrate, essence, and the compound of these are called substance, so also is the universal. Some think that the universal is in the fullest sense a cause/principle; so let us attack this point. It seems impossible that any universal term should be the name of a substance. Primary substance is that kind of substance that is peculiar to an individual, which does not belong to anything else; but the universal is common, since it naturally belongs to more than one thing. Of which individual then will this be the substance? Either of all or of none. But it cannot be the substance of all; and if it is to be the substance of one, this one will be the others also; for things whose substance is one and whose essence is one are themselves also one.

Substance = that which is not predicatable of a subject; the universal is predicatable of some subject always.

Perhaps the universal, while it cannot be substance in the way in which the essence is so, can be present in this (e.g. animal can be present in man and horse). So there is a formula of the universal; the universal will be
the substance of something. E.g. man is the substance of the individual man in whom it is present, and animal must be the substance of that in which it is present as something peculiar to it. It is impossible and absurd that the “this”, i.e. the substance, if it consists of parts, should not consist of substances nor of what is a “this”, but of quality; for that which is not substance, i.e. the quality, will then be prior to substance and to the “this” (impossible).

No universal attribute is a substance, also since no common predicate indicates a “this”, but rather a “such”. If not, many difficulties follow and especially the “third man” (infinite regress argument). A substance cannot consist of substances present in it actually (for things that are thus actually two are never actually one, though if they are potentially two, they can be one). The same will hold good of number; for two is either not one, or there is no unit present in it actually.

Difficulty: If no substance can consist of universals because a universal indicates a “such”, not a “this”, and if no composite substance can be composed of actual substances, every substance would be incomposite, so that there would not even be a formula of any substance. But we’ve stated that it is either only, or primarily, substance that can be defined; yet now it seems that not even substance can. There cannot, then, be a definition of anything; or rather in a sense there can be, and in a sense there cannot. We will solve this below.

14 Criticisms of Forms/Ideas involving Genera, Differentiae, and Substance (1039a-b). If Ideas are substances and can exist apart, and at the same time the Form consists of the genus and the differentiae, the same difficulty follows. If the Forms exist and animal is present in man and horse, it is either one and the same in number, or different. (In formula it is clearly one; for he who states the formula unfolds the same formula in either case.) If there is a Man-in-Himself who is a “this” and exists apart, the parts of which he consists (e.g. animal and two-footed) must indicate a “this” and be things existing apart and substances; therefore animal too must be of this sort. [DY OBJ: Plato would claim that Man-Itself does not consist of other substances; it is the one nature or essence of Man. Man Itself is what all men have in common; Animal Itself would be what all animals have in common; so it is not made up of 0-footed, one-footed, two-footed, etc. Moreover, the Form is not IN the sensible instance; a Form-COPY is, according to Plato. Thus, Aristotle is simply assuming his view here in order to criticize Plato.]

If animal, which is in the horse and in man, is one and the same, as you are one and the same with yourself, how will the one in things that exist apart be one, and how will this animal escape being divided even from itself? [DY: see above.]

If it is to share in two-footed and many-footed, an impossible conclusion follows: contrary attributes will belong at the same time to it although it is one and a “this”. If it does not, what is the relation implied when one says the animal is two-footed or has feet? But perhaps these are put together and are in contact, or are mixed. Yet all these are absurd. [DY: Plato also says that the Forms “blend” in the Sophist and hints at this in Republic V; e.g. Animal Itself partakes of Being, because it exists; Sameness, because it is the same as itself; that would help explain how animal can be two-footed or no-footed on his view.]

Suppose the Form is different in each species. Then there will be practically an infinite number of things whose substance is animal; for it is not by accident that man has animal for one of its elements. [DY OBJ: I don’t see why this follows.] Also, animal-in-itself will be many. For the animal in each species will be the substance of the species; for it is not dependent on anything else. And all the elements of which man is composed will be Ideas. Since these consequences are impossible, there are not Forms of sensible things.

15 Substances Capable of Generation/Destruction; Formulae are Not; No Definition or Demonstration of Sensible Individuals, though Formulae are Stable; Criticism of Plato’s Ideas (1039b-1040b). Since substance is of two kinds, the concrete thing (the formula taken with the matter) and the formula (in its generality), substances (as concrete things) are capable of destruction and generation, but formulae are not (the being of house is not destroyed or generated, but only the being of this house); no one produces nor makes formulae. So there is neither definition nor demonstration of sensible individual substances, because they have matter so all the individual instances of them are destructible. Since demonstration is of necessary truths and definition involves knowledge, and if, just as knowledge cannot be sometimes knowledge and sometimes ignorance, but the state which varies is opinion, so too demonstration and definition cannot
varies, but it is opinion that deals with that which can be otherwise than as it is, then there can neither be
definition nor demonstration of sensible individuals. Though the formulae remain in the soul unchanged, there
will no longer be either definition or demonstration.

It is impossible to define any Idea. For the Platonic Idea is an individual, and can exist apart; and the
formula must consist of words; and he who defines must not invent a word (for it would be unknown), but the
established words are common to each of a number of things; these then must apply to something besides the
thing defined (e.g. if one were defining you, he would say “an animal which is lean” or “white”, or something
else which will apply also to some one other than you). [DY OBJ: First, in the very first phrase here, Aristotle is
equivocating on “individual”, because he uses that for “perceptible thing” or primary substance, and Plato says
Forms are eternal, immutable, immaterial essences; second, Plato is clear that words are images, and reflect
reality and the Forms (or not), but are no more real than perceptible things that constantly change; third, Forms
are experienced, and then described; they are not merely described; lastly, Aristotle himself holds that universals
are definable and what each thing of that kind have in common, which is basically what a Form is; so if this is a
good criticism of Forms, it is a good one for universals too.] Perhaps all the attributes taken apart may belong to
many subjects, but together they belong only to this one; contra this: first, they belong also to both the elements,
e.g. two-footed animal belongs to animal and to the two-footed. And where the elements are eternal this is even
necessary, since the elements are prior to and parts of the compound; what is more, they can also exist apart, if
“man” can exist apart. For either neither or both can. If, then, neither can, the genus will not exist apart from
the species; but if it does, the differentia will also. [DY OBJ: Plato doesn’t believe in attributes of substances (in
the first sentence) — that is Aristotle’s view he’s imposing on Plato’s view, in order to criticize his view. Moreover,
Aristotle is still assuming that the words are essences, which they are not, on Plato’s view; thus the prior criticism
fails. Second, they are prior in being; and things which are prior to others are not destroyed when the others are.
[DY: Is he saying that attributes are prior, or substances? I can’t tell.]

If the Ideas consist of Ideas (as they must, since elements are simpler than the compound), then the
elements of which the Idea consists (e.g. animal and two-footed) must be predicated of many subjects. If not,
how will they be known? For then there’ll be an Idea that cannot be predicated of more subjects than one. But
this is impossible: every Idea is thought to be capable of being shared. [DY OBJ: I don’t understand the
objection: it seems to be a non-sequitur: Why must the elements be predicated of many subjects, and even if it is
[1] that doesn’t multiply the Forms, and [2] then he can’t say in the next sentence or so that there will be an Idea
that CANNOT be predicated of more subjects than one. Why not? And THEN to say that this is impossible
just boggles the mind. How can one respond to this in a rational way?]

It is impossible to define in the case of eternal things, especially those which are unique, like the sun or
the moon. [DY OBJ: Aristotle holds that knowledge is of what is eternal, so he needs to answer this criticism as
well; and are the sun and moon eternal, for Plato?] If one tries to do so, one errs not only by adding attributes
after whose removal the sun would still exist (e.g. “going round the earth” or “night-hidden”); but also by the
mention of attributes which can belong to another subject (e.g. if another thing with the stated attributes comes
into existence, it will be a sun); so the formula is general. But the sun was supposed to be an individual, like
Cleon or Socrates. Why don’t Platonists produce a definition of an Idea? [DY OBJ: Socrates proposes that the
definition of shape is the limit of a solid in the Meno.] It would become clear, if they tried, that what has now
been said is true.

16 Substances as Potentialities; Unity/Being are not Substances; Criticisms of Plato’s Forms
(1040b-1041a). Most things thought to be substances are only potentialities (e.g. the parts of animals – none of
them exists separately; and when they are separated, they only exist as matter – and earth, fire, and air; for none
of them is one, but they are like a heap before it is fused by heat and some one thing is made out of the bits.
Perhaps the parts of living things and the corresponding parts of the soul exist both actually and potentially. All
the parts must exist only potentially, when they are one and continuous by nature. [DY: Confusing, since he
says that maybe parts exist actually, but then just denies it.]

Since “unity” is used like “being”, and the substance of that which is one is one, and things whose
substance is numerically one are numerically one, neither unity nor being can be the substance of things, just as
being an element or a principle cannot be the substance. Of these things, being and unity are more substantial
than principle or element or cause, but being and unity are not substance, since in general nothing that is common is substance; for substance does not belong to anything but to itself and to that which has it. [DY OBJ: Nothing has unity or being? And what happened to Being As Substance, the first category? Being IS substance in the first senses of being, for Aristotle, no?], of which it is the substance. Also, that which is one cannot be in many things at the same time, but that which is common is present in many things at the same time; so no universal exists apart from the individuals.

Platonists are right in saying the Forms exist apart, if they are substances; but they are wrong when they say the one in many is a Form (because they can’t say what the imperishable substances that exist apart from the individual and sensible substances are). They make them the same in kind as the perishable things – Man Himself and the Horse Itself, adding to the sensible things the word “Itself”. Even if we had not seen the stars, I suppose, there would be eternal substances of unknown things. So no universal term is the name of a substance, and no substance is composed of substances. [DY OBJ: Plato does say what the Forms are, and Aristotle says that they say there are Forms of perishable things, so this is confusing; also, the “Forms of unknown things” point is not a criticism, but a true statement about how Plato conceived of the Forms, so no response is necessary here.]

17 Substance, “Why” Questions; The Cause/Form that Makes Matter a Definite Thing is the Substance of that Thing; Compounded Elements (e.g. Syllables) are More than their Elements (1041a-b). What, and what sort of thing, is substance, taking another starting-point? (Perhaps from this we’ll get a clear view of that substance which exists apart from sensible substances.) Since substance is a principle and a cause, let us attack it from this standpoint. The ‘why’ is always sought in this form: “Why does one thing attach to another?” For to inquire why the musical man is a musical man, is either to inquire – as we have said – why the man is musical, or it is something else. We are inquiring, then, why something is predicable of something; that it is predicable must be clear; for if not, the inquiry is an inquiry into nothing. E.g. why does it thunder? Why is sound produced in the clouds? Why are certain things, i.e. stones and bricks, a house? Here we are seeking the cause. And this is the essence (to speak abstractly), which in some cases is that for the sake of which (e.g. perhaps a house or a bed), and perhaps the first mover; for this also is a cause. The efficient cause is sought in the case of genesis and destruction; the final cause is sought in the case of being.

The question is why the matter is some individual thing, e.g. why are these materials a house? Because that which was the essence of a house is present. And why is this individual thing, or this body in this state, a man? So we seek the cause (the form), by reason of which the matter is some definite thing; and this is the substance of the thing. So of simple things, no inquiry nor teaching is possible.

Re: that which is compounded out of something so that the whole is one (not like a heap but like a syllable), the syllable is not its elements, b is not the same as b and a, nor is flesh fire and earth; for when they are dissolved the wholes, i.e. the flesh and the syllable, no longer exist, but the elements of the syllable exist, and so do fire and earth. The syllable, then, is something more than its elements (the vowel and the consonant); and the flesh is not only fire and earth or the hot and the cold, but also something else. The substance of each thing is the primary cause of its being; and since, while some things are not substances, as many as are substances are formed naturally and by nature, their substance would seem to be this nature, which is not an element but a principle. An element is that into which a thing is divided and which is present in it as matter, e.g. a and b are the elements of the syllable.

BOOK VIII [Eta, or Eta]

1 Summary of Book VII; Sensible Substances have Matter; Matter/Form/Form-Matter; Matter is Substance (1042a-b). [SUMMARY:] Causes, principles, and elements of substances are the object of our search. [DY: Aristotle gives a very brief review of Pre-Socratics and Plato on substance.] There are other substances, the essence and the substratum. In another way the genus seems more substantial than the species, and the universal than the particulars. The Ideas are connected with the universal and the genus; it is in virtue
of the same argument that they are thought to be substances. Since the essence is substance, and the
definition is a formula of the essence, we have discussed definition and essential predication. Since the definition
is a formula, and a formula has parts, we had to consider with respect to the notion of part, what are parts of the
substance and what are not, and whether the same things are also parts of the definition. Further, then, neither
the universal nor the genus is a substance.

Sensible substances all have matter. The substratum is substance: (1) the matter (what is potentially a
“this”), (2) the formula or form (a “this” that can be separately formulated), and (3) the complex of matter and form
(generated and destroyed, and is unqualifiably capable of separate existence; for of substances in the sense of
formulae some are separable and some are not).

Matter also is substance [DY OBJ: Note that Aristotle has shot this option down elsewhere! See Bk. VII,
Ch. 3!]; for in all the opposite changes that occur there is something which underlies the changes; in substance
there is something that is now being generated and again being destroyed, and now underlies the process as a
“this” and again underlies it as the privation of positive character.

2 Substance as Actuality; Formulae of Form/Actuality v. Matter v. Both (1042b-1043a). Since the
substance which exists as substratum and as matter is generally recognized, and matter exists potentially, what is
the substance (as actuality) of sensible things? [DY: Aristotle gives Democritus’ view here and asks many
questions about substances with lots of examples, but then says:] If its substance is the cause of each thing’s
being, we must seek in these differentiae the cause of the being of each of these things. None of these differentiae
is substance, even when coupled with matter, yet in each there is something analogous to substance; and as in
substances that which is predicated of the matter is the actuality itself, in all other definitions also it is what most resembles
full actuality. E.g. if we had to define a threshold, we should say “wood or stone in such and such a position”, a
house is “bricks and timbers in such and such a position”; ice is “water frozen or solidified in such and such a
way”; harmony is “such and such a blending of high and low”, and so on.

The actuality or the formula is different when the matter is different; for in some cases it is the
juxtaposition, in others the mixing, and in others some other of the attributes. So those who define a house as
stones, bricks, and timbers, are speaking of the potential house, for these are the matter; but those who define it
as a covering for bodies and chattels speak of the actuality; and those who combine both of these speak of the
third kind of substance – matter and form. The formula that gives the differentiae is an account of the
form/actuality; a formula that gives the components is an account of the matter. Archytas’ definitions are
accounts of the combined form and matter. E.g. what is still weather? Absence of motion in a large extent of air;
air is the matter, and absence of motion is the actuality and substance. So sensible substance exists as
matter, potentiality, as form/actuality, and as matter and form.

3 Names of Composite Substances and of Form; An Eternal, Indestructible Cause of a
Thing’s Being; Substances as Numbers (1043a-1044a). Sometimes a name is the composite substance,
or the actuality/form [e.g. “house,” the composite thing, “a covering consisting of bricks and stones laid thus
and thus”, or the actuality/form = “a covering”; “animal” is a soul in a body (composite) or a soul
(form/actuality)]. Soul is the substance or actuality of some body; but animal might be applied to both (because
they refer to the same thing). This question is of no importance for the inquiry into sensible substance because
the essence certainly attaches to the form and the actuality. For soul and to be soul are the same, but to be man
and man are not the same (unless indeed the soul is to be called man; and thus on one interpretation the thing is
the same as its essence, and on another it is not).

The syllable is not produced by the letters and juxtaposition, nor is the house bricks and juxtaposition:
The juxtaposition or mixing is not produced by the juxtaposed or mixed things. Man is not animal and biped,
but there must be something besides these, if these are matter – something that is neither an element in the
whole nor produced by an element, but is the substance, which people eliminate and state the matter. If then
this is the cause of the thing’s being, and if the cause of its being is its substance, they cannot be stating the
substance itself.

This cause of the thing’s being, then, must either be eternal or it must be destructible without being ever
destroyed, and must have come to be without ever being in course of coming to be. But it has been proved and
explained elsewhere that no one makes or generates the form, but it is a “this” that is made (the complex of form and matter). Substances of destructible things cannot exist apart in some cases (e.g. things which cannot exist apart from the individual instances, house or utensil), but may be able to do so in others. Perhaps non-natural substances of destructible things are not substances at all.

If all substances are in a sense numbers, they are so in this sense and not, as some say as numbers of units. For definition is a sort of number; for it is divisible, and into indivisible parts (for definitory formulae are not infinite), and number also is of this nature. As number does not admit of the more and the less, neither does substance, in the sense of form, but if any substance does, it is only substance as matter.

4 Matter and Moving/Efficient Causes; Mentioning All Causes, Including Proximate Causes; Natural But Eternal Substances; Natural Things that Aren’t Substances (1044a-b). Re: material substance: even if all things have the same primary constituent or constituents, and if the same matter serves as starting-point for their generation, yet there is a matter proper to each (e.g. the sweet or the fat of phlegm, and the bitter of bile). When the matter is one, different things may be produced owing to difference in the moving cause, e.g. from wood may be made both a chest and a bed. But some different things must have their matter different, e.g. a saw could not be made of wood, nor is this in the power of the moving cause; for it could not make a saw of wool or of wood. But if, as a matter of fact, the same thing can be made of different material, clearly the art, i.e. the moving principle, is the same; for if both the matter and the moving principle were different, the product would be too.

One should state all the possible causes. E.g. what is the material cause of man? The menstrual fluid. What is the moving cause? The semen. The formal cause? His essence. The final cause? His end. (Perhaps the latter two are the same.) We must state the proximate causes. What is the material cause? Not fire or earth, but the matter peculiar to the thing.

