

350 BC

PHYSICS

by Aristotle

translated by R. P. Hardie and R. K. Gaye

BOOK_1|CH_1

Book I

1

-

WHEN the objects of an inquiry, in any department, have principles, conditions, or elements, it is through acquaintance with these that knowledge, that is to say scientific knowledge, is attained. For we do not think that we know a thing until we are acquainted with its primary conditions or first principles, and have carried our analysis as far as its simplest elements. Plainly therefore in the science of Nature, as in other branches of study, our first task will be to try to determine what relates to its principles.

The natural way of doing this is to start from the things which are more knowable and obvious to us and proceed towards those which are clearer and more knowable by nature; for the same things are not 'knowable relatively to us' and 'knowable' without qualification. So in the present inquiry we must follow this method and advance from what is more obscure by nature, but clearer to us, towards what is more clear and more knowable by nature.

Now what is to us plain and obvious at first is rather confused masses, the elements and principles of which become known to us later by analysis. Thus we must advance from generalities to particulars; for it is a whole that is best known to sense-perception, and a generality is a kind of whole, comprehending many things within it, like parts. Much the same thing happens in the relation of the name to the formula. A name, e.g. 'round', means vaguely a sort of whole: its definition analyses this into its particular senses. Similarly a child begins by calling all men 'father', and all women 'mother', but later on distinguishes each of them.

BOOK_1|CH_2

2

-

The principles in question must be either (a) one or (b) more than one. If (a) one, it must be either (i) motionless, as Parmenides and Melissus assert, or (ii) in motion, as the physicists hold, some

declaring air to be the first principle, others water. If (b) more than one, then either (i) a finite or (ii) an infinite plurality. If (i) finite (but more than one), then either two or three or four or some other number. If (ii) infinite, then either as Democritus believed one in kind, but differing in shape or form; or different in kind and even contrary.

A similar inquiry is made by those who inquire into the number of existents: for they inquire whether the ultimate constituents of existing things are one or many, and if many, whether a finite or an infinite plurality. So they too are inquiring whether the principle or element is one or many.

Now to investigate whether Being is one and motionless is not a contribution to the science of Nature. For just as the geometer has nothing more to say to one who denies the principles of his science-this being a question for a different science or for or common to all-so a man investigating principles cannot argue with one who denies their existence. For if Being is just one, and one in the way mentioned, there is a principle no longer, since a principle must be the principle of some thing or things.

To inquire therefore whether Being is one in this sense would be like arguing against any other position maintained for the sake of argument (such as the Heraclitean thesis, or such a thesis as that Being is one man) or like refuting a merely contentious argument-a description which applies to the arguments both of Melissus and of Parmenides: their premisses are false and their conclusions do not follow. Or rather the argument of Melissus is gross and palpable and offers no difficulty at all: accept one ridiculous proposition and the rest follows-a simple enough proceeding.

We physicists, on the other hand, must take for granted that the things that exist by nature are, either all or some of them, in motion which is indeed made plain by induction. Moreover, no man of science is bound to solve every kind of difficulty that may be raised, but only as many as are drawn falsely from the principles of the science: it is not our business to refute those that do not arise in this way: just as it is the duty of the geometer to refute the squaring of the circle by means of segments, but it is not his duty to refute Antiphon's proof. At the same time the holders of the theory of which we are speaking do incidentally raise physical questions, though Nature is not their subject: so it will perhaps be as well to spend a few words on them, especially as the inquiry is not without scientific interest.

The most pertinent question with which to begin will be this: In what sense is it asserted that all things are one? For 'is' is used in many senses. Do they mean that all things 'are' substance or quantities or qualities? And, further, are all things one

substance-one man, one horse, or one soul-or quality and that one and the same-white or hot or something of the kind? These are all very different doctrines and all impossible to maintain.

For if both substance and quantity and quality are, then, whether these exist independently of each other or not, Being will be many.

If on the other hand it is asserted that all things are quality or quantity, then, whether substance exists or not, an absurdity results, if the impossible can properly be called absurd. For none of the others can exist independently: substance alone is independent: for everything is predicated of substance as subject. Now Melissus says that Being is infinite. It is then a quantity. For the infinite is in the category of quantity, whereas substance or quality or affection cannot be infinite except through a concomitant attribute, that is, if at the same time they are also quantities. For to define the infinite you must use quantity in your formula, but not substance or quality. If then Being is both substance and quantity, it is two, not one: if only substance, it is not infinite and has no magnitude; for to have that it will have to be a quantity.

Again, 'one' itself, no less than 'being', is used in many senses, so we must consider in what sense the word is used when it is said that the All is one.

Now we say that (a) the continuous is one or that (b) the indivisible is one, or (c) things are said to be 'one', when their essence is one and the same, as 'liquor' and 'drink'.

If (a) their One is one in the sense of continuous, it is many, for the continuous is divisible ad infinitum.

There is, indeed, a difficulty about part and whole, perhaps not relevant to the present argument, yet deserving consideration on its own account-namely, whether the part and the whole are one or more than one, and how they can be one or many, and, if they are more than one, in what sense they are more than one. (Similarly with the parts of wholes which are not continuous.) Further, if each of the two parts is indivisibly one with the whole, the difficulty arises that they will be indivisibly one with each other also.

But to proceed: If (b) their One is one as indivisible, nothing will have quantity or quality, and so the one will not be infinite, as Melissus says-nor, indeed, limited, as Parmenides says, for though the limit is indivisible, the limited is not.

But if (c) all things are one in the sense of having the same definition, like 'raiment' and 'dress', then it turns out that they are maintaining the Heraclitean doctrine, for it will be the same thing 'to be good' and 'to be bad', and 'to be good' and 'to be not good', and so the same thing will be 'good' and 'not good', and man and horse; in fact, their view will be, not that all things are one, but that they are nothing; and that 'to be of such-and-such a quality'

is the same as 'to be of such-and-such a size'.

Even the more recent of the ancient thinkers were in a pother lest the same thing should turn out in their hands both one and many. So some, like Lycophron, were led to omit 'is', others to change the mode of expression and say 'the man has been whitened' instead of 'is white', and 'walks' instead of 'is walking', for fear that if they added the word 'is' they should be making the one to be many-as if 'one' and 'being' were always used in one and the same sense. What 'is' may be many either in definition (for example 'to be white' is one thing, 'to be musical' another, yet the same thing be both, so the one is many) or by division, as the whole and its parts. On this point, indeed, they were already getting into difficulties and admitted that the one was many-as if there was any difficulty about the same thing being both one and many, provided that these are not opposites; for 'one' may mean either 'potentially one' or 'actually one'.

BOOK_1|CH_3

3

-

If, then, we approach the thesis in this way it seems impossible for all things to be one. Further, the arguments they use to prove their position are not difficult to expose. For both of them reason contentiously-I mean both Melissus and Parmenides. [Their premisses are false and their conclusions do not follow. Or rather the argument of Melissus is gross and palpable and offers no difficulty at all: admit one ridiculous proposition and the rest follows-a simple enough proceeding.] The fallacy of Melissus is obvious. For he supposes that the assumption 'what has come into being always has a beginning' justifies the assumption 'what has not come into being has no beginning'. Then this also is absurd, that in every case there should be a beginning of the thing-not of the time and not only in the case of coming to be in the full sense but also in the case of coming to have a quality-as if change never took place suddenly. Again, does it follow that Being, if one, is motionless? Why should it not move, the whole of it within itself, as parts of it do which are unities, e.g. this water? Again, why is qualitative change impossible? But, further, Being cannot be one in form, though it may be in what it is made of. (Even some of the physicists hold it to be one in the latter way, though not in the former.) Man obviously differs from horse in form, and contraries from each other.

The same kind of argument holds good against Parmenides also, besides any that may apply specially to his view: the answer to him being that 'this is not true' and 'that does not follow'. His assumption that one is used in a single sense only is false, because

it is used in several. His conclusion does not follow, because if we take only white things, and if 'white' has a single meaning, none the less what is white will be many and not one. For what is white will not be one either in the sense that it is continuous or in the sense that it must be defined in only one way. 'Whiteness' will be different from 'what has whiteness'. Nor does this mean that there is anything that can exist separately, over and above what is white. For 'whiteness' and 'that which is white' differ in definition, not in the sense that they are things which can exist apart from each other. But Parmenides had not come in sight of this distinction.

It is necessary for him, then, to assume not only that 'being' has the same meaning, of whatever it is predicated, but further that it means (1) what just is and (2) what is just one.

It must be so, for (1) an attribute is predicated of some subject, so that the subject to which 'being' is attributed will not be, as it is something different from 'being'. Something, therefore, which is not will be. Hence 'substance' will not be a predicate of anything else. For the subject cannot be a being, unless 'being' means several things, in such a way that each is something. But ex hypothesi 'being' means only one thing.

If, then, 'substance' is not attributed to anything, but other things are attributed to it, how does 'substance' mean what is rather than what is not? For suppose that 'substance' is also 'white'. Since the definition of the latter is different (for being cannot even be attributed to white, as nothing is which is not 'substance'), it follows that 'white' is not-being--and that not in the sense of a particular not-being, but in the sense that it is not at all. Hence 'substance' is not; for it is true to say that it is white, which we found to mean not-being. If to avoid this we say that even 'white' means substance, it follows that 'being' has more than one meaning.

In particular, then, Being will not have magnitude, if it is substance. For each of the two parts must be in a different sense.