Re: natural but eternal substances: perhaps some have no matter, or not matter of this sort but only such as can be moved in respect of place. Nor does matter belong to those natural things that are not substances; their substratum is the substance. E.g. what is the cause of an eclipse? What is its matter? There is none; the moon is that which suffers eclipse. What is the moving cause that extinguishes the light? The earth. The final cause perhaps does not exist. The formal principle is the definitory formula, but this is obscure if it does not include the cause. E.g. what is eclipse? Deprivation of light. If we add “by interposition of the earth”, this formula includes the cause. In the case of sleep it is not clear what it is that proximately has this affection (not the animal, heart or other part).

5 Contraries Cannot Come from Another; Matter and Contraries (1044b-1045a). Since some things are and are not, without coming to be and ceasing to be (e.g. points, if they can be said to be), and in general forms (for it is not white that comes to be, but the wood comes to be white), not all contraries can come from one another, but it is in different senses that a white man comes from a black man, and white comes from black. Only those things which come to be and change into one another have matter. Immutable things have no matter.

How is the matter of each thing related to its contrary states? E.g. if the body is potentially healthy, and disease is contrary to health, is it potentially both? And is water potentially wine and vinegar? We answer that it is the matter of one in virtue of its positive state and its form, and of the other in virtue of the privation of its positive state and the corruption of it contrary to its nature. And all things which change thus into one another must be reduced to their matter, e.g. if from a corpse is produced an animal, the corpse is first reduced to its matter, and only then becomes an animal; and vinegar is first reduced to water, and only then becomes wine.

6 Cause of Unity of Definitions and Numbers; Definition of Definition; Matter and Form Elements of a Formula Solve Difficulties; Proximate Matter and Form; Matter-Less Things are Essentially Unities (1045a-b). Difficulty: what is the cause of the unity of definitions and numbers? In things with several parts and a whole that is not a mere heap, but the totality beyond the parts, there is a cause of unity; contact, viscosity, etc. is the cause in some material things. A definition is a formula that is one not by being connected together (e.g. the Iliad) but by dealing with one object. What then is it that makes man one; why
is he one and not many, e.g. animal-biped, especially if there is a Platonic Ideal Animal and an Ideal Biped? 
Why are not those Ideas the ideal man, so that men would exist by participation not in man, nor in one Idea, 
but in two, animal and biped (and thereby be two)?

If, as we say, one element is matter and another is form, and one is potentially and the other actually, the
question is no longer difficult. Take the difficulty posed if “round bronze” were the definition of cloak; for this
name would be a sign of the definitory formula, so that the question is, what is the cause of the unity of round 
and bronze? The difficulty disappears, because the one is matter, the other form. The agent is the reason why
that which was potentially becomes actually (in generated things; and the agent is the essence of both). Matter is
the object of reason, and of sense, and part of the formula is always matter and part is actuality (e.g. the circle is
a figure that is plane). But of matter-less things, either for reason or for sense, each is by its nature essentially a
kind of unity, as it is essentially a kind of being (a “this”, a quality, or a quantity). So neither “existent” nor
“one” is present in definitions, and an essence is by its very nature a kind of unity as it is a kind of being. (This is
why none of these has any reason outside itself for being one, nor for being a kind of being; for each is by its
nature a kind of being and a kind of unity, not as being in the genus “being” or “one” nor in the sense that being
and unity can exist apart from particulars.)

Being healthy will be either a communion or a connection or a composition of soul and health, and the
fact that the bronze is a triangle will be a composition of bronze and triangle, and the fact that a thing is white
will be a composition of surface and whiteness. The proximate matter and the form are one and the same thing,
the one potentially, the other actually. There is no other cause unless there is something that caused the
movement from potentiality into actuality. And all things which have no matter are without qualification
essentially unities.

BOOK IX [Th, or Theta]

1 Potentiality; Different Kinds Thereof; Acting v. Being Acted on are One and Different;
Privation (1045b-1046a). Let us explain potentiality in the strictest sense and the other kinds thereof. As
stated elsewhere, “potentiality” and the word “can” have several senses [DY: See V,12] (ignoring homonymous
potentialities).

All potentialities that conform to the same type are starting points in reference to one primary kind,
which is a starting-point of change in another thing or in the thing itself qua other. One kind is a potentiality for
being acted on (i.e. the principle in the very thing acted on, which makes it capable of being changed and acted
on by another thing or by itself regarded as other); and another kind is a state of insusceptibility to change for
the worse and to destruction by another thing or by the thing itself as other (i.e. by a principle of change).

In a sense the potentiality of acting and of being acted on is one (for a thing may be capable either
because it can be acted on or because something else can be acted on by it), but in a sense the potentialities are
different (for the one is in the thing acted on; it is because it contains a certain motive principle, and because
even the matter is a motive principle, that the thing acted on is acted on, one thing by another, another by another;
e.g. that which is oily is inflammable, and that which yields in a particular way can be crushed; and so on). The
other potentiality is in the agent (e.g. heat and the art of building are present, one in the heat causer and the
other in the builder). An organic unity cannot be acted on by itself; for it is one and not two different things.
Privation has several senses: (1) that which has not a certain quality and (2) that which might naturally have it
but has not got it, either in general of when it might naturally have it, and either completely or to some degree
fails to have it.

2 Non-Rational and Rational Potentiality; (1046a-b). Some potentialities will be non-rational (i.e. are
present in soulless things) and some will be accompanied by reason (associated with soul). This is why all arts (i.e.
all productive forms of knowledge) are potentialities; they are principles of change in another thing or in the
artist himself considered as other.
Rational potentialities are capable of contrary effects (e.g., the medical art can produce both disease and health), but one non-rational power produces one effect (e.g., the hot is capable only of heating). The reason is that science is a rational formula, and the same rational formula explains a thing and its privation. The rational formula applies to one object in virtue of that object's nature, and to the other, in a sense, accidentally. The contrary is the primary privation, and this is the entire removal of the positive term.

3 The Megaric View is Absurd; Potentiality is Possible; Actuality is Movement (1046b-1047b).
The Megaric school claims that a thing can act only when it is acting, and when it is not acting it cannot act (e.g., he who is not building cannot build; only he who is building, when he is building). This view is absurd.

First, on this view a man will not be a builder unless he is building (for to be a builder is to be able to build), and so with the other arts. If a man will not have the art when he has ceased to use it, and yet he may immediately build again; how then will he have got the art? And similarly with regard to lifeless things; nothing will be either cold, hot, sweet, or perceptible at all if people are not perceiving it; so that the upholders of this view will have to maintain the doctrine of Protagoras. But, indeed, nothing will even have perception if it is not perceiving, i.e., exercising its perception.

Second, if that which is deprived of potentiality is incapable, that which is not happening will be incapable of happening; but he who says of that which is incapable of happening that it is or will be will say what is untrue; for this is what incapacity meant. So these views do away with both movement and becoming. For that which stands will always stand, and if sitting will always sit; for that which cannot get up will be incapable of getting up. This is wrong (these views make potentiality and actuality the same), so potentiality and actuality are different.

So it is possible that a thing may be capable of being and not be, and capable of not being and yet be, and similarly with other predicates (e.g., walking). A thing is capable of doing something if there is nothing impossible in its having the actuality of that of which it is said to have the capacity. E.g., if a thing is capable of sitting and it is open to it to sit, there will be nothing impossible in its actually sitting; and similarly with being moved, standing, being, or coming to be (and their opposites).

“Actuality” (which we connect with fulfillment) strictly speaking is movement (but is applied otherwise). (And so people do not assign movement to non-existent things, though they do assign some other predicates — e.g., they say that non-existent things are objects of thought and desire, but not that they are moved; and this because, while they do not actually exist, they would have to exist actually if they were moved.)

4 There is Nothing Incapable of Being; False v. Impossible; If A Necessarily Implies B, then if A is Possible, B is Possible (1047b). If we are correct, it cannot be true to say, “this is capable of being but will not be”; this view leads to the conclusion that there is nothing incapable of being. Suppose, for instance, that a man (one who did not understand the meaning of “incapable of being”) were to say that the diagonal of the square is capable of being measured but will not be measured, because a thing may be capable of being or coming to be, and yet not be or be about to be. But it follows necessarily from the premises that if we actually suppose that which is not, but is capable of being, to be or to have come to be, there will be nothing impossible in this. The result will be impossible, for the actual measuring of the diagonal is impossible. [DY: I don’t see why it’s impossible to measure the diagonal.] For the false and the impossible are not the same; that you are standing now is false, but not impossible.

Also, if, when A is, B must be, then, when A is possible, B also must be possible. For if B need not be possible, there is nothing to prevent its not being possible. When A is possible, nothing impossible would follow if A were supposed to be; and then B must of course be. But if B is impossible, A also must be so. But A was supposed possible; therefore B also is possible.

5 Rational Potentialities Must Be in a Thing; (1047b-1048a). All potentialities are either innate (e.g. the senses), come by practice (e.g. the power of playing the flute) or come by learning (e.g. the arts); we must acquire the latter two by previous exercise.

Since some things/potentialities can work according to or involve a rational formula, while other things/potentialities are non-rational, rational potentialities must be in a living thing, and non-rational
potentialities can be both in the living and in the lifeless. Everything that has a rational potentiality and desires X, when it desires that for which it has a potentiality and in the circumstances in which it has it, must do this. It has the potentiality in question when the passive object is present and is in a certain state; if not it will not be able to act. To add the qualification “if nothing external prevents it” is not further necessary; for it has the potentiality in so far as this is a potentiality of acting, and it is this not in all circumstances but on certain conditions, among which will be the exclusion of external hindrances; for these are barred by some of the positive qualifications. So even if one has a rational wish, or an appetite, to do two things or contrary things at the same time, one cannot do them; for it is not on these terms that one has the potentiality for them, nor is it a potentiality for doing both at the same time, since one will do just the things which it is a potentiality for doing.

6 Actuality; Infinite/Void is Potential; Movement v. Actuality (1048a-b). Let us discuss actuality, what and what sort of thing it is. Actuality = the existence of the thing, not in the way which we express by “potentially” (e.g. potentially a statue of Hermes is in the block of wood and the half-line is in the whole, because it might be separated out, and even the man who is not studying we call a man of science, if he is capable of studying). Otherwise, actually. Here is an analogy: EX1: that which is building (actuality, A) is to that which is capable of building (potentiality, P); EX2: waking (A) and sleeping (P); EX3: that which is seeing (A) to that which has its eyes shut but has sight (P); EX4: that which is shaped out of the matter (A) to the matter (P); EX: that which has been wrought (A) to the unwrought (P). (Some things are as movement to potentiality, and the others as substance to some sort of matter.)

The infinite and the void and all similar things exist potentially and actually in a different sense from many other things are said so to exist (e.g. that which sees or walks or is seen). For these latter predicates can at some time be truly asserted without qualification (e.g. the seen is so called sometimes because it is being seen, sometimes because it is capable of being seen). But the infinite does not exist potentially in the sense that it will ever actually have separate existence; its separateness is only in knowledge. The fact that division never ceases to be possible gives the result that this actuality exists potentially, but not that it exists separately.

Since of the actions which have a limit none is an end but all are relative to the end (e.g. the process of making thin), and the things themselves when one is making them thin are in movement without being already at the end, this is not an action or at least not a complete one (for it is not an end); but that in which the end is present is an action. E.g. at the same time we are seeing and have seen, are understanding and have understood, are thinking and have thought; we are living well and have lived well, and are happy and have been happy (but it is not true that at the same time we are learning and have learnt, or are being cured and have been cured). So we must call some processes movements, and others actualities. For every movement is incomplete (e.g. making thin, learning, walking, building): it is not true that at the same time we are walking and have walked, or are building and have built, or are coming to be and have come to be – it is a different thing that is being moved and that has been moved, and that is moving and that has moved; but it is the same thing that at the same time has seen and is seeing, or is thinking and has thought. Having X’ed is an actuality, and X’ing is a movement.

7 When a Thing is Potentially; Internal- v. External Causes of Potentiality; Definition of Prime Matter; Ultimate Subject is Matter Sometimes (1048b-1049b). We must distinguish when a thing is potentially and when it is not; for it is not at any and every time. E.g. not everything can be healed by the medical art or by chance, but there is a certain kind of thing that is capable of it, and only this is potentially healthy. The definition of that which as a result of thought comes to be in fulfillment from having been potentially is that when it has been wished, it happens if nothing external hinders it. Similarly there is potentially a house (i.e. the source/cause is external), if nothing in the matter prevents it from becoming a house, and if there is nothing that must be added or taken away or changed. For internally-sourced becomings or changes, those things are potentially X and will be X of themselves if nothing external hinders them (e.g. the seed is not yet potentially a man; for it must further undergo a change in a foreign medium; earth is not yet potentially a statue – it must change in order to become bronze).

When we call a thing not X but “of” X (e.g. a casket is not wood but of wood, and wood is not earth but made of earth), that something is always potentially the thing that comes after it in this series. E.g. a casket is not earthen nor earth, but wooden; for wood is potentially a casket and is the matter of a casket, wood in general of
a casket in general, and this particular wood of this particular casket. And if there is a first thing, which no
longer is called after something else, and said to be of it, this is prime matter (e.g. if earth is airy and air is not
fire but fiery, fire then is prime matter, not being a “this”). The subject and substratum differ by being or not
being a “this”; the substratum of accidents is an individual such as a man, i.e. body and soul, while the accident
is something like musical or white. Wherever this is so, the ultimate subject is a substance; but when this is not so
but the predicate is a form or a “this”, the ultimate subject is matter and material substance.

8 Actuality is Prior to Potentiality in Formula, Substance, and Time; Action as the End v. Done for an End; Actuality in Eternal Things (1049b-1051a). Actuality is prior to potentiality. Nature is potentiality because it is a principle of movement in the thing itself as itself. To such potentiality, actuality is
prior both (1) in formula and (2) in substance; and (3) in time it is prior and not, in different senses.

(1) It is prior in formula; for that which is in the primary sense potential is potential because it is possible
for it to become actual (e.g. “capable of building” = that which can build; “capable of seeing” = that which can
see; “visible” = that which can be seen). In general, the formula and the knowledge of the one must precede the
knowledge of the other.

(3) In time it is prior in this sense: the actual member of a species is prior to the potential member of the
same species, though the individual is potential before it is actual. E.g. the matter and the seed and that which is
capable of seeing, which are potentially a man and corn and seeing, but not yet actually so, are prior in time to
this particular man who now exists actually, and to the corn and to the seeing subject; but they are posterior in
time to other actually existing things, from which they were produced.

It is impossible to be a builder if one has built nothing or a harpist if one has never played the harp; for
he who learns to play the harp learns to play it by playing it, and all other learners do similarly. He who is
learning must know some part of the science. So the actuality is in this sense also prior to the potentiality, in
order of becoming and of time.

(2) It is also prior in substance; first, because the things that are posterior in becoming are prior in form
and in substance, e.g. man is prior to boy and human being to seed; for the one already has its form, and the
other has not. Second, because everything that comes to be moves towards a principle or end. That for the sake of
which a thing is is its principle, and the becoming is for the sake of the end; and the actuality is the end, and it is
for the sake of this that the potentiality is acquired. EX1: animals do not see in order that they may have sight,
but they have sight that they may see; EX2: men have the art of building that they may build, EX3: theoretical
science that they may theorize. Matter exists in a potential state [it may attain to its form]; when it exists actually,
then it is in its form.

The same holds good where the end is a movement; as teachers think they have achieved their end when
they have exhibited the pupil at work, so also does nature. If this is not the case, it will be hard to say about the
knowledge or the statue, whether it is within or without. The action is the end, and the actuality is the action.
The word “actuality” is derived from “action”, and points to the fulfillment.

In some cases the exercise is the ultimate thing (e.g. in sight the ultimate thing is seeing, and no other
product besides this results from sight), but from some things a product follows (e.g. from the art of building, a
house and the act building results); nonetheless, the act is in the former case the end and in the latter more of an
end than the mere potentiality is. The act of building is the thing that is being built, and comes to be--and is--at
the same time as the house.

Where the result is something apart from the exercise, the actuality is in the thing that is being made
(e.g. the act of building is in the thing that is being built; weaving is in the thing being woven); in general, the
movement is in the thing that is being moved; when there is no product apart from the actuality, the actuality is
in the agents [e.g. the act of seeing is in the seeing subject; theorizing in the theorizing subject; life (and well-
being, a kind of life) is in the soul].

So the substance or form is actuality, and actuality is prior in substance to potentiality; and as we have
said, one actuality always precedes another in time right back to the actuality of the eternal prime mover.

Actuality is prior in a higher sense also; eternal things are prior in substance to perishable things, and no
eternal thing exists potentially. Reason: every potentiality is at one and the same time a potentiality for the
opposite; for, while that which is not capable of being present in a subject cannot be present, everything that is
capable of being may possibly not be actual. So that which is capable of being may either be or not be, and the same thing is capable both of being and of not being. That which is capable of not being may possibly not be; and that which may possibly not be is perishable, either without qualification (“without qualification” = “in substance”). Nothing that is without qualification imperishable is without qualification; so imperishable things exist actually. Anything that is of necessity cannot be potential; Necessary things are primary; if these did not exist, nothing would exist. If eternal movement exists, it does not exist potentially; if there is an eternal mover, it is actually in motion. So the sun, stars, and the whole heaven are always active, and they don’t tire in this activity; movement does not imply for them, as for perishable things, the potentiality for opposites, so that the continuity of the movement should be laborious.

Imperishable things are imitated by those that are involved in change (e.g. earth and fire). These are also always active; for they have their movement of themselves and in themselves.

9 Good Actuality is Better/More Valuable than Good Potentiality; Nothing Bad in Eternal Things; Geometrical Relations Discovered by Actualization (1051a). Good actuality is better and more valuable than good potentiality. Every potential thing is equally capable of contraries (e.g. the potentially healthy is the same as the potentially ill, and has both potentialities at once; as so for rest and motion, for building and throwing down, for being built and being thrown down). The capacity for contraries is present at the same time; but contraries and actualities cannot be present at the same time (e.g. health and illness). So one of them must be the good, but the capacity is potentially either both contraries or neither; so actuality is better.