(2) Substance is plainly divisible into other substances, if we consider the mere nature of a definition. For instance, if 'man' is a substance, 'animal' and 'biped' must also be substances. For if not substances, they must be attributes--and if attributes, attributes either of (a) man or of (b) some other subject. But neither is possible.

(a) An attribute is either that which may or may not belong to the subject or that in whose definition the subject of which it is an attribute is involved. Thus 'sitting' is an example of a separable attribute, while 'snubness' contains the definition of 'nose', to which we attribute snubness. Further, the definition of the whole is not contained in the definitions of the contents or elements of the definitory formula; that of 'man' for instance in 'biped', or that

of 'white man' in 'white'. If then this is so, and if 'biped' is supposed to be an attribute of 'man', it must be either separable, so that 'man' might possibly not be 'biped', or the definition of 'man' must come into the definition of 'biped'-which is impossible, as the converse is the case.

(b) If, on the other hand, we suppose that 'biped' and 'animal' are attributes not of man but of something else, and are not each of them a substance, then 'man' too will be an attribute of something else. But we must assume that substance is not the attribute of anything, that the subject of which both 'biped' and 'animal' and each separately are predicated is the subject also of the complex 'biped animal'.

Are we then to say that the All is composed of indivisible substances? Some thinkers did, in point of fact, give way to both arguments. To the argument that all things are one if being means one thing, they conceded that not-being is; to that from bisection, they yielded by positing atomic magnitudes. But obviously it is not true that if being means one thing, and cannot at the same time mean the contradictory of this, there will be nothing which is not, for even if what is not cannot be without qualification, there is no reason why it should not be a particular not-being. To say that all things will be one, if there is nothing besides Being itself, is absurd. For who understands 'being itself' to be anything but a particular substance? But if this is so, there is nothing to prevent there being many beings, as has been said.

It is, then, clearly impossible for Being to be one in this sense.

BOOK_1|CH_4

4

-

The physicists on the other hand have two modes of explanation.

The first set make the underlying body one either one of the three or something else which is denser than fire and rarer than air then generate everything else from this, and obtain multiplicity by condensation and rarefaction. Now these are contraries, which may be generalized into 'excess and defect'. (Compare Plato's 'Great and Small'-except that he make these his matter, the one his form, while the others treat the one which underlies as matter and the contraries as differentiae, i.e. forms).

The second set assert that the contrarities are contained in the one and emerge from it by segregation, for example Anaximander and also all those who assert that 'what is' is one and many, like Empedocles and Anaxagoras; for they too produce other things from their mixture by segregation. These differ, however, from each other in that the former imagines a cycle of such changes, the latter a

single series. Anaxagoras again made both his 'homceomerous' substances and his contraries infinite in multitude, whereas Empedocles posits only the so-called elements.

The theory of Anaxagoras that the principles are infinite in multitude was probably due to his acceptance of the common opinion of the physicists that nothing comes into being from not-being. For this is the reason why they use the phrase 'all things were together' and the coming into being of such and such a kind of thing is reduced to change of quality, while some spoke of combination and separation. Moreover, the fact that the contraries proceed from each other led them to the conclusion. The one, they reasoned, must have already existed in the other; for since everything that comes into being must arise either from what is or from what is not, and it is impossible for it to arise from what is not (on this point all the physicists agree), they thought that the truth of the alternative necessarily followed, namely that things come into being out of existent things, i.e. out of things already present, but imperceptible to our senses because of the smallness of their bulk. So they assert that everything has been mixed in every. thing, because they saw everything arising out of everything. But things, as they say, appear different from one another and receive different names according to the nature of the particles which are numerically predominant among the innumerable constituents of the mixture. For nothing, they say, is purely and entirely white or black or sweet, bone or flesh, but the nature of a thing is held to be that of which it contains the most.

Now (1) the infinite qua infinite is unknowable, so that what is infinite in multitude or size is unknowable in quantity, and what is infinite in variety of kind is unknowable in quality. But the principles in question are infinite both in multitude and in kind. Therefore it is impossible to know things which are composed of them; for it is when we know the nature and quantity of its components that we suppose we know a complex.

Further (2) if the parts of a whole may be of any size in the direction either of greatness or of smallness (by 'parts' I mean components into which a whole can be divided and which are actually present in it), it is necessary that the whole thing itself may be of any size. Clearly, therefore, since it is impossible for an animal or plant to be indefinitely big or small, neither can its parts be such, or the whole will be the same. But flesh, bone, and the like are the parts of animals, and the fruits are the parts of plants. Hence it is obvious that neither flesh, bone, nor any such thing can be of indefinite size in the direction either of the greater or of the less.

Again (3) according to the theory all such things are already

present in one another and do not come into being but are constituents which are separated out, and a thing receives its designation from its chief constituent. Further, anything may come out of anything-water by segregation from flesh and flesh from water. Hence, since every finite body is exhausted by the repeated abstraction of a finite body, it seems obviously to follow that everything cannot subsist in everything else. For let flesh be extracted from water and again more flesh be produced from the remainder by repeating the process of separation: then, even though the quantity separated out will continually decrease, still it will not fall below a certain magnitude. If, therefore, the process comes to an end, everything will not be in everything else (for there will be no flesh in the remaining water); if on the other hand it does not, and further extraction is always possible, there will be an infinite multitude of finite equal particles in a finite quantity-which is impossible. Another proof may be added: Since every body must diminish in size when something is taken from it, and flesh is quantitatively definite in respect both of greatness and smallness, it is clear that from the minimum quantity of flesh no body can be separated out; for the flesh left would be less than the minimum of flesh.

Lastly (4) in each of his infinite bodies there would be already present infinite flesh and blood and brain- having a distinct existence, however, from one another, and no less real than the infinite bodies, and each infinite: which is contrary to reason.

The statement that complete separation never will take place is correct enough, though Anaxagoras is not fully aware of what it means. For affections are indeed inseparable. If then colours and states had entered into the mixture, and if separation took place, there would be a 'white' or a 'healthy' which was nothing but white or healthy, i.e. was not the predicate of a subject. So his 'Mind' is an absurd person aiming at the impossible, if he is supposed to wish to separate them, and it is impossible to do so, both in respect of quantity and of quality- of quantity, because there is no minimum magnitude, and of quality, because affections are inseparable.

Nor is Anaxagoras right about the coming to be of homogeneous bodies. It is true there is a sense in which clay is divided into pieces of clay, but there is another in which it is not. Water and air are, and are generated 'from' each other, but not in the way in which bricks come 'from' a house and again a house 'from' bricks; and it is better to assume a smaller and finite number of principles, as Empedocles does.

All thinkers then agree in making the contraries principles, both those who describe the All as one and unmoved (for even Parmenides treats hot and cold as principles under the names of fire and earth) and those too who use the rare and the dense. The same is true of Democritus also, with his plenum and void, both of which exist, he says, the one as being, the other as not-being. Again he speaks of differences in position, shape, and order, and these are genera of which the species are contraries, namely, of position, above and below, before and behind; of shape, angular and angle-less, straight and round.

It is plain then that they all in one way or another identify the contraries with the principles. And with good reason. For first principles must not be derived from one another nor from anything else, while everything has to be derived from them. But these conditions are fulfilled by the primary contraries, which are not derived from anything else because they are primary, nor from each other because they are contraries.

But we must see how this can be arrived at as a reasoned result, as well as in the way just indicated.

Our first presupposition must be that in nature nothing acts on, or is acted on by, any other thing at random, nor may anything come from anything else, unless we mean that it does so in virtue of a concomitant attribute. For how could 'white' come from 'musical', unless 'musical' happened to be an attribute of the not-white or of the black? No, 'white' comes from 'not-white'-and not from any 'not-white', but from black or some intermediate colour. Similarly, 'musical' comes to be from 'not-musical', but not from any thing other than musical, but from 'unmusical' or any intermediate state there may be.

Nor again do things pass into the first chance thing; 'white' does not pass into 'musical' (except, it may be, in virtue of a concomitant attribute), but into 'not-white'-and not into any chance thing which is not white, but into black or an intermediate colour; 'musical' passes into 'not-musical'-and not into any chance thing other than musical, but into 'unmusical' or any intermediate state there may be.

The same holds of other things also: even things which are not simple but complex follow the same principle, but the opposite state has not received a name, so we fail to notice the fact. What is in tune must come from what is not in tune, and vice versa; the tuned passes into untunedness-and not into any untunedness, but into the corresponding opposite. It does not matter whether we take attunement, order, or composition for our illustration; the principle is obviously the same in all, and in fact applies equally to the production of a house, a statue, or any other complex. A house comes from certain things in a certain state of separation instead of conjunction, a

statue (or any other thing that has been shaped) from shapelessness—each of these objects being partly order and partly composition.

If then this is true, everything that comes to be or passes away from, or passes into, its contrary or an intermediate state. But the intermediates are derived from the contraries—colours, for instance, from black and white. Everything, therefore, that comes to be by a natural process is either a contrary or a product of contraries.

Up to this point we have practically had most of the other writers on the subject with us, as I have said already: for all of them identify their elements, and what they call their principles, with the contraries, giving no reason indeed for the theory, but constrained as it were by the truth itself. They differ, however, from one another in that some assume contraries which are more primary, others contraries which are less so: some those more knowable in the order of explanation, others those more familiar to sense. For some make hot and cold, or again moist and dry, the conditions of becoming; while others make odd and even, or again Love and Strife; and these differ from each other in the way mentioned.

Hence their principles are in one sense the same, in another different; different certainly, as indeed most people think, but the same inasmuch as they are analogous; for all are taken from the same table of columns, some of the pairs being wider, others narrower in extent. In this way then their theories are both the same and different, some better, some worse; some, as I have said, take as their contraries what is more knowable in the order of explanation, others what is more familiar to sense. (The universal is more knowable in the order of explanation, the particular in the order of sense: for explanation has to do with the universal, sense with the particular.) 'The great and the small', for example, belong to the former class, 'the dense and the rare' to the latter.

It is clear then that our principles must be contraries.

BOOK_1|CH_6

6

-

The next question is whether the principles are two or three or more in number.

One they cannot be, for there cannot be one contrary. Nor can they be innumerable, because, if so, Being will not be knowable: and in any one genus there is only one contrariety, and substance is one genus: also a finite number is sufficient, and a finite number, such as the principles of Empedocles, is better than an infinite multitude; for Empedocles professes to obtain from his principles all that Anaxagoras obtains from his innumerable principles. Lastly, some contraries are

more primary than others, and some arise from others—for example sweet and bitter, white and black—whereas the principles must always remain principles.

This will suffice to show that the principles are neither one nor innumerable.

Granted, then, that they are a limited number, it is plausible to suppose them more than two. For it is difficult to see how either density should be of such a nature as to act in any way on rarity or rarity on density. The same is true of any other pair of contraries; for Love does not gather Strife together and make things out of it, nor does Strife make anything out of Love, but both act on a third thing different from both. Some indeed assume more than one such thing from which they construct the world of nature.

Other objections to the view that it is not necessary to assume a third principle as a substratum may be added. (1) We do not find that the contraries constitute the substance of any thing. But what is a first principle ought not to be the predicate of any subject. If it were, there would be a principle of the supposed principle: for the subject is a principle, and prior presumably to what is predicated of it. Again (2) we hold that a substance is not contrary to another substance. How then can substance be derived from what are not substances? Or how can non-substances be prior to substance?

If then we accept both the former argument and this one, we must, to preserve both, assume a third somewhat as the substratum of the contraries, such as is spoken of by those who describe the All as one nature—water or fire or what is intermediate between them. What is intermediate seems preferable; for fire, earth, air, and water are already involved with pairs of contraries. There is, therefore, much to be said for those who make the underlying substance different from these four; of the rest, the next best choice is air, as presenting sensible differences in a less degree than the others; and after air, water. All, however, agree in this, that they differentiate their One by means of the contraries, such as density and rarity and more and less, which may of course be generalized, as has already been said into excess and defect. Indeed this doctrine too (that the One and excess and defect are the principles of things) would appear to be of old standing, though in different forms; for the early thinkers made the two the active and the one the passive principle, whereas some of the more recent maintain the reverse.

To suppose then that the elements are three in number would seem, from these and similar considerations, a plausible view, as I said before. On the other hand, the view that they are more than three in number would seem to be untenable.

For the one substratum is sufficient to be acted on; but if we have four contraries, there will be two contrarities, and we shall

have to suppose an intermediate nature for each pair separately. If, on the other hand, the contrarieties, being two, can generate from each other, the second contrariety will be superfluous. Moreover, it is impossible that there should be more than one primary contrariety. For substance is a single genus of being, so that the principles can differ only as prior and posterior, not in genus; in a single genus there is always a single contrariety, all the other contrarieties in it being held to be reducible to one.

It is clear then that the number of elements is neither one nor more than two or three; but whether two or three is, as I said, a question of considerable difficulty.

BOOK_1|CH_7

7

-

We will now give our own account, approaching the question first with reference to becoming in its widest sense: for we shall be following the natural order of inquiry if we speak first of common characteristics, and then investigate the characteristics of special cases.

We say that one thing comes to be from another thing, and one sort of thing from another sort of thing, both in the case of simple and of complex things. I mean the following. We can say (1) 'man becomes musical', (2) what is 'not-musical becomes musical', or (3), the 'not-musical man becomes a musical man'. Now what becomes in (1) and (2)-'man' and 'not musical'-I call simple, and what each becomes-'musical'-simple also. But when (3) we say the 'not-musical man becomes a musical man', both what becomes and what it becomes are complex.

As regards one of these simple 'things that become' we say not only 'this becomes so-and-so', but also 'from being this, comes to be so-and-so', as 'from being not-musical comes to be musical'; as regards the other we do not say this in all cases, as we do not say (1) 'from being a man he came to be musical' but only 'the man became musical'.

When a 'simple' thing is said to become something, in one case (1) it survives through the process, in the other (2) it does not. For man remains a man and is such even when he becomes musical, whereas what is not musical or is unmusical does not continue to exist, either simply or combined with the subject.

These distinctions drawn, one can gather from surveying the various cases of becoming in the way we are describing that, as we say, there must always be an underlying something, namely that which becomes, and that this, though always one numerically, in form at least is not one. (By that I mean that it can be described in

different ways.) For 'to be man' is not the same as 'to be unmusical'. One part survives, the other does not: what is not an opposite survives (for 'man' survives), but 'not-musical' or 'unmusical' does not survive, nor does the compound of the two, namely 'unmusical man'.

We speak of 'becoming that from this' instead of 'this becoming that' more in the case of what does not survive the change-'becoming musical from unmusical', not 'from man'-but there are exceptions, as we sometimes use the latter form of expression even of what survives; we speak of 'a statue coming to be from bronze', not of the 'bronze becoming a statue'. The change, however, from an opposite which does not survive is described indifferently in both ways, 'becoming that from this' or 'this becoming that'. We say both that 'the unmusical becomes musical', and that 'from unmusical he becomes musical'. And so both forms are used of the complex, 'becoming a musical man from an unmusical man', and unmusical man becoming a musical man'.

But there are different senses of 'coming to be'. In some cases we do not use the expression 'come to be', but 'come to be so-and-so'. Only substances are said to 'come to be' in the unqualified sense.

Now in all cases other than substance it is plain that there must be some subject, namely, that which becomes. For we know that when a thing comes to be of such a quantity or quality or in such a relation, time, or place, a subject is always presupposed, since substance alone is not predicated of another subject, but everything else of substance.

But that substances too, and anything else that can be said 'to be' without qualification, come to be from some substratum, will appear on examination. For we find in every case something that underlies from which proceeds that which comes to be; for instance, animals and plants from seed.

Generally things which come to be, come to be in different ways: (1) by change of shape, as a statue; (2) by addition, as things which grow; (3) by taking away, as the Hermes from the stone; (4) by putting together, as a house; (5) by alteration, as things which 'turn' in respect of their material substance.

It is plain that these are all cases of coming to be from a substratum.

Thus, clearly, from what has been said, whatever comes to be is always complex. There is, on the one hand, (a) something which comes into existence, and again (b) something which becomes that-the latter (b) in two senses, either the subject or the opposite. By the 'opposite' I mean the 'unmusical', by the 'subject' 'man', and similarly I call the absence of shape or form or order the 'opposite', and the bronze or stone or gold the 'subject'.

Plainly then, if there are conditions and principles which

constitute natural objects and from which they primarily are or have come to be-have come to be, I mean, what each is said to be in its essential nature, not what each is in respect of a concomitant attribute-plainly, I say, everything comes to be from both subject and form. For 'musical man' is composed (in a way) of 'man' and 'musical': you can analyse it into the definitions of its elements. It is clear then that what comes to be will come to be from these elements.

Now the subject is one numerically, though it is two in form. (For it is the man, the gold-the 'matter' generally-that is counted, for it is more of the nature of a 'this', and what comes to be does not come from it in virtue of a concomitant attribute; the privation, on the other hand, and the contrary are incidental in the process.) And the positive form is one-the order, the acquired art of music, or any similar predicate.

There is a sense, therefore, in which we must declare the principles to be two, and a sense in which they are three; a sense in which the contraries are the principles-say for example the musical and the unmusical, the hot and the cold, the tuned and the untuned-and a sense in which they are not, since it is impossible for the contraries to be acted on by each other. But this difficulty also is solved by the fact that the substratum is different from the contraries, for it is itself not a contrary. The principles therefore are, in a way, not more in number than the contraries, but as it were two, nor yet precisely two, since there is a difference of essential nature, but three. For 'to be man' is different from 'to be unmusical', and 'to be unformed' from 'to be bronze'.

We have now stated the number of the principles of natural objects which are subject to generation, and how the number is reached: and it is clear that there must be a substratum for the contraries, and that the contraries must be two. (Yet in another way of putting it this is not necessary, as one of the contraries will serve to effect the change by its successive absence and presence.)

The underlying nature is an object of scientific knowledge, by an analogy. For as the bronze is to the statue, the wood to the bed, or the matter and the formless before receiving form to any thing which has form, so is the underlying nature to substance, i.e. the 'this' or existent.

This then is one principle (though not one or existent in the same sense as the 'this'), and the definition was one as we agreed; then further there is its contrary, the privation. In what sense these are two, and in what sense more, has been stated above. Briefly, we explained first that only the contraries were principles, and later that a substratum was indispensable, and that the principles were three; our last statement has elucidated the difference between the contraries, the mutual relation of the principles, and the nature of

the substratum. Whether the form or the substratum is the essential nature of a physical object is not yet clear. But that the principles are three, and in what sense, and the way in which each is a principle, is clear.

So much then for the question of the number and the nature of the principles.