In bad things, the end or actuality must be worse than the potentiality; for that which can is both contraries alike.

The bad does not exist apart from bad things; the bad is in its nature posterior to the potentiality. So in eternal things, there is nothing bad, nothing defective, nothing perverted (for perversion is something bad). Geometrical relations are discovered by actualization; it is by dividing the given figures that people discover them. (Divisions are present only potentially.) Potentially existing relations are discovered by being brought to actuality (thinking is the actuality of thought and it is by an act of construction that people acquire that knowledge), though the single actuality is later in generation.

10 Being (Truth) and Non-Being (Falsity); Truth and Falsity in Incomposites, Subjects/Attributes, and Unchangeable Things; (1051a-1052a). “Being” and “non-being” are used first with reference to the categories, and second with reference to the potentiality or actuality of these or their opposites, while being and non-being in the strictest sense are truth and falsity. He who thinks the separated to be separated and the combined to be combined has the truth, while he whose thought is in a state contrary to that of the objects is in error. (It is not because we think that you are white, that you are white, but because you are white we who say this have the truth.) Re: contingent facts, the same opinion or the same statement comes to be false and true, and it is possible at one time to have the truth and at another to be in error; re: necessary things, opinions are always either true or always false.

Re: incommposites: what is being or not being, and truth or falsity? Contact and assertion are truth, and ignorance is non-contract. It is impossible to be in error regarding the question what a thing is, save in an accidental sense; and the same holds good regarding non-composite substances. They all exist actually, not potentially; otherwise they would come to be and cease to be; but, as it is, being itself does not come to be (nor cease to be); if it did, it would have to come out of something. It is not possible to be in error about essences and things that exist in actuality; we can only think them or not think them. Inquiry about their “what” takes the form of asking whether they are of such and such a nature or not.

There is truth if the subject and the attribute are really combined, and falsity if they are not combined; in the other case, if the object is existent it exists in a particular way, and if it does not exist in this way it does not exist at all [DY: This doesn’t make sense]; and truth = thinking these objects, and falsity does not exist, nor error, but only ignorance.

About unchangeable things there can be no error in respect of time (e.g. if the triangle does not change, it is not true that at one time its angles are equal to two right angles while later they are not (that would imply
BOOK X [I, or Iota]

1 Four Primary Senses of “One”; What Things Are One v. What it Is to be One; The One is the Measure of All Things; Measure is not Always in Number; Measure is Homogeneous with the Measured; Knowledge and Perception are the Measure of Things; Criticism of Protagoras (1052a-1053b). While “one” used in many senses [DY: ten total], the things that are primarily (of their own nature) and not accidentally called one are four: (1) That which is naturally continuous (not by contact nor by bonds); (2) That which is a whole and has a certain shape and form is one in a still higher degree; and especially if it has in itself something which is the cause of its continuity. A thing is of this sort because its movement is one and indivisible in place and time; so that evidently if a thing has by nature a principle of local (and circular, since that is the best) movement, this is in the primary sense one extended thing. The things, then, which are in this way one are either continuous or whole, and the other things that are one are those whose formula is one. Of this sort are the things the thought of which is one, i.e. those the thought of which is indivisible; and it is indivisible if the thing is indivisible in kind or in number. (3) If the thing is indivisible in number, then, the individual is indivisible, and (4) The universal: If the thing is indivisible in kind (that which in intelligibility and in knowledge is indivisible), that which causes substances to be one must be one in the primary sense.

The questions what sort of things are said to be one and what it is to be one and what is its formula should not be assumed to be the same. To be one is to be (whole and) indivisible (being essentially a “this” and capable of existing apart either in place, form, or thought); but it has been extended to the other categories. (Measure is that by which quantity is known; quantity as quantity is known either by a “one” or by a number, and all number is known by a “one”). So all quantity as quantity is known by the one, and that by which quantities are primarily known is the one itself; and so the one is the starting-point of number as number.

The measure and starting-point is something one and indivisible, since even in lines we treat as indivisible the line a foot long.

The measure is not always one in number – sometimes there are several (e.g. the quarter-tones as determined by the ratios are two; the articulate sounds by which we measure are more than one; the diagonal of the square and its side are measured by two quantities; and all spatial magnitudes). So the one is the measure of all things because we come to know the elements in the substance by dividing the things either in quantity or in kind. The one is indivisible just because the first of each class of things is indivisible. But every “one” is not indivisible (e.g. a foot – undivided in perception; and a unit – absolutely indivisible).

The measure is always homogeneous with the thing measured (e.g. the measure of spatial magnitudes is a spatial magnitude, that of length is a length, of breadth a breadth, of articulate sounds an articulate sound, of weight a weight, of units a unit). (However, the measure of numbers is not a number.)

Knowledge and perception are also the measure of things because we know something by them. But Protagoras says man is the measure of all things, meaning really the man who knows (because he has knowledge) or the man who perceives (because he has perception), which we say are the measures of objects. They are saying nothing while appearing to say something remarkable. So being one in the strictest sense is a measure, and especially of quantity, and secondly of quality.

2 The One (as Universal/Predicate) is Not One; There is a One of Each of the Ten Categories; In Substance, the One Itself is Substance (1053b-1054a). Re: the substance and nature of the one, in which of two ways does it exist? [Should we take the one itself as being a substance (e.g. Pythagoreans and Plato), or as an underlying nature explained more intelligibly (e.g. the natural philosophers – the one is love, or air, or the indefinite).]
If no universal can be a substance (as we’ve said), and if being itself cannot be a substance in the sense of a one apart from the many (for it is common to the many), but is only a predicate, then the one also cannot be a substance (being and one are the most universal of all predicates). So on one hand, classes are not certain entities and substances separable from other things; but on the other, the one cannot be a class, for the same reasons that being and substance cannot be classes.

This must hold good in all categories equally. “Being” and “unity” have an equal number of meanings; so since in the sphere of qualities the one is something definite – some entity – and in quantities, we must also ask in general what unity is, as we must ask what being is, since it is not enough to say that its nature is just to be unity or being. Since, while there are numbers and a one both in affections, qualities, quantities, and movement, in all cases the number is a number of particular things and the one is one something, and its substance is not to be one, the same must be true of substances; for it is true of all cases alike (so too in substance the one itself is one substance).

3 The Indivisible One is Opposed to the Divisible Many; The Same, Like, Other/Unlike, Difference Defined; (1054a-1055a). The one is indivisible and the many/plurality is divisible, so they are opposed. The one gets its meaning and explanation from its contrary (many), the indivisible from the divisible, because plurality and the divisible is more perceptible than the indivisible, so that in formula plurality is prior to the indivisible, because of the conditions of perception. To the one belong the same, the like, and the equal; to plurality belong the other, the unlike, and the unequal.

“The same” is: (1) “the same numerically”; (2) if it is one both in formula and in number (e.g. you are one with yourself both in form and in matter); and (3) if the formula of its primary substance is one (e.g. equal straight lines are the same, and equal-angled quadrilaterals).

Things are “like”: (a) if, not being absolutely the same, nor without difference in their compound substance, they are the same in form (e.g. the larger square is like the smaller, and unequal straight lines are like); they are like, but not identical; (b) if, having the same form, have no difference of degree (when that is possible); (c) if they have a quality that is in form one and the same (e.g. whiteness) in a greater or less degree, they are like because their form is one; and (d) if the qualities they have in common are more numerous than those in which they differ (e.g. tin is like silver, as white; gold is like fire, as yellow and red).

“Other” [and “unlike”] is: (i) the opposite of the same (so that everything is either the same as or other than everything else); (ii) whenever both their matter and their formula are not one (so that you are other than your neighbor); and (iii) the objects of mathematics. (The other is not the contradictory of the same; which is why it is not predicated of non-existent things.)

Difference is not the same as otherness. [The other and that which it is other than need not be other in some definite respect (for everything that exists is either other or the same)] That which is different from anything is different in some respect, so that there must be something identical (genus or species) whereby they differ. All things that differ differ either in genus (if the things don’t have their matter in common and are not generated out of each other) or in species (if they have the same genus). Contraries are different, and contrariety is a kind of difference (which we can see by induction).

4 Contrariety; Contrariety is Complete Difference, between State and Privation; One Thing can only have One Contrary (1055a-b). The greatest difference between things is contrariety (we know by induction). Things that differ in genus are too far distant and are incomparable; for things that differ in species, the extremes from which generation takes place are the contraries; and the distance between extremes (i.e. between the contraries) is the greatest.

That which is greatest (i.e. cannot be exceeded) in each class is complete. The complete difference marks the end; there is nothing beyond the end, and the complete needs nothing further. So contrariety is complete difference.

One thing cannot have more than one contrary (there can’t be anything more extreme than the extreme, nor can there be more than two extremes for the one interval). So if contrariety is a difference, and if a difference must be between two things, then the complete difference is.
The primary contrariety is that between state and (complete) privation. Privation is a kind of contradiction (or incapacity); for what suffers privation is either that which is quite incapable of having some attribute or should have it naturally but does not. For the extremes from which the changes proceed are contraries.

By induction, every contrariety involves, as one of its terms, a privation.

5 How the Equal is Opposed to the Great and the Small (1055b-1056b). How is the one opposed to the many and the equal opposed to the great and the small? If the question “whether” is always concerned with opposites, and we can ask whether it is greater or less or equal, what is the opposition between the greater and the less, and the equal? The equal is not contrary either to one alone or to both; for why should it be contrary to the greater rather than to the less? Perhaps the equal is contrary to the unequal, so it will be contrary to more things than one. But then it follows that one thing has two contraries, which is impossible. The equal is evidently intermediate between the great and the small, but no contrary is either observed to be intermediate, nor, from its definition, can be so; for it would not be a perfect contrary if it were intermediate between any two things, but rather it always has something intermediate between itself and something else.

So the equal is opposed either as negation or as privation. It cannot be opposite to the great rather than to the small or vice versa. It is then the privative negation of both. The equal, then, is that which is neither great nor small and is naturally fitted to be either great or small; and it is opposed to both as a privative negation (and therefore is also intermediate). That which is neither good nor bad is opposed to both, but has no name; but that which is neither white nor black has more claim to a name.

6 The Many Cannot Be Absolutely Opposed to the One; Many is Applied to Divisibles; One is Opposed to Many in Numbers (1056b-1057a). If the many are absolutely opposed to the one, certain impossible results follow: (1) One will then be few; for the many are opposed also to the few; (2) Two will be many, since the double is multiple, and double derives from two; therefore one will be few (for there is nothing fewer than one); (3) if a lot and few are in plurality what the long and the short are in length, and whatever is a lot is also many, and the many are a lot (unless, indeed, there is a difference in the case of an easily-bounded continuum), the few will be a plurality. So one is a plurality, if it is few; and this must be so, if two are many.

“Many” is applied to the things that are divisible; the “many” is: (a) a plurality which is excessive either absolutely or relatively; or (b) number, as so is opposed to the one. We say “one or many”, just as if one were to say “one and ones” or “white thing and white things”, or to compare the measured with the measure. Each number is said to be many because it consists of ones and because each number is measurable by one; and it is many as that which is opposed to one, not to the few. In this sense, even two is many; it is the first plurality. But without qualification two is few (it is the first plurality that is deficient).

The one is opposed then to the many in numbers as measure to thing measurable. Not everything that is one is a number, i.e. if the thing is indivisible it is not a number. Though knowledge is similarly spoken of as related to the knowable, the relation does not work out similarly, for while knowledge might be thought to be the measure, and the knowable the thing measured, the fact is that all knowledge is knowable, but not all that is knowable is knowledge, because in a sense knowledge is measured by the knowable.

7 Intermediates must be Composed of Contraries, in the Same Genus, and Stand between Opposites (1057a-b). Since contraries admit of (and sometimes have) an intermediate, the intermediate must be composed of the contraries. All intermediates are in the same genus as the things between which they stand. Intermediates are those things into which that which changes must change first (e.g. we must pass through the intermediate, going from the highest string to the lowest; in colors we must come to crimson and gray if we are to pass from white to black; and so on). But to pass from one genus to another genus (e.g. from color to figure) is not possible except incidentally.

All intermediates stand between opposites of some kind; for only between these can change take place in virtue of their own nature. Of relative terms, those that are not contrary have no intermediate (they are not in the same genus); what intermediate could there be between knowledge and the knowable? But between great and small there is one.
If intermediates are in the same genus (shown above) and stand between contraries, they must be composed of these contraries (e.g. all colors which are between white and black must be said to be composed of the genus (i.e. color) and certain differentiae). All the other intermediates also, therefore, are composite; for that which has more of a quality than one thing and less than another is compounded somehow out of the things than which it is said to have more and less respectively. And since there are no other things prior to the contraries and homogeneous with the intermediates, all intermediates must be compounded out of the contraries. Therefore all the inferior classes, both the contraries and their intermediates, will be compounded out of the primary contraries.

8 Contraries within a Species are within one Genus and Indivisible (1057b-1058a). That which is other in species is other than something in something, and this must belong to both (e.g. if it is an animal other in species, both are animals). The things that are other in species must be in the same genus. “Genus” = that one identical thing that is predicated of both and is differentiated in no merely accidental way, whether conceived as matter or otherwise.

All things are divided by opposites, and it has been proved that contraries are in the same genus. Contrariety was seen to be complete difference; and every difference in species is a difference from something in something; so that this is the same for both and is their genus.

Two things are other in species when they are contrary, being in the same genus and being indivisible (and those things are the same in species, which have no contrariety, being indivisible); in the process of division contrarieties arise even in the intermediate stages before we come to the indivisibles.

9 Why Woman does not Differ from Man in Species; they Differ in Matter (1058a-b). Why does woman not differ from man in species, since female and male are contrary, their difference is a contrariety, and both female and male belong to it as “animal”? Analogously, the contrarieties “with feet” and “with wings” make things different in species, but whiteness and blackness do not. Perhaps it is because the former are modifications peculiar to the genus, and the latter are less so. And since one element is formula and one is matter, contrarieties that are in the formula make a difference in species, but those that are in the compound material thing do not make one. So whiteness in a man, or blackness, does not make one, nor is there a difference in species between the white man and the black man, not even if each of them be denoted by one word. (Callias is formula together with matter; white man, then, is so also, because Callias is white; man, then, is white only incidentally. Nor do a brazen and a wooden circle differ in species; and if a brazen triangle and a wooden circle differ in species, it is not because of the matter, but because there is a contrariety in the formula.) Male and female are indeed modifications peculiar to animal, not however in virtue of its substance but in the matter, i.e. the body. This is why the same seed becomes female or male by being acted on in a certain way.

10 The (Im)Perishable are Contraries and Different in Kind; Criticism of Plato’s Forms (1058b-1059a). Since contraries are other in form, and the perishable and the imperishable are contraries (for privation is a determinate incapacity), the perishable and the imperishable must be different in kind.

Nothing is by accident perishable. Perishableness must either be the substance or be present in the substance of each perishable thing. The same account holds for imperishableness; for both are attributes which are present of necessity. The characteristics, then, in respect of which and in direct consequence of which one thing is perishable and another imperishable, are opposite, so that the things must be different in kind.

So there cannot be Platonic Forms, for then one man would be perishable and another imperishable. Yet the Forms are said to be the same in form with the individuals and not homonymous; but things which differ in kind are further apart than those which differ in form. [DY OBJ: I deny that the Forms are said to be the same in form with the individuals; they share a definition perhaps, but not in the sense that the Forms are eternal, immaterial and immutable, whereas a man is none of these:]

BOOK XI [K, or Kappa]

1 Questions concerning Wisdom (One Science or Many? Examines All Substances ... Accidents ... Imperceptible Substances (Forms) ... Mathematics ... or Elements?) It does deal with Mathematics (1059a-1060a). Wisdom is a science of first principles, but is Wisdom one science or several? If of one, it may be objected that one science always deals with contraries, but the first principles are not contrary. If it is not one, what are these sciences with which it is to be identified?

Does one science or more examine the first principles of demonstration? If of one, why of this rather than of any other? If of more, which must these be said to be?

Does wisdom investigate all substances or not? If not all, it is hard to say which; but if, being one, it investigates them all, it is doubtful how the same science can embrace several subject-matters.

Does it deal with substances only or also with their accidents? If in the case of attributes demonstration is possible, in that of substances it is not. But if the two sciences are different, what is each of them and which is Wisdom? If we think of it as demonstrative, the science of the accidents is Wisdom, but if as dealing with first principles, the science of substances claims the title.

Wisdom must not deal with the four causes (mentioned the Physics); it does not deal with the final cause (i.e. the good, and this is found in the field of action and movement; and it is the first mover – for that is the nature of the end – of unmovable things there is no first mover); it is hard to say whether wisdom deals with (im)perceptible substances. If with imperceptible, it must deal either with Platonic Forms or mathematical objects. But the Forms do not exist; so Wisdom does not deal with Forms. Moreover, wisdom does not treat mathematical objects; for none of them can exist separately. Also, wisdom does not deal with perceptible substances; for they are perishable.

Which science deals with mathematical objects? Not natural science (they deal with things that have in themselves a principle of movement and rest); not the science that inquires into demonstration and science; for this is just the subject which it investigates. So wisdom treats of those subjects.

Does wisdom deal with the principles that are by some called elements? All men suppose these to be present in compound things; perhaps wisdom should treat rather of universals; for every formula and every science is of universals (the highest classes – being and unity) and not of particulars. Being and unity contain all things that are, and are most like principles because they are first by nature; if they perish, all other things are destroyed with them; all things are and are one. But being and unity are not genera or principles (because no genus is predicable of any of its differentiae). The species are not the principles (because inasmuch as the species are involved in the destruction of the genera, the genera are more like principles; for that which involves another in its destruction is a principle of it). These are some difficulties.