BOOK_1|CH_8

8

-

We will now proceed to show that the difficulty of the early thinkers, as well as our own, is solved in this way alone.

The first of those who studied science were misled in their search for truth and the nature of things by their inexperience, which as it were thrust them into another path. So they say that none of the things that are either comes to be or passes out of existence, because what comes to be must do so either from what is or from what is not, both of which are impossible. For what is cannot come to be (because it is already), and from what is not nothing could have come to be (because something must be present as a substratum). So too they exaggerated the consequence of this, and went so far as to deny even the existence of a plurality of things, maintaining that only Being itself is. Such then was their opinion, and such the reason for its adoption.

Our explanation on the other hand is that the phrases 'something comes to be from what is or from what is not', 'what is not or what is does something or has something done to it or becomes some particular thing', are to be taken (in the first way of putting our explanation) in the same sense as 'a doctor does something or has something done to him', 'is or becomes something from being a doctor.' These expressions may be taken in two senses, and so too, clearly, may 'from being', and 'being acts or is acted on'. A doctor builds a house, not qua doctor, but qua housebuilder, and turns gray, not qua doctor, but qua dark-haired. On the other hand he doctors or fails to doctor qua doctor. But we are using words most appropriately when we say that a doctor does something or undergoes something, or becomes something from being a doctor, if he does, undergoes, or becomes qua doctor. Clearly then also 'to come to be so-and-so from not-being' means 'qua not-being'.

It was through failure to make this distinction that those thinkers gave the matter up, and through this error that they went so much farther astray as to suppose that nothing else comes to be or exists apart from Being itself, thus doing away with all becoming.

We ourselves are in agreement with them in holding that nothing can be said without qualification to come from what is not. But

nevertheless we maintain that a thing may 'come to be from what is not'-that is, in a qualified sense. For a thing comes to be from the privation, which in its own nature is not-being,-this not surviving as a constituent of the result. Yet this causes surprise, and it is thought impossible that something should come to be in the way described from what is not.

In the same way we maintain that nothing comes to be from being, and that being does not come to be except in a qualified sense. In that way, however, it does, just as animal might come to be from animal, and an animal of a certain kind from an animal of a certain kind. Thus, suppose a dog to come to be from a horse. The dog would then, it is true, come to be from animal (as well as from an animal of a certain kind) but not as animal, for that is already there. But if anything is to become an animal, not in a qualified sense, it will not be from animal: and if being, not from being-nor from not-being either, for it has been explained that by 'from not being' we mean from not-being qua not-being.

Note further that we do not subvert the principle that everything either is or is not.

This then is one way of solving the difficulty. Another consists in pointing out that the same things can be explained in terms of potentiality and actuality. But this has been done with greater precision elsewhere. So, as we said, the difficulties which constrain people to deny the existence of some of the things we mentioned are now solved. For it was this reason which also caused some of the earlier thinkers to turn so far aside from the road which leads to coming to be and passing away and change generally. If they had come in sight of this nature, all their ignorance would have been dispelled.

BOOK_1|CH_9

9

-

Others, indeed, have apprehended the nature in question, but not adequately.

In the first place they allow that a thing may come to be without qualification from not being, accepting on this point the statement of Parmenides. Secondly, they think that if the substratum is one numerically, it must have also only a single potentiality-which is a very different thing.

Now we distinguish matter and privation, and hold that one of these, namely the matter, is not-being only in virtue of an attribute which it has, while the privation in its own nature is not-being; and that the matter is nearly, in a sense is, substance, while the privation in no sense is. They, on the other hand, identify their Great and Small

alike with not being, and that whether they are taken together as one or separately. Their triad is therefore of quite a different kind from ours. For they got so far as to see that there must be some underlying nature, but they make it one-for even if one philosopher makes a dyad of it, which he calls Great and Small, the effect is the same, for he overlooked the other nature. For the one which persists is a joint cause, with the form, of what comes to be-a mother, as it were. But the negative part of the contrariety may often seem, if you concentrate your attention on it as an evil agent, not to exist at all.

For admitting with them that there is something divine, good, and desirable, we hold that there are two other principles, the one contrary to it, the other such as of its own nature to desire and yearn for it. But the consequence of their view is that the contrary desires its wtextinction. Yet the form cannot desire itself, for it is not defective; nor can the contrary desire it, for contraries are mutually destructive. The truth is that what desires the form is matter, as the female desires the male and the ugly the beautiful-only the ugly or the female not per se but per accidens.

The matter comes to be and ceases to be in one sense, while in another it does not. As that which contains the privation, it ceases to be in its own nature, for what ceases to be-the privation-is contained within it. But as potentiality it does not cease to be in its own nature, but is necessarily outside the sphere of becoming and ceasing to be. For if it came to be, something must have existed as a primary substratum from which it should come and which should persist in it; but this is its own special nature, so that it will be before coming to be. (For my definition of matter is just this-the primary substratum of each thing, from which it comes to be without qualification, and which persists in the result.) And if it ceases to be it will pass into that at the last, so it will have ceased to be before ceasing to be.

The accurate determination of the first principle in respect of form, whether it is one or many and what it is or what they are, is the province of the primary type of science; so these questions may stand over till then. But of the natural, i.e. perishable, forms we shall speak in the expositions which follow.

The above, then, may be taken as sufficient to establish that there are principles and what they are and how many there are. Now let us make a fresh start and proceed.

Of things that exist, some exist by nature, some from other causes.

'By nature' the animals and their parts exist, and the plants and the simple bodies (earth, fire, air, water)-for we say that these and the like exist 'by nature'.

All the things mentioned present a feature in which they differ from things which are not constituted by nature. Each of them has within itself a principle of motion and of stationariness (in respect of place, or of growth and decrease, or by way of alteration). On the other hand, a bed and a coat and anything else of that sort, qua receiving these designations i.e. in so far as they are products of art-have no innate impulse to change. But in so far as they happen to be composed of stone or of earth or of a mixture of the two, they do have such an impulse, and just to that extent which seems to indicate that nature is a source or cause of being moved and of being at rest in that to which it belongs primarily, in virtue of itself and not in virtue of a concomitant attribute.

I say 'not in virtue of a concomitant attribute', because (for instance) a man who is a doctor might cure himself. Nevertheless it is not in so far as he is a patient that he possesses the art of medicine: it merely has happened that the same man is doctor and patient-and that is why these attributes are not always found together. So it is with all other artificial products. None of them has in itself the source of its own production. But while in some cases (for instance houses and the other products of manual labour) that principle is in something else external to the thing, in others those which may cause a change in themselves in virtue of a concomitant attribute-it lies in the things themselves (but not in virtue of what they are).

'Nature' then is what has been stated. Things 'have a nature'which have a principle of this kind. Each of them is a substance; for it is a subject, and nature always implies a subject in which it inheres.

The term 'according to nature' is applied to all these things and also to the attributes which belong to them in virtue of what they are, for instance the property of fire to be carried upwards-which is not a 'nature' nor 'has a nature' but is 'by nature' or 'according to nature'.

What nature is, then, and the meaning of the terms 'by nature' and 'according to nature', has been stated. That nature exists, it would be absurd to try to prove; for it is obvious that there are many things of this kind, and to prove what is obvious by what is not is the mark of a man who is unable to distinguish what is self-evident from what is not. (This state of mind is clearly possible. A man blind from birth might reason about colours. Presumably therefore such persons must be talking about words without any thought to correspond.)

Some identify the nature or substance of a natural object with that immediate constituent of it which taken by itself is without arrangement, e.g. the wood is the 'nature' of the bed, and the bronze the 'nature' of the statue.

As an indication of this Antiphon points out that if you planted a bed and the rotting wood acquired the power of sending up a shoot, it would not be a bed that would come up, but wood-which shows that the arrangement in accordance with the rules of the art is merely an incidental attribute, whereas the real nature is the other, which, further, persists continuously through the process of making.

But if the material of each of these objects has itself the same relation to something else, say bronze (or gold) to water, bones (or wood) to earth and so on, that (they say) would be their nature and essence. Consequently some assert earth, others fire or air or water or some or all of these, to be the nature of the things that are. For whatever any one of them supposed to have this character-whether one thing or more than one thing-this or these he declared to be the whole of substance, all else being its affections, states, or dispositions. Every such thing they held to be eternal (for it could not pass into anything else), but other things to come into being and cease to be times without number.

This then is one account of 'nature', namely that it is the immediate material substratum of things which have in themselves a principle of motion or change.

Another account is that 'nature' is the shape or form which is specified in the definition of the thing.

For the word 'nature' is applied to what is according to nature and the natural in the same way as 'art' is applied to what is artistic or a work of art. We should not say in the latter case that there is anything artistic about a thing, if it is a bed only potentially, not yet having the form of a bed; nor should we call it a work of art. The same is true of natural compounds. What is potentially flesh or bone has not yet its own 'nature', and does not exist until it receives the form specified in the definition, which we name in defining what flesh or bone is. Thus in the second sense of 'nature' it would be the shape or form (not separable except in statement) of things which have in themselves a source of motion. (The combination of the two, e.g. man, is not 'nature' but 'by nature' or 'natural'.)

The form indeed is 'nature' rather than the matter; for a thing is more properly said to be what it is when it has attained to fulfilment than when it exists potentially. Again man is born from man, but not bed from bed. That is why people say that the figure is not the nature of a bed, but the wood is-if the bed sprouted not a bed but wood would come up. But even if the figure is art, then on the same principle the

shape of man is his nature. For man is born from man.

We also speak of a thing's nature as being exhibited in the process of growth by which its nature is attained. The 'nature' in this sense is not like 'doctoring', which leads not to the art of doctoring but to health. Doctoring must start from the art, not lead to it. But it is not in this way that nature (in the one sense) is related to nature (in the other). What grows qua growing grows from something into something. Into what then does it grow? Not into that from which it arose but into that to which it tends. The shape then is nature.

'Shape' and 'nature', it should be added, are in two senses. For the privation too is in a way form. But whether in unqualified coming to be there is privation, i.e. a contrary to what comes to be, we must consider later.

BOOK_2|CH_2

2

-

We have distinguished, then, the different ways in which the term 'nature' is used.

The next point to consider is how the mathematician differs from the physicist. Obviously physical bodies contain surfaces and volumes, lines and points, and these are the subject-matter of mathematics.

Further, is astronomy different from physics or a department of it? It seems absurd that the physicist should be supposed to know the nature of sun or moon, but not to know any of their essential attributes, particularly as the writers on physics obviously do discuss their shape also and whether the earth and the world are spherical or not.

Now the mathematician, though he too treats of these things, nevertheless does not treat of them as the limits of a physical body; nor does he consider the attributes indicated as the attributes of such bodies. That is why he separates them; for in thought they are separable from motion, and it makes no difference, nor does any falsity result, if they are separated. The holders of the theory of Forms do the same, though they are not aware of it; for they separate the objects of physics, which are less separable than those of mathematics. This becomes plain if one tries to state in each of the two cases the definitions of the things and of their attributes. 'Odd' and 'even', 'straight' and 'curved', and likewise 'number', 'line', and 'figure', do not involve motion; not so 'flesh' and 'bone' and 'man'-these are defined like 'snub nose', not like 'curved'.

Similar evidence is supplied by the more physical of the branches of mathematics, such as optics, harmonics, and astronomy. These are in a way the converse of geometry. While geometry investigates physical

lines but not qua physical, optics investigates mathematical lines, but qua physical, not qua mathematical.

Since 'nature' has two senses, the form and the matter, we must investigate its objects as we would the essence of snubness. That is, such things are neither independent of matter nor can be defined in terms of matter only. Here too indeed one might raise a difficulty. Since there are two natures, with which is the physicist concerned? Or should he investigate the combination of the two? But if the combination of the two, then also each severally. Does it belong then to the same or to different sciences to know each severally?

If we look at the ancients, physics would to be concerned with the matter. (It was only very slightly that Empedocles and Democritus touched on the forms and the essence.)

But if on the other hand art imitates nature, and it is the part of the same discipline to know the form and the matter up to a point (e.g. the doctor has a knowledge of health and also of bile and phlegm, in which health is realized, and the builder both of the form of the house and of the matter, namely that it is bricks and beams, and so forth): if this is so, it would be the part of physics also to know nature in both its senses.

Again, 'that for the sake of which', or the end, belongs to the same department of knowledge as the means. But the nature is the end or 'that for the sake of which'. For if a thing undergoes a continuous change and there is a stage which is last, this stage is the end or 'that for the sake of which'. (That is why the poet was carried away into making an absurd statement when he said 'he has the end for the sake of which he was born'. For not every stage that is last claims to be an end, but only that which is best.)

For the arts make their material (some simply 'make' it, others make it serviceable), and we use everything as if it was there for our sake. (We also are in a sense an end. 'That for the sake of which' has two senses: the distinction is made in our work *On Philosophy*.) The arts, therefore, which govern the matter and have knowledge are two, namely the art which uses the product and the art which directs the production of it. That is why the using art also is in a sense directive; but it differs in that it knows the form, whereas the art which is directive as being concerned with production knows the matter. For the helmsman knows and prescribes what sort of form a helm should have, the other from what wood it should be made and by means of what operations. In the products of art, however, we make the material with a view to the function, whereas in the products of nature the matter is there all along.

Again, matter is a relative term: to each form there corresponds a special matter. How far then must the physicist know the form or essence? Up to a point, perhaps, as the doctor must know sinew or

the smith bronze (i.e. until he understands the purpose of each): and the physicist is concerned only with things whose forms are separable indeed, but do not exist apart from matter. Man is begotten by man and by the sun as well. The mode of existence and essence of the separable it is the business of the primary type of philosophy to define.

BOOK_2|CH_3

3

-

Now that we have established these distinctions, we must proceed to consider causes, their character and number. Knowledge is the object of our inquiry, and men do not think they know a thing till they have grasped the 'why' of (which is to grasp its primary cause). So clearly we too must do this as regards both coming to be and passing away and every kind of physical change, in order that, knowing their principles, we may try to refer to these principles each of our problems.

In one sense, then, (1) that out of which a thing comes to be and which persists, is called 'cause', e.g. the bronze of the statue, the silver of the bowl, and the genera of which the bronze and the silver are species.

In another sense (2) the form or the archetype, i.e. the statement of the essence, and its genera, are called 'causes' (e.g. of the octave the relation of 2:1, and generally number), and the parts in the definition.

Again (3) the primary source of the change or coming to rest; e.g. the man who gave advice is a cause, the father is cause of the child, and generally what makes of what is made and what causes change of what is changed.

Again (4) in the sense of end or 'that for the sake of which' a thing is done, e.g. health is the cause of walking about. ('Why is he walking about?' we say. 'To be healthy', and, having said that, we think we have assigned the cause.) The same is true also of all the intermediate steps which are brought about through the action of something else as means towards the end, e.g. reduction of flesh, purging, drugs, or surgical instruments are means towards health. All these things are 'for the sake of' the end, though they differ from one another in that some are activities, others instruments.

This then perhaps exhausts the number of ways in which the term 'cause' is used.

As the word has several senses, it follows that there are several causes of the same thing not merely in virtue of a concomitant attribute), e.g. both the art of the sculptor and the bronze are causes of the statue. These are causes of the statue qua statue, not

in virtue of anything else that it may be-only not in the same way, the one being the material cause, the other the cause whence the motion comes. Some things cause each other reciprocally, e.g. hard work causes fitness and vice versa, but again not in the same way, but the one as end, the other as the origin of change. Further the same thing is the cause of contrary results. For that which by its presence brings about one result is sometimes blamed for bringing about the contrary by its absence. Thus we ascribe the wreck of a ship to the absence of the pilot whose presence was the cause of its safety.

All the causes now mentioned fall into four familiar divisions. The letters are the causes of syllables, the material of artificial products, fire, &c., of bodies, the parts of the whole, and the premisses of the conclusion, in the sense of 'that from which'. Of these pairs the one set are causes in the sense of substratum, e.g. the parts, the other set in the sense of essence-the whole and the combination and the form. But the seed and the doctor and the adviser, and generally the maker, are all sources whence the change or stationariness originates, while the others are causes in the sense of the end or the good of the rest; for 'that for the sake of which' means what is best and the end of the things that lead up to it. (Whether we say the 'good itself or the 'apparent good' makes no difference.)

Such then is the number and nature of the kinds of cause.

Now the modes of causation are many, though when brought under heads they too can be reduced in number. For 'cause' is used in many senses and even within the same kind one may be prior to another (e.g. the doctor and the expert are causes of health, the relation 2:1 and number of the octave), and always what is inclusive to what is particular. Another mode of causation is the incidental and its genera, e.g. in one way 'Polyclitus', in another 'sculptor' is the cause of a statue, because 'being Polyclitus' and 'sculptor' are incidentally conjoined. Also the classes in which the incidental attribute is included; thus 'a man' could be said to be the cause of a statue or, generally, 'a living creature'. An incidental attribute too may be more or less remote, e.g. suppose that 'a pale man' or 'a musical man' were said to be the cause of the statue.

All causes, both proper and incidental, may be spoken of either as potential or as actual; e.g. the cause of a house being built is either 'house-builder' or 'house-builder building'.

Similar distinctions can be made in the things of which the causes are causes, e.g. of 'this statue' or of 'statue' or of 'image' generally, of 'this bronze' or of 'bronze' or of 'material' generally. So too with the incidental attributes. Again we may use a complex expression for either and say, e.g. neither 'Polyclitus' nor 'sculptor' but 'Polyclitus, sculptor'.

All these various uses, however, come to six in number, under each of which again the usage is twofold. Cause means either what is particular or a genus, or an incidental attribute or a genus of that, and these either as a complex or each by itself; and all six either as actual or as potential. The difference is this much, that causes which are actually at work and particular exist and cease to exist simultaneously with their effect, e.g. this healing person with this being-healed person and that house-building man with that being-built house; but this is not always true of potential causes--the house and the housebuilder do not pass away simultaneously.

In investigating the cause of each thing it is always necessary to seek what is most precise (as also in other things): thus man builds because he is a builder, and a builder builds in virtue of his art of building. This last cause then is prior: and so generally.

Further, generic effects should be assigned to generic causes, particular effects to particular causes, e.g. statue to sculptor, this statue to this sculptor; and powers are relative to possible effects, actually operating causes to things which are actually being effected.

This must suffice for our account of the number of causes and the modes of causation.

BOOK_2|CH_4

4

-

But chance also and spontaneity are reckoned among causes: many things are said both to be and to come to be as a result of chance and spontaneity. We must inquire therefore in what manner chance and spontaneity are present among the causes enumerated, and whether they are the same or different, and generally what chance and spontaneity are.