2 Further Questions about Wisdom’s Object(s): Something apart from individual things? Non-Sensible Substance? Is it Being and Unity? Knowledge of First Principles since those are Theses, but Knowledge is of Suches? (1060a-b). Is there something apart from individual things, or is it with these that wisdom deals? The things that are apart from the individuals are genera or species and they are infinite; and wisdom treats of neither. Is wisdom concerned with separable substance or sensible substances (i.e. the substances in this world)? It seems so. But to posit other and eternal substances equal in number to the sensible and perishable substances (as Plato does) is improbable. It cannot be matter either, since it does not exist in actuality but only in potency, and the form or shape is a more important principle than this; but the form is perishable, so there is no eternal substance at all which can exist apart and independent. But yet such a principle and substance seems to exist and is sought by nearly all the best thinkers as something that exists; for how is there to be order unless there is something eternal, independent, and permanent?

So if there is a non-sensible substance or principle of such a nature as that which we are now seeking, and if this is one for all things, and the same for eternal and for perishable things, why, if there is the same principle, are some of these eternal, and others not? This is paradoxical. If there is one principle of perishable and another of eternal things, why wouldn’t the things that fall under the eternal principle also be eternal? (And if it is perishable it must have another principle, and that must have yet another, and this will go on to infinity.)
If we set up *being and unity* (the most unchangeable principles), if each of these does not indicate a “this” and a substance, how will they be separable and independent (as eternal, primary principles should be)? If each of them does signify a 'this' and a substance, all things that are are substances; but this is false. How could the first principle be a unity and a substance, and generate number as the first product from unity and from matter, where number is substance? How are we to think of two, and each of the other numbers composed of units, as one? Further, how are we to suppose that there is a substance of unity and the point? Every substance comes into being, but the point does not; for the point is a division.

Further, all knowledge is of universals and of the “such”, but substance does not belong to universals, but is rather a “this” and separable, so if there is knowledge about the first principles, how can the first principle be substance?

And is there anything apart from the compound thing (form and matter), or not? If not, all things that are in matter are perishable. But if so, it must be the form or shape. When would this exist apart and in what would it not? (Sometimes the form is not separable – e.g. in the case of a house.)

Lastly, are the principles the same in kind or in number? If one in number, all things will be the same.

### 3 Wisdom/Philosophy is One Science of Being As Being, just as Medical and Health, and Geometry have One Common Nature; Philosophy Studies Attributes and Contraries of Being As Being (1060b-1061b).

Since the philosophy/wisdom treats of being as being universally (and not of some part of it), and “being” has ten senses, if (a) it is used homonymously and in virtue of no common nature, it does not fall under one science (there would be no one class); but (b) if it is used in virtue of some common nature, it will fall under one science. “Being” is used (as said above) like “medical” (refers somehow to medical science) and “healthy” (refers to health). (Other terms refer to other things, but each term refers to some one thing.)

**DY OBJ:** Note that Aristotle also states in *Nicomachean Ethics* that *Good* is said in as many ways as *Being*, and he’s just stated here that other terms refer to other things but each refers to one thing; so why isn’t there one science of *goodness* (as Aristotle denies)? E.g., (1) a prescription and (2) a knife are called medical because (1) proceeds from medical science, and (2) is useful to it. A thing is called healthy because it is (i) indicative or (ii) productive of health or because it is productive of it. And the same is true in the other cases. Everything that is, then, is said to be in this same way; each thing is said to be because it is a modification of being as being, or a permanent or a transient state, or a movement of it, or something else. Since everything that is may be referred to some one common nature, each of the contrarieties also may be referred to the first differences and contrarieties of being (plurality and unity or likeness and unlikeness, or others). It makes no difference whether that which is be referred to being or to unity (since they are convertible; for that which is one is also somehow being, and that which is being is one). But as every pair of contraries falls to be examined by one and the same science, and in each pair one term is the privation of the other (e.g. unjust and just; in all such cases the privation is not of the whole formula, but only of its extreme form. Even though the mathematician investigates abstractions (for in his investigation he eliminates all the sensible qualities (e.g. weight and lightness) and leaves only the quantitative and continuous and their attributes, there is one and the same science of all these things – geometry; the same is true with regard to being. That is, only philosophy studies the attributes of being and the contrarieties in it as being; natural science studies things that move; dialectic and sophistic deal with the attributes of things that are, but not of things as being, and not with being itself insofar as it is being. This is how there can be one science of things which are many and different in genus.

### 4 First Philosophy Studies Math; Natural Science and Math are parts of Wisdom (1061b).

Since even the mathematician uses the common axioms only in a special application, first philosophy must examine the principles of mathematics also. Mathematics marks off a part of its proper matter and studies it separately but not that matter as being but insofar as each of them is continuous in one or more dimensions; but philosophy does not inquire about particular subjects with such and such attributes, but considers each subject in relation to being as being. Natural science studies the attributes and the principles of the things that are, as moving and not as being, whereas the primary science deals with these only insofar as the underlying subjects are existent. So both natural science and mathematics are necessarily parts of Wisdom.
5 The Principle of Non-Contradiction (PNC) is in Things and Must be Recognized as True; The Necessary Must Be; My Opponents Utterly Destroy Rational Discourse (1061b-1062b). The Principle of Non-Contradiction (PNC; the same thing cannot at one and the same time be and not be, or admit any other similar pair of opposites) is in things, and we cannot be deceived about it and must always recognize the truth. We can’t fully prove this, though there is proof ad hominem (he who says this is and is not denies what he affirms, so that what the word signifies, he says it does not signify; and this is impossible). So if “this is” signifies something, one cannot truly assert the contradictory.

If a word signifies something and X can be truly asserted of it, it necessarily is X; and it is impossible that that which is necessary should ever not be; so it is impossible to make opposed assertions truly of the same subject (e.g. he who says “man” will be no more right than he who says “not-man”). (Perhaps if we had questioned Heraclitus himself in this way we might have forced him to confess that opposite statements can never be true of the same subjects.) This appears to refute what is said by those who raise such objections and utterly destroy rational discourse.

6 Protagoras is Wrong; One Appearance Must be Mistaken; Start with Unchangeable Things (Heavenly Bodies); Explaining contrary Movements; ThosePositing Difficulties with Reason; Heraclitus and Anaxagoras are Wrong (1062b-1063b). Protagoras’ view (man is the measure of all things) is wrong in the same way; from his view it follows that the same thing both is and is not, is bad and good, and all other opposite statements are true, because often a particular thing appears beautiful to some and ugly to others, and that which appears to each man is the measure. Considering the source of the opinion may solve this difficulty [PY OB]: Has Aristotle committed the Genetic (“Poisoning the Well”) Fallacy? Some philosophers observed that all men don’t have the same views about the same things due to contrary appearances.

To lend oneself equally to the opinions and appearances of disputing parties is foolish; clearly one of them must be mistaken. Consider sensation: the same thing never appears sweet to some and bitter to others, unless one’s sense of taste has been perverted or injured. If this is so, we should trust the other party as the measure. (The same goes for good and bad, and beautiful and ugly, and all other such qualities.)

To judge about the truth, one must start from the unchangeable things (e.g. the heavenly bodies).

If there is movement and X moved, and everything is moved out of something and into something, it follows that X must first be in that out of which it is to be moved, and then not be in it, and move into the other and come to be in it, so the contradictory statements are not true at the same time (as our opponents assert).

When the doctor orders people to take some particular food, why do they take it? They should not, if there were no fixed constant nature in sensible things, but all moved and flowed for ever.

If we are always changing and never remain the same, what wonder is it if to us, as to the sick, things never appear the same?

As for those positing difficulties via reason, they must posit something and no longer demand a reason for it (this is how all reasoning and all proof is accomplished); if they posit nothing, they destroy discussion and all reasoning. So we can’t reason with such men.

So we cannot accept the views either of Heraclitus (as above) or of Anaxagoras: Since he says a portion of everything is in everything, he says nothing is sweet any more than it is bitter, and so with any other pair of contraries, since in everything everything is present not potentially only, but actually and separately. (Lastly, all statements cannot be false nor all true: if all are false it will not be true even to say all are false; if all are true it will not be false to say all are false.)

7 There is No Demonstration of the Substance/What; Natural Science is Not Practical or Productive but is Theoretical; Theology is the Best Science Because it Deals with Separable and Immovable Substance (this substance is to be proven latter); Theology is a Universal Science (1063b-1064b). Every science seeks certain principles and causes for each of its objects (e.g. medicine and gymnastics), whether productive or mathematical. Each of these marks off a certain class of things for itself and busies itself about this as about something that exists and is – but not as being (as first philosophy does). Non-first philosophy sciences gets the “what” in some class of things (via perception or hypothesis) and tries to prove the other truths. But there is no demonstration of the substance – the “what”.
Natural science is not a practical or a productive science. In productive sciences, the principle of production is in the producer and not in the product (as an art or some other capacity). In practical science, the movement is not in the thing done, but rather in the doers. But natural science deals with the things that have in themselves a principle of movement; so it is theoretical. So the natural philosopher should define things and state the formula of the substance/the “what” – whether as akin to snub or rather to concave. (The formula of the snub includes the matter of the thing, but that of the concave is independent of the matter; for snubness is found in a nose, so that its formula includes the nose – for the snub is a concave nose.)

Since there is a science of being as being and capable of existing apart, is this natural science or not? Natural science (theoretical) deals with the things that have a principle of movement in themselves; mathematics (a theoretical science) deals with things that are at rest and cannot exist apart. So we will prove that there is a third theoretical science (theology) about a substance that can exist apart and is unmoveable. Such a thing must surely be the divine and the first, most important principle. The class of theoretical sciences is the best, and theology is best; for it deals with the highest of existing things. [DY: Note how Aristotle answers the question about whether natural science is identical to the science of being as being, by ultimately answering that theology is the best science because it deals with a separable and immovable substance. But he only refers to this science as either first philosophy, philosophy, or wisdom, above; he does not say that the focal meaning of being is God elsewhere (or anywhere else, to my knowledge. In any case, he is being clear that he thinks there is a connection between these concepts.)

Each of the mathematical sciences deals with some one determinate class of things, but universal mathematics applies equally to all. If natural substances are the first of existing things, natural science must be the first of sciences; but if there is another (separable and unmoveable) substance, the science of it must be different and prior to natural science, and universal because it is prior.

8 Being by Accident; Sophistic Considers Being by Accident; There is No Science of the Accidental; Accidental Causes are Unordered and Indefinite; Reason and Nature are Prior to Chance Causes (1064b-1065b). We must consider being by accident. No traditional science busies itself about the accidental (e.g. building doesn’t consider what will happen to the house dwellers, nor does weaving, or shoemaking, or the confectioning); each of these sciences considers only its proper end. Only sophistic busies itself about the accidental, so that Plato was not wrong when he said that the sophist spends his time on non-being.

But a science of the accidental is not even possible due to what the accidental really is. Everything either is always or of necessity, or for the most part, or is neither for the most part, nor always and of necessity, but merely as it chances (e.g. there might be cold in the dog-days). The accidental is what occurs, but not always nor of necessity, nor for the most part. So there is no science of the accidental because all science is of that which is always or for the most part.

If there were causes and principles of the accidental (as in sciences), everything would be of necessity. If A is when B is, and B is when C is, and if C exists of necessity, A and B would be necessary as well (but A was supposed to be accidental). And if the cause be supposed not to exist but to be coming to be, everything will occur of necessity as well (e.g. tomorrow’s eclipse will occur if A occurs, and A if B occurs, and B if C occurs; so if we subtract time from the limited time between now and tomorrow, we will come to the already existing condition as some time; since this exists, everything after this will occur of necessity, so that all things occur of necessity).

Of indeterminate/accidental things, the causes are unordered and indefinite.

The final cause is found in events that happen by nature or by thought. Chance is when one of these events happens by accident. An existent thing may be a cause either by its own nature or by accident. Chance and thought are concerned with the same sphere; for choice cannot exist without thought. The causes from which chance results might happen are indeterminate; therefore chance is obscure to human calculation and is a cause by accident, but in the unqualified sense a cause of nothing. It is good or bad luck when the result is good or evil; and prosperity or misfortune when the scale is large.

Nothing accidental is prior to the essential; neither are accidental causes prior. So if chance or spontaneity is a cause of the heavens, reason and nature are causes before it.
9 Actuality of the Potential is a Movement; It is Hard to Grasp What Movement Is; Movement is in the Movable; Actuality of the Mover and Moved is One (1065b-1066a). Some things exist only actually, some potentially, some potentially and actually. [DY: He doesn’t give an example of “both”] — some as beings, some as quantities, others in the other categories. There is no movement apart from things; for change is always according to the categories of being; there are as many kinds of movement and change as of being. The actuality of the potential as such is movement. E.g., when the buildable exists actually, it is being built, and this is the process of building (similarly with learning, healing, and rolling, walking, leaping, ageing, and ripening). Movement takes place when the fulfillment itself exists, and neither earlier nor later. [DY: Why wouldn’t there be movement before the process is finished and achieves its end?] The fulfillment of that which is potentially, when it is fulfilled and actual, not as itself, but as movable, is movement. Here, as = bronze is potentially a statue, e.g.; but the fulfillment of bronze, as bronze, is not movement. It is not the same to be bronze and to be a certain potentiality. If it were absolutely the same in its formula, the fulfillment of bronze would have been a movement. But it is not the same. Consider contraries: to be capable of health and illness are not the same; if they were, health and illness would have been the same. (It is which underlies (e.g. moisture or blood) and is healthy or sick that is one and the same.) Since they are not the same (as color and the visible are not the same), it is the fulfillment of the potential as such, that is movement. Each thing is capable of being sometimes actual, sometimes not, e.g. the buildable as buildable; and the actuality of the buildable as buildable is building. The actuality is either this – building – or the house. When the house exists, it is no longer buildable; the buildable is being built. The building is a movement. The same account applies to all other movements.

We are right about movement because we cannot put it in another class. Movement is thought to be an actuality, but incomplete; the reason is that the potential, whose actuality it is, is incomplete. So it is hard to grasp what movement is; for it must be classed either with privation, potentiality, or with absolute actuality, but none of these is possible. So movement must be actuality (in the sense we have defined) that is hard to understand but capable of existing.

Movement is in the movable; it is the fulfillment of this by that which is capable of causing movement. The actuality of that which is capable of causing movement is no other than that of the movable. It must be the fulfillment of both. A thing is capable of causing movement because it can do this to movables, and it is a mover because it is active; so the actuality of the mover and moved is one.

10 Definitions of Infinite; Infinite is invisible, indivisible, and an Accident of Subjects; Infinite is not a Sensible Thing; There is not an Infinite Body; The Infinite is not the Same (1066a-1067a). The infinite is (1) that which is incapable of being traversed due to its nature (as the voice is invisible); (2) that which admits only of incomplete traverse; (3) scarcely admits of traverse; (4) that which, though it naturally admits of traverse, is not traversed or limited; (5) a thing may be infinite in respect of addition or of subtraction or of both. The infinite cannot be a separate, independent thing. (If it is neither a spatial magnitude nor a plurality, and infinity itself is its substance and not an accident, it will be indivisible (the divisible is either magnitude or plurality). But if indivisible, it is not infinite.) How can an infinite exist by itself, unless number and magnitude also exist by themselves (since infinity is an attribute of these)? If the infinite is an accident of something else, it cannot be as infinite an element in things. The infinite cannot exist actually. The infinite must be invisible and indivisible. But the actually infinite [DY: which he just denied exists] cannot be indivisible; for it must be a quantity. So infinity belongs to a subject incidentally and is not a principle.

The infinite is not a sensible thing: If the formula of body is that which is bounded by planes, there cannot be an infinite body either sensible or intelligible; nor a separate and infinite number, for number or that which has a number can be counted. Natural science makes clear that the infinite cannot be composite (since the elements are limited in multitude and the infinite body will be infinite in every direction) or simple (there is no body apart from the elements; everything can be resolved into simple bodies). [More reasons why the infinite is not a sensible thing are given.]

There cannot be an infinite body and also a proper place for all bodies, if every sensible body has either weight or lightness. If there cannot be an infinite place, there cannot be an infinite body; for that which is in a
place is somewhere, and this means either up or down or in one of the other directions, and each of these is a limit.

The infinite is not the same in the sense that it is one thing in magnitude, movement, or time; (a movement is infinite in virtue of the distance covered by the spatial movement or alteration or growth, and a time is called infinite because of the movement which occupies it).

11 Change; Accidental v. Essential Change; Accidental v. Essential Movement; Three Changes; Only the Change from Subject to Subject is Movement (1067b-1068a). Some things change in an accidental sense (e.g. that in which the musical may be said to walk) and some change without qualification, because something in them changes in parts (e.g. the body becomes healthy, because the eye does). The essentially movable is moved primarily by its own nature. The mover causes movement either in an accidental sense or in respect of a part of itself or essentially. There is something that primarily causes movement, something that is moved, the time in which it is moved, and that from which and that into which it is moved. But the forms and the affections and the place, which are the terminals of the movement of moving things, are unmoving (e.g. knowledge or heat; it is not heat that is a movement, but heating). Essential change is found in things between contraries, and their intermediates, and between contradictories.

That which changes changes either (1) from subject into subject, (2) from subject into non-subject, or (3) from non-subject into subject. (“Subject” = that which is expressed by an affirmative term.) (3) The change from non-subject into contradictory subject is generation – absolute change/generation, and partial change/generation; and (2) the change from subject to non-subject is destruction – absolute change/destruction, and partial change/destruction. That which is not cannot be moved, so generation cannot be movement; for that which is not is generated. Nor is destruction movement; for the contrary of movement is movement or rest, but the contrary of destruction is generation. Since every movement is a change, and the kinds of change are the three named above, and of these those in the way of generation and destruction are not movements, and these are the changes from a thing to its contradictory, only the change (1) from subject into subject can be movement. The subjects are either contrary or intermediate; even privation must be regarded as contrary, and is expressed by a positive term (e.g. “naked,” “toothless,” or “black”).

12 There is Only Movement in Quality, Quantity, and Place (not Substance, Relation, Agent/Patient, Mover/Moved; Definitions of Unmovable; Definitions of Together, Apart, Touch, Contrary in Place, Continuous, Successive, and a Point v. a Unit (1068a-1069a). Of the categories substance, quality, place, acting or being acted on, relation, and quantity [DY: Note that he didn’t mention all ten – he’s missing time, state or having, and position], there must be three kinds of movement – of quality, quantity, and place. There is no movement in respect of substance (because there is nothing contrary to substance), nor in respect of relation (if one of two things changes, the other might cease to be true, though it does not change at all, so that their movement is accidental), nor of agent and patient, nor of mover and moved (because there is no movement of movement nor generation of generation, nor, in general, change of change). A thing changes at the same time from health into illness, and from this change itself into another. If it has become ill, it will have changed into some determinate change or other (from something into something); so it will be the opposite change (growing well). This happens only incidentally, e.g. there is a change from the process of recollection (changing into a state of knowledge) to that of forgetting (changing into a state of ignorance).

The process will go on to infinity, if there is to be change of change and generation of generation. Since there is not a first term of an infinite number of terms, the first in this series will not exist, and therefore no following term will exist. [DY OBJ: This doesn’t make sense, even given his view of math – the Greeks believed that one was the first number, so why would the set of natural numbers have a beginning? I agree that infinity itself doesn’t have a beginning, but an infinite set seems to be able to have a beginning.] Nothing can either come to be, move, or change. [DY: Compare Aquinas’ Argument from Cause for God’s existence.

The unmovable is either (1) that which is wholly incapable of being moved; (2) that which is moved with difficulty in a long time or begins slowly; or (3) that which would naturally be moved and can be moved, but is not moving when, where, and as it would naturally be moved (this is being at rest; for rest is contrary to movement, so that it must be a privation in which that which is receptive of movement).
Things that are in one primary place are together, and things that are in different places are apart. Things, whose extremes are together, touch. That at which the (naturally and continuously) changing thing naturally arrives before it arrives at the extreme into which it is changing, is between. That which is most distant in a straight line is contrary in place. [DY OB: Is there a most distant that isn’t infinite?] That which, being successive, touches, is contiguous. Since all change is between opposites, and these are either contraries or contradictories, and there is no middle term for contradictories, clearly that which is between is between contraries. Two things are called continuous (=a species of the contiguous) when the limits of each, with which they touch and are kept together, become one and the same. The successive is primary (the successive does not necessarily touch, but that which touches is successive). A point is not the same as a unit; for contact belongs to points, but not to units, which have only succession; and there is something between two of the former but not between two of the latter.

BOOK XII [L, or Lambda]

1 Three Kinds of Substance: Sensible (Changeable), Immovable, and Unnamed (1069a-b). Substance is the subject of our inquiry; for the principles and the causes we are seeking are those of substances. If the universe is of the nature of a whole, substance is its first part (then quality, then quantity).

There are three kinds of substance; (1) the sensible (one kind is eternal and the other is perishable and comprises e.g. plants and animals) – of which we must grasp the elements; (2) the immovable (we’ll review different philosophers’ positions below); and (3) the third kind [unnamed], which belongs to another non-natural science, if there is no principle common to it and to the other kinds. Sensible substance is changeable [DY: except eternal sensible substance] and there must be something underlying which changes into the contrary state; for the contraries do not change.

2 Matter Exists Besides the Contraries [Four Changes]; Change is from One Contrary to its Opposite; Anaxagoras is more Correct on Potentiality; Changeable Things Have Matter; Some Eternal Things Have Matter for Motion; Three Causes/Principles (1069b). Something persists, but the contrary does not; so matter exists besides the contraries. Since there are four kinds of changes [(1) change of the essence, (2) quality, (3) quantity, or (4) place], and (1) change in essence/the “this” is simple generation and destruction, (3) change in quantity is increase and diminution, (2) change in quality/affect is alteration, and (4) change in place is motion, changes will be from given states into those contrary to them in these ways. The matter that changes must be capable of both states. Since things are said to be in two ways (everything changes from being potentially to actually, e.g. from potentially white to actually white, and more or less. So not only can a thing come to be, incidentally, out of that which is not, but also all things come to be out of that which is potentially, but not actually: this is the ‘One’ of Anaxagoras (and it is better than the views of Empedocles, Anaximander, and Democritus, to say all things were together potentially but not actually). Therefore these thinkers seem to have had some notion of matter.

All things that change have matter, but different matter; and of eternal things those which are not generable but are moveable in space have matter for motion from one place to another.

If a thing exists potentially, still it is not potentially any and every thing, but different things come from different things; but it’s false that all things were together; they differ in their matter, since otherwise why did an infinity of things come to be, and not one thing? Reason is one; if matter also is one, it [DY: Reason? And is Reason capitalized because it refers to Nous, or the Divine Mind, God?] must have come to be in actuality what the matter was in potentiality. The causes/principles are three: the pair of contraries of (i) the formula and form and (ii) privation; and (iii) the matter.

3 Matter is Changed by a Prime Mover into Form; Three kinds of Substance; Efficient Causes Precede Their Effects; Formal Causes are Simultaneous with Their Effects (1069b-1070a). Neither the matter nor the form comes to be – i.e. the proximate matter and form. Everything that changes is
something (matter) and is changed by something (prime mover) and into something (the form). This process cannot go on to infinity.

Each substance comes into being out of something synonymous. Things come into being either by (1) art, (2) nature, (3) chance or (4) spontaneity. (1) Art is a principle of movement in something other than the thing moved; (2) nature is a principle in the thing itself (e.g. man begets man), and (3) & (4) are privations of (1) and (2).

There are three kinds of substance: (a) the matter, which is a “this” by being [DY OBJ]: He denies that matter is a “this” above; (b) the nature (a “this” and a state that it moves towards); and (c) the particular composite substance (e.g. Socrates or Callias). [Plato was not far wrong when he said that there are as many Forms as there are kinds of natural things (were there Forms).] Moving/Efficient causes precede their effects, but formal causes are simultaneous with their effects (EX1: when a man is healthy, health exists; EX2: the shape of a bronze sphere exists at the same time as the bronze sphere). Does any form survive afterwards? Yes, in some cases (e.g. the soul – at least reason; it is impossible that all soul should survive).

4 Causes/Principles in a Sense Different and the Same; All Things have and do not have the Same Elements; Moving/External Causes; First Mover (1070a-b). The causes/principles of different things are different, but if one speaks universally and analogically, they are the same for all. If they’re the same for all, it is paradoxical (because relatives and substances would proceed from the same elements, and there is no common element); and all things cannot have the same elements because none of the elements can be the same as that which is composed of the elements (e.g. a or b cannot be the same as ba). (The intelligibles, e.g. unity or being, are not elements either; these are predicable of each of the compounds too.) None of the elements would be either a substance or a relative; but it must be one or other. All things then have not the same elements.

In a way, all things have the same elements, and in a way, they have not. Different things have different elements; so all things do not have the same elements; but analogically there are three principles: the form, privation, and matter; so they have the same elements. (Each of these is different for each class, e.g. in color they are white, black, and surface; and light, darkness, and air produce day and night.)

Since there are external causes, i.e. the moving cause, that which moves a thing or makes it rest is a principle and a substance. So analogically there are three elements, and four causes and principles; but the elements and primary moving causes are each different in different things. EXs: Health, disease, body; the moving cause is the medical art. Form, disorder of a particular kind, bricks; the moving cause is the building art. Since the moving cause in the case of natural things is, for instance man, and in the products of thought it is the form or its contrary, there are in a sense three causes, while in a sense there are four. For the medical art is in some sense health, and the building art is the form of a house, and man begets man; further, besides these there is that which as first of all things moves all things.

5 Substance can Exist Apart and Non-Substances Cannot; Analogically Identical Things are Principles; Individual is the Source of Individuals; Causes are Analogically the Same; the First Cause of All Things (1070b-1071b). Substances can exist apart and non-substances cannot. So all things have the same causes (e.g., probably soul and body, or reason, desire, and body), because, without substances, affections and movements do not exist.

Analogically identical things are principles, i.e., actuality and potency; but these also are not only different for different things but also apply in different senses to them (depending on the matter, form, privation or composite).

Some causes can be expressed in universal terms, and some cannot. The primary principles of all things are the actual primary “this” and another thing that exists potentially. The universal causes, then, of which we spoke do not exist. The individual is the source of the individuals; while man is the cause of man universally, there is no universal man.

Causes are analogically the same because matter, form, privation, and the moving cause are common to all things; and the causes of substances may be treated as causes of all things in this sense, that when they are removed all things are removed; that which is first in respect of fulfillment is the cause of all things. But in another sense there are different first causes (viz. all the contraries that are neither stated as classes nor spoken of in several ways; and, further, the matters of different things are different).
6 Immoveable Substance is Necessarily Eternal, Without Matter, and an Actuality; Criticisms of Plato and Leucippus; Actuality is Prior to Potentiality; Aristotle’s View of Creation (of Eternality and Generation and Destruction) (1071b-1072a). Unmovable substance [DY: See Ch. 1 of this Book] is necessarily eternal. Substances are the first of existing things, and if they are all destructible, all things are destructible. But it is impossible that movement should either come into being or cease to be; it must always have existed. (Nor can time come into being or cease to be; for there could not be a before and an after if time did not exist.) Movement is continuous just as time is; for time is either the same thing as movement or an attribute of movement. There is no continuous movement except circular movement in place.

If there is something that is capable of moving things or acting on them, but is not actually doing so, there will not be movement; that which has a capacity need not exercise it. [So positing eternal Forms doesn’t help, unless they have some principle in them that can cause movement; and even this is not enough, because if it does not act, there will be no movement. {DY OBJ: Plato would say that the Form of Motion is the reason that anything can move; Motion Itself does not need to move in order to perceptible things to move, and the gods created time when they began the rotations of the universe; so the gods were actually moving. Interestingly, Aristotle himself posits that an eternal God is the First, Unmoved Mover, so we must ask what the difference is here, since his God and Plato’s Forms are eternal.} Even if it acts, this will not be enough, if its substance is potentiality; there will not be eternal movement; that which is potentially may possibly not be. There must be a principle, whose very substance is actuality. These substances must be without matter and eternal, so they must be actuality.

Difficulty: If it is true that not everything that is able to act acts, and potentiality is prior so, nothing at all will exist; it is possible for things to be capable of existing but not yet to exist. Even if we generate the world from night (as mythologists) or hold that all things were together (natural philosophers), the same impossible result ensues. How will there be movement, if there is no actual cause? Matter will surely not move itself.

This is why Leucippus and Plato (e.g.) suppose eternal actuality; they say there is always movement. But why and what this movement is they do not say. [DY: See my last comment; we don’t have enough text to attempt a good defense of Leucippus here.], nor, if the world moves in this way or that, do they tell us the cause of its doing so [DY: Plato discusses ten kinds of motion in his Laws: he states that the heavens are revolving around the gods, and that these come from God, and the Good is the source of All Things, including Forms. So it is not true that Plato says nothing about this motion. Moreover, Plato holds that the Earth is a god, and hence moves itself, just as a soul does, with regularity. (Aristotle must answer this question as well.) We do not have enough info on Leucippus.]

That actuality is prior to potentiality is testified by Anaxagoras (for his thought is actuality), Empedocles (love and strife), and by Leucippus, Democritus and others (“there is always movement”).

And chaos or night did not exist for any infinite time, but the same things have always existed (either passing through a cycle of changes or in some other way), since actuality is prior to potentiality. If there is a constant cycle, something must always remain, acting in the same way. If there is to be generation and destruction, there must be something else (X) that is always acting in different ways. X must act in one way in virtue of itself, and in another (Y) in virtue of something else (either of a third agent (Z) or of X). But it must be in virtue of X. Otherwise, this causes the motion both of Z and Y. X was the cause of eternal movement; and something else is the cause of variety, and evidently both together are the cause of eternal variety.

7 The Heavens are Eternal; The First Mover Necessarily Exists, is Good and a First Principle that Causes Nature and the Heavens; Thought Thinking Itself; God’s Existence and Many Qualities (1072a-1073a). We can solve these difficulties [DY: in the previous chapter] with this account [DY: See the last underlined account immediately above]. So there is something that is always moved with an unceasing motion, which is motion in a circle (in theory and in fact). So the first heavens must be eternal. There is also something that moves them. Since that which is moved and moves is intermediate, there is a mover which moves without being moved, being eternal, substance, and actuality. [The (primary) objects of desire and thought move in this way; they move without being moved and so are the same. The apparent good is the object of appetite, and the real good is the primary object of wish. But desire follows opinion rather than opinion
desired; the thinking is the starting-point. Thought is moved by the object of thought, and one side of the list of opposites is in itself the object of thought; in this list, substance is first, and in substance, that which is simple and exists actually. But the good, also, and that which is in itself desirable are on this same side of the list; and the first in any class is always best, or analogous to the best. {DY OB: So simple substance is first, but good and intrinsically desirable thing(s) are below that? How can the good be the best then, if not first? } That that for the sake of which is found among the unmoveables is shown by making a distinction; for that for the sake of which is both that for which and that towards which. So the unmovable produces motion by being loved, and it moves the other moving things. If something is moved it is capable of being otherwise than as it is. So if the actuality of the heavens is primary motion, then in so far as they are in motion, in this respect they are capable of being otherwise, in place, even if not in substance. The substance – that moves while itself unmoved, and existing actually – can in no way be otherwise than as it is. The first mover produces circular motion (the first kind of spatial motion that is the first kind of change). So the first mover of necessity exists; since it is necessary, it is good, and so a first principle. (The necessary is: (1) that which is necessary because it is contrary to impulse, (2) that without which the good is impossible, and (3) that which cannot be otherwise but is absolutely necessary.)

On this first principle depend the heavens and the world of nature. Its life is such as the best that we enjoy, and enjoy for only a short time. It is ever in this state (which we cannot be), since its actuality is also pleasure. (And therefore waking, perception, and thinking are most pleasant, and hopes and memories are so because of their reference to these.) Thought in itself deals with that which is best in itself, and that which is thought in the fullest sense with that which is best in the fullest sense. Thought thinks itself because it shares the nature of the object of thought; it becomes an object of thought in coming into contact with and thinking its objects, so that thought and object of thought are the same. {DY OB: If there is thinker and thought, this is dual; how can thinking and the object of thought be the same? Granted, we can think about our thoughts or thinking, but that is thinking about thinking, and there arguably is still a dual nature here. } That which is capable of receiving the object of thought – i.e. the substance – is thought. {DY OB: So, since knowledge is of universals, universals are thoughts and substances, even though they are not “thises” as Aristotle states? Or is substance not thought but the act of thought? Then substance is not a “this” but an action, according to Aristotle. } Thought is active when it possesses this object [or essence, of thought]. So actuality is the divine element that thought seems to contain, and the act of contemplation is what is most pleasant and best. If God is always in that good state in which we sometimes are, this compels our wonder. God is in a better state. Life also belongs to God; the actuality of thought is life, and God is that actuality; and God’s essential actuality is life most good and eternal. So God is a living being, eternal, most good, and life and duration continuous and eternal belong to God; for this is God.

Thus, there is a substance that is eternal, unmovable, and separate from sensible things. This substance cannot have any magnitude, is without parts, and indivisible. It produces movement through infinite time, but nothing finite has infinite power. It is also impassive and unalterable; all the other changes are posterior to change of place.

8 The Number of Eternal Unmovable Separate Substances; Astronomy Studies Perceptible but Eternal Substance; 55 Planetary Movements/Spheres; All Movement is for the Sake of the Stars; There is but One Heaven; The Stars are Gods (1073a-1074b). Does one such substance or how many? Others (e.g. Plato) have said nothing clear about this.

The first principle or primary being is not movable either in itself or accidentally, but produces the primary eternal and single movement. Since that which is moved must be moved by something, the first mover must be in itself unmovable, eternal movement must be produced by something eternal and a single movement by a single thing, and since we see that besides the simple spatial movement of the universe, which we say the first and unmovable substance produces, there are other spatial movements (the planets) that are eternal (the body which moves in a circle is eternal and unresting as argued in the Physics VIII.8-9), each of these movements must be caused by a substance unmovable in itself and eternal. That which is prior to a substance must be a substance. So there must be eternal, unmovable, magnitude-less substances that are of the same number as the movements of the stars.
In the number of movements of heavenly bodies we reach a problem that must be treated from the standpoint of astronomy (the mathematical science most akin to philosophy), since it speculates about perceptible but eternal substance (the other mathematical sciences, i.e. arithmetic and geometry, treat of no substance). The movements are more numerous than the bodies that are moved; for each of the planets has more than one movement. We’ll examine what some of the mathematicians say about this.

[Aristotle here reviews Eudoxus and Callippus’ views.]

But it is necessary that for each of the planets there should be [he has a lot of reasoning here to conclude that the number of spheres of planetary motion is:] fifty-five. And if one were not to add to the moon and to the sun the movements we mentioned, all the spheres will be forty-nine.

If everything that moves is for the sake of that which is moved, and every movement belongs to something that is moved, no movement can be for the sake of itself or of another movement, but all movements must be for the sake of the stars. (If a movement is to be for the sake of a movement, this latter also will have to be for the sake of something else; so since there cannot be an infinite regress, the end of every movement will be one of the divine bodies which move through the heaven.)

There is but one heaven. (The unmovable first mover is one both in formula and in number; so that which is moved always and continuously is one alone; therefore there is one heaven alone.)

Our most remote forefathers had a myth that these substances are gods and that the divine encloses the whole of nature. Later, they said these gods are in the form of men or like some of the other animals. But the view that the first substances are gods is an inspired utterance.

9 What makes Divine Thought Divine; The Divine must Think about the Divine/Precious/Immutable; It is a Thinking on Thinking; Thinking and the Object of Thought are Identical for the Divine (1074b-1075a).