Some people even question whether they are real or not. They say that nothing happens by chance, but that everything which we ascribe to chance or spontaneity has some definite cause, e.g. coming 'by chance' into the market and finding there a man whom one wanted but did not expect to meet is due to one's wish to go and buy in the market. Similarly in other cases of chance it is always possible, they maintain, to find something which is the cause; but not chance, for if chance were real, it would seem strange indeed, and the question might be raised, why on earth none of the wise men of old in speaking of the causes of generation and decay took account of chance; whence it would seem that they too did not believe that anything is by chance. But there is a further circumstance that is surprising. Many things both come to be and are by chance and spontaneity, and although know that

each of them can be ascribed to some cause (as the old argument said which denied chance), nevertheless they speak of some of these things as happening by chance and others not. For this reason also they ought to have at least referred to the matter in some way or other.

Certainly the early physicists found no place for chance among the causes which they recognized-love, strife, mind, fire, or the like. This is strange, whether they supposed that there is no such thing as chance or whether they thought there is but omitted to mention it-and that too when they sometimes used it, as Empedocles does when he says that the air is not always separated into the highest region, but 'as it may chance'. At any rate he says in his cosmogony that 'it happened to run that way at that time, but it often ran otherwise.' He tells us also that most of the parts of animals came to be by chance.

There are some too who ascribe this heavenly sphere and all the worlds to spontaneity. They say that the vortex arose spontaneously, i.e. the motion that separated and arranged in its present order all that exists. This statement might well cause surprise. For they are asserting that chance is not responsible for the existence or generation of animals and plants, nature or mind or something of the kind being the cause of them (for it is not any chance thing that comes from a given seed but an olive from one kind and a man from another); and yet at the same time they assert that the heavenly sphere and the divinest of visible things arose spontaneously, having no such cause as is assigned to animals and plants. Yet if this is so, it is a fact which deserves to be dwelt upon, and something might well have been said about it. For besides the other absurdities of the statement, it is the more absurd that people should make it when they see nothing coming to be spontaneously in the heavens, but much happening by chance among the things which as they say are not due to chance; whereas we should have expected exactly the opposite.

Others there are who, indeed, believe that chance is a cause, but that it is inscrutable to human intelligence, as being a divine thing and full of mystery.

Thus we must inquire what chance and spontaneity are, whether they are the same or different, and how they fit into our division of causes.

BOOK_2|CH_5

-

First then we observe that some things always come to pass in the same way, and others for the most part. It is clearly of neither of

these that chance is said to be the cause, nor can the 'effect of chance' be identified with any of the things that come to pass by necessity and always, or for the most part. But as there is a third class of events besides these two-events which all say are 'by chance'-it is plain that there is such a thing as chance and spontaneity; for we know that things of this kind are due to chance and that things due to chance are of this kind.

But, secondly, some events are for the sake of something, others not. Again, some of the former class are in accordance with deliberate intention, others not, but both are in the class of things which are for the sake of something. Hence it is clear that even among the things which are outside the necessary and the normal, there are some in connexion with which the phrase 'for the sake of something' is applicable. (Events that are for the sake of something include whatever may be done as a result of thought or of nature.) Things of this kind, then, when they come to pass incidental are said to be 'by chance'. For just as a thing is something either in virtue of itself or incidentally, so may it be a cause. For instance, the housebuilding faculty is in virtue of itself the cause of a house, whereas the pale or the musical is the incidental cause. That which is per se cause of the effect is determinate, but the incidental cause is indeterminable, for the possible attributes of an individual are innumerable. To resume then; when a thing of this kind comes to pass among events which are for the sake of something, it is said to be spontaneous or by chance. (The distinction between the two must be made later-for the present it is sufficient if it is plain that both are in the sphere of things done for the sake of something.)

Example: A man is engaged in collecting subscriptions for a feast. He would have gone to such and such a place for the purpose of getting the money, if he had known. He actually went there for another purpose and it was only incidentally that he got his money by going there; and this was not due to the fact that he went there as a rule or necessarily, nor is the end effected (getting the money) a cause present in himself-it belongs to the class of things that are intentional and the result of intelligent deliberation. It is when these conditions are satisfied that the man is said to have gone 'by chance'. If he had gone of deliberate purpose and for the sake of this-if he always or normally went there when he was collecting payments-he would not be said to have gone 'by chance'.

It is clear then that chance is an incidental cause in the sphere of those actions for the sake of something which involve purpose. Intelligent reflection, then, and chance are in the same sphere, for purpose implies intelligent reflection.

It is necessary, no doubt, that the causes of what comes to pass by chance be indefinite; and that is why chance is supposed to

belong to the class of the indefinite and to be inscrutable to man, and why it might be thought that, in a way, nothing occurs by chance. For all these statements are correct, because they are well grounded. Things do, in a way, occur by chance, for they occur incidentally and chance is an incidental cause. But strictly it is not the cause-without qualification-of anything; for instance, a housebuilder is the cause of a house; incidentally, a fluteplayer may be so.

And the causes of the man's coming and getting the money (when he did not come for the sake of that) are innumerable. He may have wished to see somebody or been following somebody or avoiding somebody, or may have gone to see a spectacle. Thus to say that chance is a thing contrary to rule is correct. For 'rule' applies to what is always true or true for the most part, whereas chance belongs to a third type of event. Hence, to conclude, since causes of this kind are indefinite, chance too is indefinite. (Yet in some cases one might raise the question whether any incidental fact might be the cause of the chance occurrence, e.g. of health the fresh air or the sun's heat may be the cause, but having had one's hair cut cannot; for some incidental causes are more relevant to the effect than others.)

Chance or fortune is called 'good' when the result is good, 'evil' when it is evil. The terms 'good fortune' and 'ill fortune' are used when either result is of considerable magnitude. Thus one who comes within an ace of some great evil or great good is said to be fortunate or unfortunate. The mind affirms the essence of the attribute, ignoring the hair's breadth of difference. Further, it is with reason that good fortune is regarded as unstable; for chance is unstable, as none of the things which result from it can be invariable or normal.

Both are then, as I have said, incidental causes-both chance and spontaneity-in the sphere of things which are capable of coming to pass not necessarily, nor normally, and with reference to such of these as might come to pass for the sake of something.

BOOK_2|CH_6

6

-

They differ in that 'spontaneity' is the wider term. Every result of chance is from what is spontaneous, but not everything that is from what is spontaneous is from chance.

Chance and what results from chance are appropriate to agents that are capable of good fortune and of moral action generally. Therefore necessarily chance is in the sphere of moral actions. This is indicated by the fact that good fortune is thought to be the same, or nearly the same, as happiness, and happiness to be a kind of

moral action, since it is well-doing. Hence what is not capable of moral action cannot do anything by chance. Thus an inanimate thing or a lower animal or a child cannot do anything by chance, because it is incapable of deliberate intention; nor can 'good fortune' or 'ill fortune' be ascribed to them, except metaphorically, as Protarchus, for example, said that the stones of which altars are made are fortunate because they are held in honour, while their fellows are trodden under foot. Even these things, however, can in a way be affected by chance, when one who is dealing with them does something to them by chance, but not otherwise.

The spontaneous on the other hand is found both in the lower animals and in many inanimate objects. We say, for example, that the horse came 'spontaneously', because, though his coming saved him, he did not come for the sake of safety. Again, the tripod fell 'of itself', because, though when it fell it stood on its feet so as to serve for a seat, it did not fall for the sake of that.

Hence it is clear that events which (1) belong to the general class of things that may come to pass for the sake of something, (2) do not come to pass for the sake of what actually results, and (3) have an external cause, may be described by the phrase 'from spontaneity'. These 'spontaneous' events are said to be 'from chance' if they have the further characteristics of being the objects of deliberate intention and due to agents capable of that mode of action. This is indicated by the phrase 'in vain', which is used when A which is for the sake of B, does not result in B. For instance, taking a walk is for the sake of evacuation of the bowels; if this does not follow after walking, we say that we have walked 'in vain' and that the walking was 'vain'. This implies that what is naturally the means to an end is 'in vain', when it does not effect the end towards which it was the natural means-for it would be absurd for a man to say that he had bathed in vain because the sun was not eclipsed, since the one was not done with a view to the other. Thus the spontaneous is even according to its derivation the case in which the thing itself happens in vain. The stone that struck the man did not fall for the purpose of striking him; therefore it fell spontaneously, because it might have fallen by the action of an agent and for the purpose of striking. The difference between spontaneity and what results by chance is greatest in things that come to be by nature; for when anything comes to be contrary to nature, we do not say that it came to be by chance, but by spontaneity. Yet strictly this too is different from the spontaneous proper; for the cause of the latter is external, that of the former internal.

We have now explained what chance is and what spontaneity is, and in what they differ from each other. Both belong to the mode of causation 'source of change', for either some natural or some intelligent

agent is always the cause; but in this sort of causation the number of possible causes is infinite.

Spontaneity and chance are causes of effects which though they might result from intelligence or nature, have in fact been caused by something incidentally. Now since nothing which is incidental is prior to what is per se, it is clear that no incidental cause can be prior to a cause per se. Spontaneity and chance, therefore, are posterior to intelligence and nature. Hence, however true it may be that the heavens are due to spontaneity, it will still be true that intelligence and nature will be prior causes of this All and of many things in it besides.