The nature of the divine thought involves certain problems; thought is held to be the most divine of phenomena, but what must thought be in order to be divine? If it thinks nothing (like one asleep), what is there here of dignity? If it thinks, but this depends on something else, it cannot be the best substance; it is through thinking that its value belongs to it. Whether its substance is the faculty of thought or the act of thinking, what does it think? Either itself or something else; and if something else, either the same always or something different. It thinks that which is most divine and precious, and it does not change; for change would be change for the worse, and this would be already a movement. First, if it is not the act of thinking but a capacity, it would be reasonable to suppose that the continuity of its thinking is wearisome to it. Second, there would be something else more precious than thought (i.e. that which is thought). Both thinking and the act of thought will belong even to one who has the worst of thoughts. So if this ought to be avoided (and it ought, for there are even some things which it is better not to see than to see), the act of thinking cannot be the best of things. So it must be itself that thought thinks (since it is the most excellent of things), and its thinking is a thinking on thinking.

Knowledge, perception, opinion, and understanding always have something else as their object, and themselves only by the way. If thinking and being thought are different, in respect of which does goodness belong to thought? Being an act of thinking and being an object of thought are not the same. In some cases the knowledge is the object. Since thought and the object of thought are not different in the case of things that have not matter, they will be the same (i.e. the thinking will be one with the object of its thought).

Is the object of the thought composite? Everything that is matter-less is indivisible. As human thought (the thought of composite objects) is in a certain period of time, so throughout eternity is the thought that has itself for its object.

10 The Universe Contains the Highest Good as Separate by Itself and as the Order of its Parts; OBJs against Opponents (1075a-1076a). In which way does the nature of the universe contain the (highest) good: as something separate and by itself, or as the order of the parts? Probably in both ways, as an army does. The good is found both in the order and in the leader, and more in the latter; he does not depend on the order but it depends on him. All things are ordered together somehow, but not all alike; and the world is such that everything is connected and ordered together to one end.
Many impossible or paradoxical results confront those who hold different views from our own.

[Aristotle reviews and details here arguments against his opponents’ views, including Empedocles, Anaxagoras, and Plato. He concludes this chapter with:] “The rule of many is not good; let there be one ruler.” (Iliad II 204)

BOOK XIII [M, or Mu]

1 How are the Objects of Math Substances? Are Ideas Substances? (1076a). Since our inquiry is whether there is immovable and eternal substance besides the sensible substances (and, if there is, what it is), we must first consider what is said by others; for one must be content to state some points better than one’s predecessors, and others no worse.

Two prevalent opinions: (1) the objects of mathematics (numbers, lines, and so on) are substances, and (2) the Ideas are substances. First we must consider the objects of mathematics, leaving aside whether they are Ideas or not for now; then we must separately consider the Ideas themselves in a general way; the greater part of our account must attack whether the substances and the principles of existing things are numbers and Ideas.

First, then, how do objects of mathematics exist?

2 Mathematical Objects cannot Exist in Sensible Things; but they cannot Exist Separately; the Same Goes for Numbers; Modes of Generation of Mathematical Objects; Are Lines Substances? Mathematical Objects are Prior in Formula (1076a-1077b). It is impossible for mathematical objects to exist in sensible things because (as we’ve already argued): (1) it is impossible for two solids to be in the same place; and (2) according to the same argument all the other powers and characteristics also should exist in sensible things (none of them existing separately). Further, on this theory it is impossible for any body whatever to be divided; it would have to be divided at a plane, and the plane at a line, and the line at a point, so that if the point cannot be divided, neither can the line, and if the line cannot, neither can the plane nor the solid. (If the sensible things are divided the others will be divided too, or else not even the sensible things can be divided.)

It is impossible that mathematical entities should exist separately. If besides the sensible solids there are to be other solids that are separate from and prior to the sensible solids, then besides the planes there must also be other and separate planes, points, and lines. But if these exist, then besides the planes, lines, and points of the mathematical solid there must be others that are separate. The incomposite is prior to the compound; and if there are insensible bodies prior to the sensible bodies, then the planes that exist by themselves must be prior to those that are in the motionless solids. So these will be planes and lines other than those that exist along with the separate mathematical solids (which themselves exist along with the mathematical solids, while the others are prior to the mathematical solids). The accumulation becomes absurd; with which of these, then, will the mathematical sciences deal? Certainly not with the planes, lines, and points in the motionless solid; for science always deals with what is prior. The same account will apply also to numbers; there will be another set of units apart from each set of points, and also apart from each set of realities, from the objects of sense and again from those of thought; so there will be various classes of mathematical numbers.

Further difficulties: How is it possible that a heaven and its parts (or indeed anything which has movement) should exist apart from the sensible heaven? And the objects of optics and harmonics will exist apart; there will be voice and sight besides the sensible or individual voices and sights. So the other senses and their objects will exist apart; why should one set of them do so and another not? Then animals also will exist apart, since the senses will.

What will make mathematical magnitudes one?

The modes of generation of the objects of mathematics show that we are right. The dimension first generated is length, then comes breadth, lastly depth, and the process is complete.

Body is a sort of substance that has completeness in a sense. But how can lines be substances? Neither as a form or shape, as the soul perhaps is, nor as matter, like body.
Grant that objects of mathematics are prior in formula. Still not all things that are prior in formula are prior in substance. E.g., if attributes, such as moving or white, do not exist apart from their substances, the white is prior to the white man in formula, but not in substance. It cannot exist separately, but is always along with the compound thing (the white man). So neither is the result of abstraction prior nor that which is produced by adding posterior (e.g., it is by adding to the white that we speak of the white man).

So the objects of mathematics are not substances in a higher sense than bodies are, they are not prior to sensibles in being (but only in formula), and they cannot in any way exist separately. But since they could not exist in sensibles either, they either do not exist at all or exist in a special way (but not without qualification).

3 Formulae/Demonstrations of Sensible Magnitudes; Mathematical Objects Exist Without Qualification; Attributes Belong to Things as Lengths and Planes; Mathematics deals with the Beautiful and the Good (1077b1078b). It is possible that there are both formulae and demonstrations about sensible magnitudes (not as sensible but as possessed of certain definite qualities). As there are many formulae about things merely considered as in motion, apart from the essence (and accidents) of each such thing, and as it is not necessary that there should be either something in motion separate from sensibles, or a separate substance in the sensibles, so too in moving things there will be formulae and sciences which treat them not as moving but only as bodies, planes, lines, divisibles, indivisibles having position, or indivisibles.

Since separable and inseparable things (e.g. moving things) exist without qualification, the objects of mathematics exist without qualification. (And other sciences too deal with such and such a subject essentially and without qualification – e.g. with the healthy if it treats things as healthy, with man if as man. So too is it with geometry; if its subjects happen to be sensible, though it does not treat them as sensible, the mathematical sciences will not for that reason be sciences of sensibles – nor of other things separate from sensibles.

Many properties attach to things in virtue of their own nature as possessed of some such property; e.g., there are attributes peculiar to the animal as female or as male, yet there is no female nor male separate from animals. So there are attributes that belong to things merely as lengths or as planes. A science that abstracts from the magnitude of things and/or movement (and deals with primary, uniform movement) is more precise. (The same is true of harmonics, optics, and mechanics.) Thus if we suppose things separated from their attributes and make any inquiry concerning them as such, we shall not be in error.

We shall investigate as separate what is not separate, as the arithmetician/geometers do. A man as man is one indivisible thing; and the arithmetician supposes one indivisible thing, and then considers whether any attribute belongs to a man as indivisible. But the geometer treats him neither as man nor as indivisible, but as a solid. Geometers speak correctly since they talk about existing things, and their subjects do exist (being exists not only in fulfillment but also as matter).

Since the good (always implies conduct as its subject) and the beautiful (found also in motionless things) are different, it is not true that mathematics say nothing of the beautiful or the good: these sciences say/prove attributes that are their results or their formulae. The chief forms of beauty are order and symmetry and definiteness, which the mathematical sciences demonstrate in a special degree. Since these (e.g. order and definiteness) are obviously causes of many things, these sciences must treat the beautiful as in some sense a cause.

4 History and Criticisms of Plato’s Ideas/Forms (1078b1079b). Re: the Ideas (leaving out the nature of numbers for now), as the theory was originally understood. Platonists were persuaded by Heraclitean doctrine that all sensible things are ever passing away, so if knowledge or thought is to have an object, there must be some other and permanent entities, apart from those which are sensible; there can be no knowledge of things which are in a state of flux. Socrates occupied himself with the excellences of character, and became the first to raise the problem of universal definitions of them; he sought the essence so he could deduce (and the essence is the starting-point of deductions). Two things may be fairly ascribed by Socrates: inductive arguments and universal definition, both concerned with science’s starting-point. But Socrates did not make the universals or the definitions exist apart; Platonists gave them separate existence and called these Ideas.

They thought there must be Ideas of all things that are spoken of universally, almost as if a man wished to count certain things, and couldn’t count them when they were few, but multiplied them and then counted
There are many criticisms of the Forms, and some of these are repeats of earlier criticisms. Aristotle hasn’t shown what Forms there are of non-substances; he’s asserted them, and Plato would claim that Forms are substances, even though there is a Form of Beauty, which Aristotle would call an attribute. This is a big reason why Aristotle denies Forms exist (due to Plato’s ontology not including his categories).

If they can be shared in, there must be Ideas of substances only. Forms are not shared in incidentally, but each Form must be shared in as something not predicated of a subject. (E.g. if a thing shares in the double itself, it shares also in eternal, but incidentally; for the double happens to be eternal.) So the Forms will be substance.

Aristotle hasn’t shown what Forms there are of non-substances; he’s asserted them. And Plato would claim that Forms are substances, even though there is a Form of Beauty, which Aristotle would call an attribute. This is a big reason why Aristotle denies Forms exist (due to Plato’s ontology not including his categories).

The same names indicate substance in this and in the ideal world (doesn’t “there is something apart from the particulars” = the one over many?). If the Ideas and the things that share in them have the same form, there will be something common: for why should 2 be one and the same in all the perishable 2’s, or in the 2’s which are many but eternal, and not the same in the 2 itself as in the individual 2? But if they have not the same form, they will have only the name in common (e.g. like calling both Callias and a piece of wood “man”).

Plato says that the sensibles resemble the Forms they partake in, so beautiful things, say, partake in Beauty, Being, Sameness, Likeness, Difference, Motion, and/or many other Forms all at once. Even according to Aristotle, universals are what each thing of that kind have in common, so there should be the “third man” being created on his view as well, if he treats his universals the same way in which he treats Plato’s Forms (i.e., by arguing that since sensibles of this kind have something in common, that creates a Form of that kind).

If the common formulae apply to the Forms, e.g. that plane figure and the other parts of the formula apply to the circle itself, but that what it is must be added, we must inquire whether this is not absolutely empty. For to what will this be added? To “center,” “plane,” or to all the parts of the formula? For all the elements in the substance are Ideas, e.g. animal and two-footed. Further, the added notion must be an Idea, like plane, a definite entity that will be present as genus in all its species. Plato would say that a perceptible circle is not what it is to be a circle; Circle Itself is what it is to be a circle; the perceptible circle resembles the Circle Itself; there is no need to add the Circle Itself to a formula, though it may itself have a formula. Moreover, there can be Forms of Planes or Lines as well, and I fail to see why this is a damning criticism of Plato’s Forms.

5 Further Criticisms of Forms (1079b-1080a). (10) What on earth do the Forms contribute to sensible things (either to eternal things or to those that come into being and cease to be); they cause neither movement nor any change in them. Plato would say that without Forms, the sensibles couldn’t/wouldn’t exist, so the Forms cause the sensible things in some way, and that would seem to be a contribution. Motion Itself causes motion, as do souls as self-movers, as Aristotle himself would say. (11) They help in no way towards the knowledge of other things (they are not even the substance of these, else they would have been in them).

According to Aristotle, substances are not in the substances; they are what the thing is, and attributes are in the subject/substance; so this point is incoherent], nor towards their being, at least if they are not in the individuals which share in them; then they might be thought perhaps to be causes, as white is for the white thing in which it is mixed.

None of the proofs of Forms is convincing; some are non-sequiturs; some prove more Forms than they initially accept. Many of the following are repeats of earlier criticisms.

1. According to the arguments from the sciences there will be Forms of all things of which there are sciences, and (2) if there is one attribute common to many things, there will be Forms even of negations, and (3) if thought has an object when the individual object has perished, there will be Forms of perishable things. (4) The most accurate arguments lead to Ideas of relations, of which they say there is no independent class, and (5) others involve the difficulty of the third man. (6) The arguments for the Forms destroy the dyad (which is more precious than the Forms to them); number is first and not the dyad (by their arguments), and the relative is prior to that and prior to the self-dependent.

(7) There will be Forms (according to their assumptions) not only of substances but also of many other things, and there are sciences of non-substances. But according to the necessities and opinions about the Forms, if they can be shared in there must be Ideas of substances only. Forms are not shared in incidentally, but each Form must be shared in as something not predicated of a subject. (E.g. if a thing shares in the double itself, it shares also in eternal, but incidentally; for the double happens to be eternal.) So the Forms will be substance.
Aristotle says there are ten kinds of being, so he must be sympathetic to this kind of explanation. Sensibles are a combination of the eternal Receptacle (see the Timaeus) into and out of which go the Form-copies of many Forms; so the Forms themselves are not in the sensibles—if they were, they’d have to change. And Aristotle needs to explain how the universal is not in the substance but somehow the universal accounts for the stability of an object. But this (Anaxagoras/Eudoxus) argument is wrong in many ways.

(12) All other things cannot come from the Forms in any of the ways that are usually suggested; e.g. to say that they are patterns and the other things share in them is to use empty words and poetical metaphors. For what is it that works, looking to the Ideas? [DY OBJ: The empty metaphor objection is above, and Plato would say that craftspeople and artists look to Forms to do their work; they’re looking to create the best physical working model of the concept that they see in their minds, and not the best physical model they can model after a) the best physical model that already exists, or b) broken models.] Any thing can both be and come into being without being copied from something else, so whether Socrates exists or not, a man like Socrates might come to be. This might be so even if Socrates were eternal. [DY OBJ: This assumes that people come from Forms of Individual people, and we’re not sure if Plato believed in these kinds of Forms, so this may be a Straw Man fallacy.] (13) There will be several patterns of the same thing, and thus several Forms, e.g. animal and two-footed, and also man-himself, will be Forms of man. [DY OBJ: The Forms Animal Itself and Man Itself are not identical, or Forms of the same thing; the former is what all animals have in common, and the latter is what all humans have in common.] (14) The Forms are patterns not only of sensible things, but of things-themselves also (e.g. the genus is the pattern of the species of the genus); therefore the same thing will be pattern and copy. [DY OBJ: Plato acknowledges as part of his theory of Forms that they “blend” – i.e., they partake of one another (see the Sophist). E.g., the Form Beauty partakes of Being because it exists, it partakes of Sameness because it is the same as itself; Difference because it is different than Justice, etc. So this criticism is puzzling.]

(15) It might be impossible that substance and that whose substance it is should exist apart; so how could the Ideas, being substances of things, exist apart? [DY OBJ: Just as Aristotelian universals are not identical to the primary substances of the same name, particular things only exist because of their relation to the relevant Form. They “exist apart” only in the sense that they are not identical to the particular thing, and would exist even if the particular of that kind did not exist.]

(16) In Plato’s Phaedo (100d) it is stated in this way – the Forms are causes both of being and of becoming. Yet though the Forms exist, still things do not come into being, unless there is something to move them; and many other things come into being (e.g. a house or a ring), of which they say there are no Forms. So even the things of which they say there are Ideas can both be and come into being owing to such causes as produce the things just mentioned, and not owing to the Forms. [DY OBJ: As stated above, Motion Itself causes motion, and the Form is said to cause its instances in some way, via Form-copies and the Receptacle. Next, Plato explicitly states that there are Forms of artifacts, such as awls and shuttles (Cratylus), beds, tables, and couches (Republic X); so why would he deny the Form of House exists?]

6 Numbers as Separable Substances and First Causes; Mathematical v. Ideal Number Counting; Pythagoreans, and Forms of Numbers (1080a-b). Re: numbers as separable substances and first causes of things: If number is a real thing and its substance is nothing other than just number, as some say, then either (i) there is a first in it and a second, each being different in kind (this is true of the units without qualification, and any unit is incomparable with any unit), or (ii) they are all directly successive (and any of them is comparable with any, as they say is the case with mathematical number); in mathematical number no unit is in any way different from another. Or (iii) some units must be comparable and some not (e.g. 2 is first after 1, and then 3 and so on), and the units in each number are comparable (e.g. those in the first 2 with one another, and those in the first 3 with one another, and so on); but the units in the 2 itself are not comparable with those in the 3 itself; and so on. So while mathematical number is counted thus: after 1, 2 (which consists of another 1 besides the former 1), and 3 (which consists of another 1 besides these two), and so on, ideal number is counted thus: after 1, a distinct 2 which does not include the first 1, and a 3 which does not include the 2, and so on. Or (iv) one kind of number is like the first that was named, one the mathematical kind, and one the ideal number.

These numbers must either be separable from things, or not separable but in sensible things (not in the way that we first considered, but in the sense that sensible things consist of numbers which are present in them)
– either some or all of them. These are of necessity the only ways in which the numbers can exist. And of
those who say that the 1 is the beginning, substance, and element of all things, and that number is formed from
the 1 and something else, almost every one has described number in one of these ways. Some say both kinds of
number exist, that which has a before and after being identical with the Ideas, and mathematical number being
different from the Ideas and from sensible things, and both being separable from sensible things; and others say
mathematical number alone exists, as the first of realities, separate from sensible things.

The Pythagoreans believe in one kind of number – the mathematical; only they say it is not separate but
sensible substances are formed out of it. They construct the whole universe out of numbers – only not numbers
consisting of abstract units; they suppose the units to have spatial magnitude. But they don’t explain how the
first 1 was constructed so as to have magnitude.

Another thinker says the first kind of number, that of the Forms, alone exists, and some say
mathematical number is identical with this.

The case of lines, planes, and solids is similar: Some think that those which are the objects of
mathematics are different from those which come after the Ideas; and of those who express themselves otherwise
some speak of the objects of mathematics and in a mathematical way (viz. those who do not make the Ideas
numbers nor say that Ideas exist); and others speak of the objects of mathematics, but not mathematically; for
they say that neither is every spatial magnitude divisible into magnitudes, nor do any two units make 2.

7 Comparable v. Non-Comparable Units; We cannot Differentiate the Units in Any Way (1080b-
1082b). Are the units are comparable or non-comparable, and if non-comparable, in which of the two ways we
distinguished? It is possible that any unit is non-comparable with any, and it is possible that those in the ideal 2
are non-comparable with those in the ideal 3, and, generally, that those in each primary number are non-
comparable with one another. If all units are comparable and without difference, we only get mathematical
number, and the Ideas cannot be the numbers. What sort of number will the ideal man or animal or any other
Form be? There is one Idea of each thing, e.g. one of ideal man and another one of ideal animal; but the similar
and undifferentiated numbers are infinitely many, so this 3 is no more the ideal man than any other 3. But if the
Ideas are not numbers, neither can they exist at all. From what principles will the Ideas come? Number comes
from the 1 and the indefinite dyad, and the principles/elements are said to be such of number, and the Ideas
cannot be ranked as either prior or posterior to the numbers.

If the units are totally non-comparable, number of this sort cannot be mathematical number, since that
consists of undifferentiated units. Nor can it be ideal number. 2 will not come first after 1 and the indefinite
dyad, because the units in the ideal 2 are generated at the same time. (Besides, if one unit is to be prior to the
other, it will be prior to the 2 composed of these; for when there is one thing prior and another posterior, the
compound of these will be prior to one and posterior to the other.)

Since the ideal 1 is first, and there is a 1 which is first among the others and next after the ideal 1, and
again a third which is next after the second and next but one after the first 1, the units must be prior to the
numbers by which they are named in counting (e.g. there will be a third unit in 2 before 3 exists, and a fourth
and a fifth in 3 before the numbers 4 and 5 exist). So the units are non-comparable in this way (though my
opponents deny this), even though it is impossible. It is reasonable that the units should have priority and
posteriority if there is a first unit and a first 1, and the 2’s also if there is a first 2; after the first it is reasonable
and necessary that there should be a second, and if a second, a third, and so on. But they make a first unit and
1, but not a second and a third, and a first 2, but not a second and a third.

It is impossible if all the units are non-comparable, that there should be an ideal 2 and 3; and similarly in
the case of the other numbers. Whether the units are undifferentiated or each differs from each, number must
be counted by addition (e.g. 2 by adding another one to the one, 3 by adding another one to the two, and so on).
So numbers cannot be generated (as my opponents do) from the dyad and the 1 (e.g. 2 becomes part of 3, and 3
of 4, and the same happens in the case of the succeeding numbers, but for them 4 came from the first 2 and the
indefinite 2, which makes it two 2’s other than the ideal 2; if not, the ideal 2 will be a part of 4 and one other 2
will be added). And similarly 2 will consist of the ideal 1 and another 1; but if this is so, the other element cannot
be an indefinite 2; for it generates a unit, but not a definite 2. Besides the ideal 3 and the ideal 2 how can there
be other 3’s and 2’s? How do they consist of prior and posterior units? All these doctrines are absurd and fiction,
and there cannot be a first 2 and then an ideal 3 (but there must be, if the 1 and the indefinite dyad are to be the elements). So it is impossible that all the units are non-comparable.

If the units are differentiated, each from each, these difficulties follow of necessity. They also follow if units in different numbers are differentiated, but those in the same number are alone undifferentiated from one another. E.g. in the ideal 10 there are ten units, and the 10 is composed both of them and of two 5's. But since the ideal 10 is not any chance number nor composed of any chance 5's (or even units), the units in this 10 must differ. For if they do not differ, neither will the 5's of which the 10 consists differ; but since they differ, the units also will differ. [DY: So far in this chapter, Aristotle has only raised issues with non-comparable units; in the following paragraphs, he finally begins to make statements and give his view]

As to the 2 being a thing apart from the two units, and the 3 a thing apart from the three units, how is this possible? Either by one's sharing in the other (as white man is different from white and man, for it shares in these), or when one is a differentia of the other (as man is different from animal and two-footed).

It follows that there are prior and posterior 2's, and similarly with the other numbers. Let the 2's in the 4 be simultaneous; yet these are prior to those in the 8, and as the 2 generated them, they generated the 4's in the ideal 8. So if the first 2 is an Idea, these 2's also will be Ideas. The same account applies to the units; for the units in the first 2 generate the four in 4, so that all the units come to be Ideas and an Idea will be composed of Ideas. So those things also, of which these are Ideas, will be composite (e.g. animals are composed of animals, if there are Ideas of them).

In general, to differentiate the units in any way is an absurd fiction (fiction = that which is brought in forcibly to suit a hypothesis). Unit differs from unit neither in quantity nor in quality, and number must be either equal or unequal (especially number that consists of abstract units); so if one number is neither greater nor less than another, it is equal; but in numbers, what is equal and in no wise differentiated is the same. If not, my opponents will have to say that even the 2's in the ideal 10 will be differentiated though they are equal, which is ridiculous.

If every unit plus another unit makes two, a unit from the ideal 2 and one from the ideal 3 will make a 2. This consists of differentiated units; and will it be prior to the 3, because one of the units is simultaneous with the 3, and the other is simultaneous with the 2. In general 1 and 1, whether the things are equal or unequal, is 2 (e.g. the good and the bad, or a man and a horse); but those who hold these views say that not even two units are 2.

If the number of the ideal 3 is not > the 2, this is surprising; and if ideal 3 > 2, there is a number in it = the 2, so that this is not different from the ideal 2. This is impossible if there is a first and a second number. Nor will the Ideas be numbers. If Ideas exist, my opponents who claim that the units must be different are right: The Form is unique; but if the units are not different, the 2's and the 3's also will not be different. So they must say that when we count “1, 2,” we do not add to the previous number; if we do, neither will the numbers be generated from the indefinite dyad, nor can a number be an Idea; one Idea will be in another, and all the Forms will be parts of one Form. So on this hypothesis they are right, but absolutely they are wrong: their view is very destructive, since they admit it leads to this difficult question – whether, when we count and say “1, 2, 3,” we count by addition or by partitions (both of which we do), so it is absurd to refer this to so great a difference of substance.

8 Differentia of a Number and Unit; Units do not Differ in Quality or Quantity; Number cannot Exist Separately; Ideal Number is Not Mathematical Number; Pythagorean view; Units and the Great and Small; Number is not Infinite or Finite(?); Is the Ideal 1 without Position? (1083b-1085a).

What is the differentia of a number (and of a unit, if it has a differentia)? Units must differ either in quantity or in quality; and neither of these seems to be possible. Number as number differs in quantity. If the units also differed in quantity, number would differ from number, though equal in number of units. Are the first units greater or smaller, and do the later ones increase or diminish? All these are irrational suppositions. Neither can they differ in quality. No attribute can attach to them; even to numbers quality is said to belong after quantity. [DY OBJ: Why can’t the quality of greater or smaller attach to 6 v. 3, or 3 v. 6, respectively? And isn’t he saying that units can’t have quality AND that quality belongs to number after quantity? Incoherent?]

Quality
could not come to them either from the 1 or from the dyad; the former has no quality, and the latter gives quantity; its nature is to cause things to be many.

If the Ideas are numbers, the units cannot all be comparable, nor can they be non-comparable in either of the two ways. Those are wrong who deny Ideas, either without qualification or as identified with certain numbers, but think the objects of mathematics exist and the numbers are the first of real things, and the ideal 1 is the starting-point of them. (But if the 1 is the starting-point, numbers must rather be what Plato said, and there must be a first 2 and 3, and the numbers must not be comparable with one another. But if we suppose this, many impossible results follow, as stated. But either this or the other must be the case, so that if neither is, number cannot exist separately.

The worst view is that ideal and mathematical number is the same. Two mistakes: (1) Mathematical number cannot be of this sort, but the proponent must make suppositions peculiar to himself; and (2) he must admit all the consequences that confront those who speak of numbers as Forms.

The doctrine of the Pythagoreans is good (they don’t think numbers can exist separately), but has other difficulties: Indivisible magnitudes do not exist; units have no magnitude; and how can a magnitude be composed of indivisibles? Arithmetical number consists of abstract units, but these thinkers identify number with real things (bodies) as if they consisted of those numbers.

If number is necessarily a self-subsistent real thing that should be conceived in one of these ways that have been mentioned, and if it cannot be conceived in any of these, then number doesn’t have a separable nature (as some hold).

Does each unit come from (i) the great and the small, equalized, or (ii) one from the small, another from the great? If (ii), neither does each thing contain all the elements, nor are the units without difference; in one there is the great and in another the small, which is contrary in its nature to the great. But if (i) is true, how will the 2 (one thing) consist of the great and the small, or how will it differ from the unit? The unit is prior to the 2; when it is destroyed the 2 is destroyed. It must be the Idea of an Idea since it is prior to an Idea, and it must have come into being before it. From what, then? Not from the indefinite dyad, for its function was to double.

Number must be either infinite or finite; these thinkers think of number as capable of existing separately, so it is impossible that neither of those alternatives should be true. It cannot be infinite; infinite number is neither odd nor even, but the generation of numbers is always the generation either of an odd or of an even number. If every Idea is an Idea of something, and the numbers are Ideas, infinite number will be an Idea of something, either of some sensible thing or of something else. Yet this is impossible. [DY OB]: Why can’t there be an Infinite Itself? Why can’t the universe be infinite, so it partakes of Infinite Itself, even just in the sense of time and not in space?

If number is finite, how far does it go and why? Number cannot go only up go 10, as some say, because the Forms will run short (e.g. if 3 is Man Itself, what number will be the Horse Itself?). It is paradoxical also that there should be an Idea of 10, but not of 11, nor of the succeeding numbers. [Other difficulties are mentioned.]

If number can exist separately, one might ask which is prior: 1, 2, or 3? Inasmuch as the number is composite, 1 is prior, but inasmuch as the universal and the form is prior, the number is prior; each of the units is part of the number as its matter, and the number acts as form. 1 the starting-point because, e.g., the right angle is thought to be prior to the acute (you need the former to define the latter – which is form), and the acute to the right (two acute angles could produce a right angle – which is matter), and each is one. But this is impossible (one kind of starting-point is the form or substance, the other the part or matter). Each is in a way one – in truth, each unit exists potentially (if the number is a unity and not like a heap, i.e. if different numbers consist of different units, as they say), but not actually.

If the ideal 1 must be merely without position (for it differs in nothing from other 1’s except that it is the starting-point), and the 2 is divisible but the unit is not, the unit must be more like the ideal 1. But if so, it must be more like the unit than the 2; so each of the units must be prior to the 2. But they deny this; at least they generate the 2 first. And if the ideal 2 is a unity and the ideal 3 is one also, both form a 2. From what, then, is this 2 produced?

9 Do the Units of 2 and 3 Succeed the Ideal 1? Is 2 or the Units in 2 Prior? Difficulties for Many Views of Universals, Numbers consisting of the One and Plurality, Etc.; Numbers consist of
Indivisibles – Magnitudes do Not; Numbers and Magnitudes Cannot Exist Apart from Things; Separation of the Universal/Form is the Main Problem with Plato’s View (1085a-1086b). Since the units between which there is nothing (e.g., those in 2 or in 3) are successive, do they succeed the ideal 1 or not, and of the terms that succeed it, is 2 or either of the units in 2 prior?

Similar difficulties occur for the classes of things posterior to number (the line, plane, and body). Some construct these out of the forms of great and small (e.g., lines from long and short, planes from broad and narrow; masses from deep and shallow). These principles are severed from one another, unless the principles of these imply one another in such a way that the broad and narrow is also long and short; but if this is so, the plane will be a line and the solid a plane. The same happens as in regard to number; these things are attributes of magnitude, but magnitude does not consist of these, any more than the line consists of straight and curved, or solids of smooth and rough.

All these difficulties arise with regard to species of a genus, when one posits the universals: is it the ideal animal or something other than the ideal animal that is in animals? True, if the universal is not separable, this will present no difficulty; but if the 1 and the numbers are separable as my opponents say, it is not easy (if even possible) to solve the difficulty. When we apprehend the unity in 2, or in general in a number, do we apprehend a thing-in-itself or something else?

Some generate magnitudes from matter of this sort, others from the point (which is not 1 but something like 1) and from other matter like plurality, but not identical with it; nonetheless the same difficulties occur. If the matter is one, line and plane and solid will be the same; from the same elements will come one and the same thing. But if the matters are more than one, and there is one for the line and a second for the plane and another for the solid, they either imply one another or not, so that the same results will follow even so; for either the plane will not contain a line or it will be a line.

They don’t explain how number can consist of the one and plurality, so the same objections arise as confront those who construct number out of the one and the indefinite dyad. The one view generates number from the universally predicated plurality, and not from a particular plurality; and the other generates it from a particular plurality, but the first; for 2 is said to be a first plurality. So there is practically no difference, but the same difficulties will follow: is it intermixture or position or fusion or generation? Above all, if each unit is one, what does it come from? Each is not the one-in-itself. So it must come from the one-in-itself and plurality, or a part of plurality. To say that the unit is a plurality is impossible, for it is indivisible; and to generate it from a part of plurality involves many other objections; for each of the parts must be indivisible (or it will be a plurality and the unit will be divisible) and the elements will not be the one and plurality; for the single units do not come from plurality and the one.

What about the point, i.e. the element out of which they make magnitudes? Surely this is not the one and only point; Out of what is each of the other points formed? Not of some distance together with the point-in-itself. Nor can parts of a distance be indivisible parts, as the parts of plurality out of which the units are said to be made are indivisible; number consists of indivisibles, but magnitudes do not.

All these objections show that number and magnitudes cannot exist apart from things.

Re: those who believe in the Ideas, one might survey at the same time their way of thinking and the difficulties into which they fall. They at the same time treat the Ideas as universal, and again as separable and individual (this is not possible has been shown before). Those who say substances are universal combined these two views in one because they did not make them identical with sensible things [DY OB]: But even for Aristotle, universals are not sensible things]. They thought that the sensible particulars were in a state of flux and none of them remained, but that the universal was apart from these and different. As stated, Socrates gave the impulse to this theory by means of his definitions, but did not separate them from the particulars; and in this he thought rightly, in not separating them. Without the universal it is not possible to get knowledge, but the separation is the cause of the objections that arise with regard to the Ideas. His successors, treating it as necessary, if there are to be substances besides the sensible and transient substances, that they must be separable, had no others, but gave separate existence to these universally predicated substances, so it followed that universals and individuals were almost the same sort of thing. This is one difficulty in the view.
10 Difficulty if We Posit Separate Substances or if We Do Not; Difficulty with Individual and Universal Separate Substance; Knowledge is Universal Potentially (as Matter) and Actually (as a “This”) (1086b-1087a). A difficulty whether the Ideas exist or not: If we do not posit separate substances (in the way in which particular things are said to be separate), we shall destroy that sort of substance that we wish to maintain; but if we do posit separate substances, how are we to conceive their elements and their principles?

If they are individual and not universal, real things will be equal to the same number as the elements, which will not be knowable. Let the syllables in speech be substances, and their elements be elements of substances; then there must be only one ba and one of each of the syllables, if they are not universal and the same in form but each is one in number, a “this,” and not homonymous (and each thing-in-itself is one). If the syllables are unique, so are the parts of which they consist; e.g. there will not be more a’s than one, nor more than one of any of the other elements, on the same principle on which none of the syllables can exist in the plural number. But if this is so, there will not be other things existing besides the elements, but only the elements. The elements will not be even knowable because they are not universal, and knowledge is of universals. This is clear both from demonstrations and from definitions; for we do not conclude that this triangle has its angles equal to two right angles, unless every triangle has its angles equal to two right angles, nor that this man is an animal, unless every man is an animal.

But if the principles are universal either the substances composed of them are universal too, or non-substance will be prior to substance; for the universal is not a substance, and the element or principle is universal, and the element or principle is prior to the things of which it is the principle or element.

All these difficulties follow naturally, when they make the Ideas out of elements and claim that there are separate unities apart from the substances that have the same form. But if in the case of the elements of speech, the a’s and the b’s may quite well be many and there need be no ideal a and ideal b besides the many, there may be an infinite number of similar syllables. That (1) all knowledge is universal, so the principles of things must also be universal and not separate substances, presents indeed the greatest difficulty, but (1) is in a sense true and in a sense not. Knowledge (like knowing) is spoken of in two ways – as potential and as actual. The potentiality being (as matter) universal and indefinite, deals with the universal and indefinite; but the actuality, being definite, deals with a definite object (being a “this”, it deals with a “this”). Per accidens sight sees universal color, because this individual color that it sees is color; and this individual a that the grammarian investigates is an a. If the principles must be universal, what is derived from them must also be universal, as in demonstrations; so there will be nothing capable of separate existence (i.e. no substance). In a sense knowledge is universal, and in a sense it is not. [DY: I can’t tell how this is supposed to solve the problem: First, knowledge is of demonstrations Posterior Analytics, so that isn’t actually knowledge, since it’s of a universal (principle)? Second, by claiming that knowledge of an individual is really universal ignores Aristotle’s distinctions between being and quality or primary substance and secondary substance. Third, how did Aristotle show here that knowledge as actuality is of an individual, so there is something capable of separate existence? On the contrary, he seems to conclude that there is nothing capable of separate existence. Lastly, what happened to his arguments against substance being an individual and a real thing (second paragraph of this chapter), if actual knowledge is of the individual? How does this solve these problems?]