BOOK_2|CH_7

7

-

It is clear then that there are causes, and that the number of them is what we have stated. The number is the same as that of the things comprehended under the question 'why'. The 'why' is referred ultimately either (1), in things which do not involve motion, e.g. in mathematics, to the 'what' (to the definition of 'straight line' or 'commensurable', &c.), or (2) to what initiated a motion, e.g. 'why did they go to war?-because there had been a raid'; or (3) we are inquiring 'for the sake of what?-'that they may rule'; or (4), in the case of things that come into being, we are looking for the matter. The causes, therefore, are these and so many in number.

Now, the causes being four, it is the business of the physicist to know about them all, and if he refers his problems back to all of them, he will assign the 'why' in the way proper to his science-the matter, the form, the mover, 'that for the sake of which'. The last three often coincide; for the 'what' and 'that for the sake of which' are one, while the primary source of motion is the same in species as these (for man generates man), and so too, in general, are all things which cause movement by being themselves moved; and such as are not of this kind are no longer inside the province of physics, for they cause motion not by possessing motion or a source of motion in themselves, but being themselves incapable of motion. Hence there are three branches of study, one of things which are incapable of motion, the second of things in motion, but indestructible, the third of destructible things.

The question 'why', then, is answered by reference to the matter, to the form, and to the primary moving cause. For in respect of coming to be it is mostly in this last way that causes are investigated-'what comes to be after what? what was the primary agent or patient?' and so at each step of the series.

Now the principles which cause motion in a physical way are two,

of which one is not physical, as it has no principle of motion in itself. Of this kind is whatever causes movement, not being itself moved, such as (1) that which is completely unchangeable, the primary reality, and (2) the essence of that which is coming to be, i.e. the form; for this is the end or 'that for the sake of which'. Hence since nature is for the sake of something, we must know this cause also. We must explain the 'why' in all the senses of the term, namely, (1) that from this that will necessarily result ('from this' either without qualification or in most cases); (2) that 'this must be so if that is to be so' (as the conclusion presupposes the premisses); (3) that this was the essence of the thing; and (4) because it is better thus (not without qualification, but with reference to the essential nature in each case).

BOOK_2|CH_8

8

-

We must explain then (1) that Nature belongs to the class of causes which act for the sake of something; (2) about the necessary and its place in physical problems, for all writers ascribe things to this cause, arguing that since the hot and the cold, &c., are of such and such a kind, therefore certain things necessarily are and come to be-and if they mention any other cause (one his 'friendship and strife', another his 'mind'), it is only to touch on it, and then good-bye to it.

A difficulty presents itself: why should not nature work, not for the sake of something, nor because it is better so, but just as the sky rains, not in order to make the corn grow, but of necessity? What is drawn up must cool, and what has been cooled must become water and descend, the result of this being that the corn grows. Similarly if a man's crop is spoiled on the threshing-floor, the rain did not fall for the sake of this-in order that the crop might be spoiled-but that result just followed. Why then should it not be the same with the parts in nature, e.g. that our teeth should come up of necessity-the front teeth sharp, fitted for tearing, the molars broad and useful for grinding down the food-since they did not arise for this end, but it was merely a coincident result; and so with all other parts in which we suppose that there is purpose? Wherever then all the parts came about just what they would have been if they had come be for an end, such things survived, being organized spontaneously in a fitting way; whereas those which grew otherwise perished and continue to perish, as Empedocles says his 'man-faced ox-progeny' did.

Such are the arguments (and others of the kind) which may cause difficulty on this point. Yet it is impossible that this should be the

true view. For teeth and all other natural things either invariably or normally come about in a given way; but of not one of the results of chance or spontaneity is this true. We do not ascribe to chance or mere coincidence the frequency of rain in winter, but frequent rain in summer we do; nor heat in the dog-days, but only if we have it in winter. If then, it is agreed that things are either the result of coincidence or for an end, and these cannot be the result of coincidence or spontaneity, it follows that they must be for an end; and that such things are all due to nature even the champions of the theory which is before us would agree. Therefore action for an end is present in things which come to be and are by nature.

Further, where a series has a completion, all the preceding steps are for the sake of that. Now surely as in intelligent action, so in nature; and as in nature, so it is in each action, if nothing interferes. Now intelligent action is for the sake of an end; therefore the nature of things also is so. Thus if a house, e.g. had been a thing made by nature, it would have been made in the same way as it is now by art; and if things made by nature were made also by art, they would come to be in the same way as by nature. Each step then in the series is for the sake of the next; and generally art partly completes what nature cannot bring to a finish, and partly imitates her. If, therefore, artificial products are for the sake of an end, so clearly also are natural products. The relation of the later to the earlier terms of the series is the same in both. This is most obvious in the animals other than man: they make things neither by art nor after inquiry or deliberation. Wherefore people discuss whether it is by intelligence or by some other faculty that these creatures work, spiders, ants, and the like. By gradual advance in this direction we come to see clearly that in plants too that is produced which is conducive to the end-leaves, e.g. grow to provide shade for the fruit. If then it is both by nature and for an end that the swallow makes its nest and the spider its web, and plants grow leaves for the sake of the fruit and send their roots down (not up) for the sake of nourishment, it is plain that this kind of cause is operative in things which come to be and are by nature. And since 'nature' means two things, the matter and the form, of which the latter is the end, and since all the rest is for the sake of the end, the form must be the cause in the sense of 'that for the sake of which'.

Now mistakes come to pass even in the operations of art: the grammarian makes a mistake in writing and the doctor pours out the wrong dose. Hence clearly mistakes are possible in the operations of nature also. If then in art there are cases in which what is rightly produced serves a purpose, and if where mistakes occur there was a purpose in what was attempted, only it was not attained, so must it be

also in natural products, and monstrosities will be failures in the purposive effort. Thus in the original combinations the 'ox-progeny' if they failed to reach a determinate end must have arisen through the corruption of some principle corresponding to what is now the seed.

Further, seed must have come into being first, and not straightway the animals: the words 'whole-natured first...' must have meant seed.

Again, in plants too we find the relation of means to end, though the degree of organization is less. Were there then in plants also 'olive-headed vine-progeny', like the 'man-headed ox-progeny', or not? An absurd suggestion; yet there must have been, if there were such things among animals.

Moreover, among the seeds anything must have come to be at random. But the person who asserts this entirely does away with 'nature' and what exists 'by nature'. For those things are natural which, by a continuous movement originated from an internal principle, arrive at some completion: the same completion is not reached from every principle; nor any chance completion, but always the tendency in each is towards the same end, if there is no impediment.

The end and the means towards it may come about by chance. We say, for instance, that a stranger has come by chance, paid the ransom, and gone away, when he does so as if he had come for that purpose, though it was not for that that he came. This is incidental, for chance is an incidental cause, as I remarked before. But when an event takes place always or for the most part, it is not incidental or by chance. In natural products the sequence is invariable, if there is no impediment.

It is absurd to suppose that purpose is not present because we do not observe the agent deliberating. Art does not deliberate. If the ship-building art were in the wood, it would produce the same results by nature. If, therefore, purpose is present in art, it is present also in nature. The best illustration is a doctor doctoring himself: nature is like that.

It is plain then that nature is a cause, a cause that operates for a purpose.

BOOK_2|CH_9

9

-

As regards what is 'of necessity', we must ask whether the necessity is 'hypothetical', or 'simple' as well. The current view places what is of necessity in the process of production, just as if one were to suppose that the wall of a house necessarily comes to be because what is heavy is naturally carried downwards and what is light to the top, wherefore the stones and foundations take the lowest place, with earth above because it is lighter, and wood at the top of all

as being the lightest. Whereas, though the wall does not come to be without these, it is not due to these, except as its material cause: it comes to be for the sake of sheltering and guarding certain things. Similarly in all other things which involve production for an end; the product cannot come to be without things which have a necessary nature, but it is not due to these (except as its material); it comes to be for an end. For instance, why is a saw such as it is? To effect so-and-so and for the sake of so-and-so. This end, however, cannot be realized unless the saw is made of iron. It is, therefore, necessary for it to be of iron, if we are to have a saw and perform the operation of sawing. What is necessary then, is necessary on a hypothesis; it is not a result necessarily determined by antecedents. Necessity is in the matter, while 'that for the sake of which' is in the definition.

Necessity in mathematics is in a way similar to necessity in things which come to be through the operation of nature. Since a straight line is what it is, it is necessary that the angles of a triangle should equal two right angles. But not conversely; though if the angles are not equal to two right angles, then the straight line is not what it is either. But in things which come to be for an end, the reverse is true. If the end is to exist or does exist, that also which precedes it will exist or does exist; otherwise just as there, if the conclusion is not true, the premiss will not be true, so here the end or 'that for the sake of which' will not exist. For this too is itself a starting-point, but of the reasoning, not of the action; while in mathematics the starting-point is the starting-point of the reasoning only, as there is no action. If then there is to be a house, such-and-such things must be made or be there already or exist, or generally the matter relative to the end, bricks and stones if it is a house. But the end is not due to these except as the matter, nor will it come to exist because of them. Yet if they do not exist at all, neither will the house, or the saw-the former in the absence of stones, the latter in the absence of iron-just as in the other case the premisses will not be true, if the angles of the triangle are not equal to two right angles.