BOOK XIV [N or Nu]

1 No Contrary is the First Principle; Many Thinkers are Wrong about Generating Numbers from the Dyad, Unequal or Plurality, or the Substance of the One; One is Measure and Not a Number; The Unequal is not One Thing, and the Dyad an Indefinite Compound (1087a-1088b). All philosophers make the first principles contraries in natural things and in unchangeable substances. Since there cannot be anything prior to the first principle of all things, the principle cannot be the principle as being something else. (To suggest this is like saying that the white is the first principle, not as anything else but as white, but yet that it is predicatable of a subject, and is white as being something else; for that subject will be prior.) All things are generated from contraries as belonging to an underlying subject; a subject must be present in the case
of contraries, and no contraries can exist apart. So no contrary is the first principle of all things in the full sense; the first principle is something different.

Some thinkers generate numbers out of the dyad of the unequal (i.e. of the great and small); the other thinker we have referred to generates them out of plurality, while according to both it is generated by the substance of one. They do not describe the principles/elements rightly.

“One” means a measure. One is always some underlying thing with a distinct nature of its own (e.g. in the scale a quarter-tone, in magnitude a foot, in rhythms a beat or a syllable; and in weight a definite weight); and in the same way in all cases, in qualities a quality, in quantities a quantity; so the one is not, in any instance, in itself a substance. The one means the measure of some plurality, and number means a measured plurality and a plurality of measures. So one is not a number; for the measure is not measures, but both the measure and the one are starting-points. The measure must always be something predicable of all alike (e.g. if the things are horses, the measure is horse, and if they are men, man). If they are a man, a horse, and a god, the measure is perhaps living beings, and the number of them will be a number of living beings. If the things are man and white and walking, these will scarcely have a number, because all belong to a subject which is one and the same in number, yet the number of these will be a number of classes, or of some equivalent term.

Those who treat the unequal as one thing, and the dyad as an indefinite compound of great and small, say what is very improbable or impossible. These are modifications and accidents, rather than substrata, of numbers and magnitudes (the many and few of number, and the great and small of magnitude) like even and odd, smooth and rough, straight and curved. The relative is least of all a substance and a real thing because it alone has no proper generation, destruction, or movement, as in quantity there is increase and diminution, in quality alteration, in place locomotion, in substance simple generation and destruction. The matter of each thing, and therefore of substance, must be that which is potentially of the nature in question; but the relative is neither potentially nor actually substance. It is strange or rather impossible, to make non-substance an element in, and prior to, substance; for all the categories are posterior.

2 Eternal Things Cannot Consist of Elements; Refuting Parmenides; How is Being As Substance, Many? Why Other Thinkers are Wrong on “Many Substances” “Solutions”; Why Should We Think that Numbers Exist? Ideas as Numbers (1088b-1090a). Can eternal things consist of elements? If they do, they will have matter; for everything that consists of elements is composite. Elements cannot be eternal, since that which is capable of not existing is not eternal (as shown earlier). If that which we are now saying is true universally – that no substance is eternal unless it is actuality, and if the elements are matter that underlies substance, no eternal substance can have elements present in it, of which it consists.

Some thought that all things that would be one (Being itself), if one did not refute Parmenides: “For never will this be proved, that things that are not are.” They thought it necessary to prove that that which is not is; thus – of that which is and something else – could the things that are be composed, if they are many.

First, if “being” has many senses, what sort of one are all the things that are, if non-being is to be supposed not to be? Is it the substances that are one, or the other categories as well, so that the “this” and the “such” and the “so much” and the other categories that indicate each some one thing will all be one? It is strange or impossible that a single nature should bring it about that part of that which is is a “this”, part a “such”, part a “so much”, part somewhere.

Second, of what sort of non-being and being do the things that are consist? “Non-being” has many senses as “being”; and not being a man means not being a certain “this”, not straight is not being of a certain quality, not three cubits long is not being of a certain quantity. From what sort of being and non-being, then, do the things that are come to be many? He means by the non-being, the union of which with being makes the things that are many, the false and the character of falsity. Since non-being has as many senses as “being”, and besides this the false is said not to be and so is potential, generation proceeds from potential (e.g. man from that which is not man but potentially man, and white from that which is not white but potentially white), whether it is one thing that is generated or many.

How is being in the sense of substances many (e.g., the generated things are numbers, lines, and bodies)? Surely the indefinite dyad or the great and the small are not a cause of there being two kinds of white or many
colors or flavors or shapes; then these also would be numbers and units. But if they had attacked this point, they would have seen the cause of the plurality in substances also; for the cause is the same or analogous.

They should have inquired also how relatives are many and not one, but they focus on how there are many units besides the first 1, and not on how there are many unequals besides the unequal. Yet they use them and speak of great and small, many and few (from which proceed numbers), long and short (from which proceeds the line), broad and narrow (from which proceeds the plane), deep and shallow (from which proceed solids); and they speak of yet more kinds of relatives. What is the reason, then, why there is a plurality of these?

We must presuppose for each thing that which is it potentially; and this thinker also claims what is potentially a “this” and a substance but is not in itself being – that it is the relative (as if he had said the qualitative), which is neither potentially the one or being, nor the contradictory of the one nor of being, but one among beings. He should not have inquired about beings in the same category (how there are many substances or many qualities) but how beings as a whole are many; for some are substances, some modifications, some relations. In the categories other than substance, we must ask, how can there be many? Since they are not separable, qualities and quantities are many only because their substrate becomes and is many. There ought to be a matter for each category; only it cannot be separable from substances. It is possible to explain how the “this” is many things. So the difficulty is, how there are actually many substances and not one.

If the “this” and the quantitative are different, we are not told how and why the things that are many, but how quantities are many. All number means a quantity, and so does the unit, unless it means merely a measure or the indivisible in quantity. So if the quantitative and essence are different, we are not told whence or how essence is many; but if any one says they are the same, he has to face many inconsistencies.

Re: the numbers: what justifies the belief that they exist? To the believer in the Ideas they provide a cause for existing things, since each number is an Idea, and the Idea is to other things somehow or other the cause of their being; let us grant this. \([\text{DY OBJ: This contradicts Aristotle’s statement above that Plato held that mathematical objects and numbers were not Forms, but intermediates between Forms and perceptibles.}]\) But for the denier of Forms who posits mathematical number, why must we believe his statement that such number exists, and of what use is such number to other things? \([\text{DY OBJ: Doesn’t this imply that Aristotle, who denies Forms and believes in mathematical numbers, is wrong or at least must answer these questions as well (including the ones that follow this comment)?}]\) Neither does he who says it exists maintain that it is the cause of anything (he rather says it is a thing in itself), nor is it observed to be the cause of anything; for the theorems of arithmeticians will all be found true even of sensible things, as was said.

3 Those Who Believe that Ideas are Numbers are Wrong; Pythagoreans are Wrong; Number/Objects of Mathematics Contribute Nothing to One Another; Those Who Posit Forms and Objects of Mathematics as Numbers are Wrong; It is Impossible to Attribute Generation to Eternal Things (1090a–1091a). Those who think Ideas exist and are numbers take each to be one thing by setting each out apart from the many, so they try at least to explain somehow why numbers exist. Since their reasons are neither conclusive nor in themselves possible, one must not assert the existence of number. But the Pythagoreans, because they saw many attributes of numbers belonging to sensible bodies, supposed real things to be numbers – not separable numbers, but numbers of which real things consist. Why? Because the attributes of numbers are present in a musical scale, in the heavens, and in many other things. But those who say that mathematical number alone exists cannot according to their hypotheses say anything of this sort; indeed, they used to say that those numbers could not be objects of the sciences (as we hold). The objects of mathematics do not exist apart; if they existed apart, their attributes would not have been present in bodies. The Pythagoreans are wrong, since they construct natural bodies out of numbers, things that have lightness and weight out of things that have neither, and so seem to speak of another heaven and other bodies, not of the sensible. We can solve the difficulty of why, if numbers are in no way present in sensible things, their attributes are present in sensible things.

Some think points, lines, planes and solids are real, because the point is the limit and extreme of the line, the line of the plane, and the plane of the solid. Extremes are not substances, but rather all these things are mere limits. Even walking and movement in general has a limit, so on their theory this will be a “this” and a substance, which is absurd.
Another difficulty: All number and the objects of mathematics contribute nothing to one another, the prior to the posterior; if number did not exist, nonetheless magnitudes would exist for those who maintain the existence of the objects of mathematics only, and if magnitudes did not exist, soul and sensible bodies would exist. The believers in the Ideas construct magnitudes out of matter and number, lines out of 2, planes out of 3, solids out of 4, and so on. But will these magnitudes be Ideas, or what is their manner of existence, and what do they contribute to things? Ideas contribute nothing, as the objects of mathematics contribute nothing. So we should not unite the objects of mathematics with the Ideas.

Those who first posited two kinds of number, that of the Forms and the other which is mathematical, neither have said nor can say in the least how mathematical number is to exist and of what it is to consist. They place it between ideal and sensible number. If it consists of the great and small, it will be the same as ideal number. If he names some other element, he will be making his elements rather many. If the principle of each of the two kinds of number is a 1, unity will be something common to these. How is the one these many things, since my opponent holds that number cannot be generated except from one and the indefinite dyad?

All this is absurd, and conflicts both with itself the probabilities, and it is like Simonides' “long story”; the long story comes into play, like those which slaves tell, when men have nothing sound to say. The very elements (the great and the small) seem to cry out against the violence that is done to them; they cannot in any way generate numbers other than those got from 1 by doubling.

It is strange, nay impossible, to attribute generation to eternal things, as the Pythagoreans do: they say that when the one had been constructed, whether out of planes, surface, seed, or unnamed elements, immediately the nearest part of the unlimited began to be drawn in and limited by the limit. We will now leave them behind, because we are investigating the principles at work in unchangeable things; it is numbers of this kind whose genesis we must study.

4 Generation of Even/Odd Numbers; How are Elements/Principles Related to the Good/Beautiful? Objections Against Ideas as Numbers, Including that Bad Itself Must Exist (1091a-1092a). Some say there is no generation of the odd number, which evidently implies that there is generation of the even; and some say the even is produced first from unequals (the great and the small) when these are equalized. The inequality must belong to them before they are equalized. If they had always been equalized, they would not have been unequal before; for there is nothing before that which is always.

A difficulty: How are the elements and the principles related to the good and the beautiful? Is any of the elements such a thing as we mean by the good itself and the best, or not, because these are later in origin? [DY: Here Aristotle mentions a bunch of views, not quite stating that they are wrong or right.]

It would be strange if self-sufficiency and self-maintenance belongs primarily to that which is primary, eternal, and most self-sufficient in some other way than as a good. But it is only indestructible or self-sufficient because its nature is good. It is probably correct that the first principle is good; but it is impossible for this principle to be the one or, an element, and/or an element of numbers. Powerful objections arise: (1) All the units become identical with species of good, and there is a great profusion of goods. [DY OB: I think Plato can and does hold a distinction between One as unity, beyond being and One Itself, a form of one and a being] (2) If the Forms are numbers, all the Forms are identical with species of good. [DY OB: Plato says that every Form partakes in the Good, so this conclusion does not necessarily follow. The numbers might be Ideas and also partake of good, without being identical to the Good Itself] (3) If there are Ideas only of goods, the Ideas will not be substances; but if the Ideas are also Ideas of substances, all animals and plants and all things that share in Ideas will be good. [DY OB: Aristotle is begging the question, assuming his view of categories is correct; that good is a quality and not substance; if the essence of what good is, the nature that all good things have in common, exists, then Aristotle’s assumption is wrong.]

These absurdities follow, besides that the contrary element of the one, whether it is plurality or the unequal (i.e. the great and small) is the Bad-Itself. In this case, all things would partake of the Bad except the One Itself, and that numbers would partake of it in a more undiluted form than magnitudes, and the Bad would be the space in which the good is realized, and it would partake in and desire that which tends to destroy it; for contrary tends to destroy contrary. [DY OB: Aristotle is making questionable assumptions, such as whatever is not good is bad, which, if I am right in this criticism, commits the False Alternatives or Black or White fallacy]
Aristotle is ignoring the neither good nor bad, and the relatively good as well. Beautiful is not bad because it is not identical to the Good. Lastly, Plato accounts for badness by saying that it is possible for something to partake of Other Itself with respect to the Good; he does not need to be committed to the existence of Badness Itself, and Aristotle should have addressed this possibility here.] Lastly, if [as we said] the matter is potentially each thing (e.g. that of actual fire is that which is potentially fire), the bad will be just the potentially good. [DY OB]: I don’t see why this is a good objection to Plato’s view; the bad can be just the potentially good, or potentially bad, or potentially neither good nor bad. I also don’t see how the matter of an actual fire is potentially fire, especially according to Aristotle’s own distinctions and definitions of actuality and potentiality. All these objections follow, partly because they make every principle an element, partly because they make contraries principles, partly because they make the one a principle, partly because they treat the numbers as the first substances, and as capable of existing apart, and as Forms.

5 The Good Must be Among the First Principles Somehow; Place and Mathematical Solids; Number Cannot Come from its Elements by Intermixture or Juxtaposition; Numbers are Not the Causes of Substances or Being; Number is None of the Four Causes (1092a-b). If it is equally impossible not to put the good among first principles in this way, the principles are not being correctly described, nor are the first substances. Nor should we compare the principles of the universe to that of animals and plants, because the more complete always comes from the indefinite and incomplete (which also leads some to say that this is also true of the first principles of reality), so that the One Itself is not even an existing thing. The first principles from which these come exist and are complete (e.g. a man produces a man, and the seed is not first).

It is strange to generate place simultaneously with the mathematical solids (place is peculiar to the individual things, and hence they are separable in place, but mathematical objects are nowhere), and to say that they must be somewhere, but not say what the place is.

Those who say that numbers are the first existent things and produce elements need to say in which sense number comes from its elements.

Not by intermixture, because not everything is capable of intermixture, the production thereof is different, and on this view the one will not be separate or a distinct entity; but they want it to be so.

Not by juxtaposition, like a syllable, because the elements must have position (but he who thinks of the one and plurality must think of them apart); so number will be either a unit and plurality, or the one and the unequal.

Coming from certain things is (1) the certain things are still to be found in the product; or (2) they are not; in which sense does number come from these elements? Only things that are generated can come from elements that are present in them. Does number come from its elements as from seed? Nothing can come from that which is indivisible. Does it come from its contrary, its contrary not persisting? All things generated this way come from something else that does persist. Some say number is treated as coming from contraries (plurality or the unequal or 1 is equal). There will then be something else that persists, from which and from one contrary the compound is or has come to be. Why in the world do the other things that come from contraries, or that have contraries, perish (even when all of the contrary is used to produce them), while number does not?

It has in no sense been determined in which way numbers are the causes of substances and of being, either as limits (as points are of magnitudes). Is it because harmony is a ratio of numbers, and so is man and everything else? How are the attributes (white, sweet, and hot) numbers? The numbers are not the substance nor causes of the form; the ratio is the substance, while the number is the matter (e.g. the substance of flesh or bone is number only in this way, “three parts of fire and two of earth”). A number, whatever it is, is always a number of certain things, either of fire or earth or of units; but the substance is that there is so much of one thing to so much of another in the mixture; and this is no longer a number but a ratio of mixture of numbers, whether these are corporeal or of any other kind.

Number (i.e. number in general or the number that consists of abstract units), is none of the four causes (efficient, material, formal, or final).
6 Things do not Get Goodness Due to Numbers; All Things Cannot Share in Number; Numbers, Contraries, and Mathematical Relations are not Causes of Nature; Ideal Numbers do not Help Explain Music (1092b-1093b). What is the good that things get from numbers because their composition is expressible by a number, either by one that is easily calculable or by an odd number? In fact honey-water is no more wholesome if it is mixed in the proportion of three times three, but it would do more good if it were in no particular ratio but well diluted than if it were numerically expressible but strong. The ratios of mixtures are expressed by the adding of numbers, not by mere numbers, e.g. it is three parts to two, not three times two. For the same genus must underlie things that are multiplied together; therefore the product $1 \times 2 \times 3$ must be measurable by $1$, and $4 \times 5 \times 7$ by $4$, and therefore all products into which the same factor enters must be measurable by that factor. The number of fire, then, cannot be $2 \times 5 \times 3 \times 7$, and at the same time that of water $2 \times 3$.

If all things must share in number, then many things must be the same, and the same number must belong to one thing and to another. Is number the cause and does the thing exist because of its number, or what? E.g. the motions of the sun, moon, and life and prime of each animal have a number. Why shouldn’t some of these numbers be squares, some cubes, and some equal, others double? There is no reason why they should not. If the same number had belonged to certain things, these would have been the same as one another, since they would have had the same form of number (e.g. sun and moon would have been the same). Why are these numbers causes? There are seven vowels, the scale has seven strings, the Pleiades are seven, at seven some animals lose their teeth, and there were seven champions who fought against Thebes. Is it because the number is what it is that the champions were seven or that the Pleiades consists of seven stars? Surely the champions were seven because there were seven gates or for some other reason, and the Pleiades we count as seven.

The celebrated characteristics of numbers and their contraries, and generally the mathematical relations, if we make them causes of nature (as some do), escape us; none of them is one of the four causes as a first principle. If mathematical objects are conceived as these thinkers conceive them, goodness is predicable of them, and the odd, the straight, the equal-by-equal, and the powers of certain numbers, are in the column of the beautiful. E.g., the seasons and a particular number go together; but these are like coincidences. They are accidents, but appropriate to one another, and one by analogy. In each category of being an analogous term is found – as the straight line is in length, the plane in surface, perhaps the odd in number, and the white in color.

Ideal numbers should not be posited as the causes of musical phenomena, because equal ideal numbers and even units differ from one another in form.

My opponents have much trouble with the generation of ideal numbers and can in no way make a system of them, which indicates that the objects of mathematics are not separable from sensible things, and they are not the first principles.