The necessary in nature, then, is plainly what we call by the name of matter, and the changes in it. Both causes must be stated by the physicist, but especially the end; for that is the cause of the matter, not vice versa; and the end is 'that for the sake of which', and the beginning starts from the definition or essence; as in artificial products, since a house is of such-and-such a kind, certain things must necessarily come to be or be there already, or since health is this, these things must necessarily come to be or be there already. Similarly if man is this, then these; if these, then those. Perhaps the necessary is present also in the definition. For if one

defines the operation of sawing as being a certain kind of dividing, then this cannot come about unless the saw has teeth of a certain kind; and these cannot be unless it is of iron. For in the definition too there are some parts that are, as it were, its matter.

BOOK_3|CH_1

Book III

1

-

NATURE has been defined as a 'principle of motion and change', and it is the subject of our inquiry. We must therefore see that we understand the meaning of 'motion'; for if it were unknown, the meaning of 'nature' too would be unknown.

When we have determined the nature of motion, our next task will be to attack in the same way the terms which are involved in it. Now motion is supposed to belong to the class of things which are continuous; and the infinite presents itself first in the continuous-that is how it comes about that 'infinite' is often used in definitions of the continuous ('what is infinitely divisible is continuous'). Besides these, place, void, and time are thought to be necessary conditions of motion.

Clearly, then, for these reasons and also because the attributes mentioned are common to, and coextensive with, all the objects of our science, we must first take each of them in hand and discuss it. For the investigation of special attributes comes after that of the common attributes.

To begin then, as we said, with motion.

We may start by distinguishing (1) what exists in a state of fulfilment only, (2) what exists as potential, (3) what exists as potential and also in fulfilment-one being a 'this', another 'so much', a third 'such', and similarly in each of the other modes of the predication of being.

Further, the word 'relative' is used with reference to (1) excess and defect, (2) agent and patient and generally what can move and what can be moved. For 'what can cause movement' is relative to 'what can be moved', and vice versa.

Again, there is no such thing as motion over and above the things. It is always with respect to substance or to quantity or to quality or to place that what changes changes. But it is impossible, as we assert, to find anything common to these which is neither 'this' nor quantum nor quale nor any of the other predicates. Hence neither will motion and change have reference to something over and above the things mentioned, for there is nothing over and above them.

Now each of these belongs to all its subjects in either of two ways: namely (1) substance-the one is positive form, the other privation;

(2) in quality, white and black; (3) in quantity, complete and incomplete; (4) in respect of locomotion, upwards and downwards or light and heavy. Hence there are as many types of motion or change as there are meanings of the word 'is'.

We have now before us the distinctions in the various classes of being between what is full real and what is potential.

Def. The fulfilment of what exists potentially, in so far as it exists potentially, is motion—namely, of what is alterable qua alterable, alteration: of what can be increased and its opposite what can be decreased (there is no common name), increase and decrease: of what can come to be and can pass away, coming to be and passing away: of what can be carried along, locomotion.

Examples will elucidate this definition of motion. When the buildable, in so far as it is just that, is fully real, it is being built, and this is building. Similarly, learning, doctoring, rolling, leaping, ripening, ageing.

The same thing, if it is of a certain kind, can be both potential and fully real, not indeed at the same time or not in the same respect, but e.g. potentially hot and actually cold. Hence at once such things will act and be acted on by one another in many ways: each of them will be capable at the same time of causing alteration and of being altered. Hence, too, what effects motion as a physical agent can be moved: when a thing of this kind causes motion, it is itself also moved. This, indeed, has led some people to suppose that every mover is moved. But this question depends on another set of arguments, and the truth will be made clear later. It is possible for a thing to cause motion, though it is itself incapable of being moved.

It is the fulfilment of what is potential when it is already fully real and operates not as itself but as movable, that is motion. What I mean by 'as' is this: Bronze is potentially a statue. But it is not the fulfilment of bronze as bronze which is motion. For 'to be bronze' and 'to be a certain potentiality' are not the same.

If they were identical without qualification, i.e. in definition, the fulfilment of bronze as bronze would have been motion. But they are not the same, as has been said. (This is obvious in contraries. 'To be capable of health' and 'to be capable of illness' are not the same, for if they were there would be no difference between being ill and being well. Yet the subject both of health and of sickness—whether it is humour or blood—is one and the same.)

We can distinguish, then, between the two—just as, to give another example, 'colour' and 'visible' are different—and clearly it is the fulfilment of what is potential as potential that is motion. So this, precisely, is motion.

Further it is evident that motion is an attribute of a thing just when it is fully real in this way, and neither before nor after. For

each thing of this kind is capable of being at one time actual, at another not. Take for instance the buildable as buildable. The actuality of the buildable as buildable is the process of building. For the actuality of the buildable must be either this or the house. But when there is a house, the buildable is no longer buildable. On the other hand, it is the buildable which is being built. The process then of being built must be the kind of actuality required. But building is a kind of motion, and the same account will apply to the other kinds also.

BOOK_3|CH_2

2

-
The soundness of this definition is evident both when we consider the accounts of motion that the others have given, and also from the difficulty of defining it otherwise.

One could not easily put motion and change in another genus-this is plain if we consider where some people put it; they identify motion with or 'inequality' or 'not being'; but such things are not necessarily moved, whether they are 'different' or 'unequal' or 'non-existent'; Nor is change either to or from these rather than to or from their opposites.

The reason why they put motion into these genera is that it is thought to be something indefinite, and the principles in the second column are indefinite because they are privative: none of them is either 'this' or 'such' or comes under any of the other modes of predication. The reason in turn why motion is thought to be indefinite is that it cannot be classed simply as a potentiality or as an actuality-a thing that is merely capable of having a certain size is not undergoing change, nor yet a thing that is actually of a certain size, and motion is thought to be a sort of actuality, but incomplete, the reason for this view being that the potential whose actuality it is is incomplete. This is why it is hard to grasp what motion is. It is necessary to class it with privation or with potentiality or with sheer actuality, yet none of these seems possible. There remains then the suggested mode of definition, namely that it is a sort of actuality, or actuality of the kind described, hard to grasp, but not incapable of existing.

The mover too is moved, as has been said-every mover, that is, which is capable of motion, and whose immobility is rest-when a thing is subject to motion its immobility is rest. For to act on the movable as such is just to move it. But this it does by contact, so that at the same time it is also acted on. Hence we can define motion as the fulfilment of the movable qua movable, the cause of the attribute being contact with what can move so that the mover is also acted on.

The mover or agent will always be the vehicle of a form, either a 'this' or 'such', which, when it acts, will be the source and cause of the change, e.g. the full-formed man begets man from what is potentially man.

BOOK_3|CH_3

3

-

The solution of the difficulty that is raised about the motion-whether it is in the movable-is plain. It is the fulfilment of this potentiality, and by the action of that which has the power of causing motion; and the actuality of that which has the power of causing motion is not other than the actuality of the movable, for it must be the fulfilment of both. A thing is capable of causing motion because it can do this, it is a mover because it actually does it. But it is on the movable that it is capable of acting. Hence there is a single actuality of both alike, just as one to two and two to one are the same interval, and the steep ascent and the steep descent are one-for these are one and the same, although they can be described in different ways. So it is with the mover and the moved.

This view has a dialectical difficulty. Perhaps it is necessary that the actuality of the agent and that of the patient should not be the same. The one is 'agency' and the other 'patiency'; and the outcome and completion of the one is an 'action', that of the other a 'passion'. Since then they are both motions, we may ask: in what are they, if they are different? Either (a) both are in what is acted on and moved, or (b) the agency is in the agent and the patiency in the patient. (If we ought to call the latter also 'agency', the word would be used in two senses.)

Now, in alternative (b), the motion will be in the mover, for the same statement will hold of 'mover' and 'moved'. Hence either every mover will be moved, or, though having motion, it will not be moved.

If on the other hand (a) both are in what is moved and acted on-both the agency and the patiency (e.g. both teaching and learning, though they are two, in the learner), then, first, the actuality of each will not be present in each, and, a second absurdity, a thing will have two motions at the same time. How will there be two alterations of quality in one subject towards one definite quality? The thing is impossible: the actualization will be one.

But (some one will say) it is contrary to reason to suppose that there should be one identical actualization of two things which are different in kind. Yet there will be, if teaching and learning are the same, and agency and patiency. To teach will be the same as to learn, and to act the same as to be acted on-the teacher will

necessarily be learning everything that he teaches, and the agent will be acted on. One may reply:

(1) It is not absurd that the actualization of one thing should be in another. Teaching is the activity of a person who can teach, yet the operation is performed on some patient-it is not cut adrift from a subject, but is of A on B.

(2) There is nothing to prevent two things having one and the same actualization, provided the actualizations are not described in the same way, but are related as what can act to what is acting.

(3) Nor is it necessary that the teacher should learn, even if to act and to be acted on are one and the same, provided they are not the same in definition (as 'raiment' and 'dress'), but are the same merely in the sense in which the road from Thebes to Athens and the road from Athens to Thebes are the same, as has been explained above. For it is not things which are in a way the same that have all their attributes the same, but only such as have the same definition. But indeed it by no means follows from the fact that teaching is the same as learning, that to learn is the same as to teach, any more than it follows from the fact that there is one distance between two things which are at a distance from each other, that the two vectors AB and BA, are one and the same. To generalize, teaching is not the same as learning, or agency as patiency, in the full sense, though they belong to the same subject, the motion; for the 'actualization of X in Y' and the 'actualization of Y through the action of X' differ in definition.

What then Motion is, has been stated both generally and particularly. It is not difficult to see how each of its types will be defined-alteration is the fulfillment of the alterable qua alterable (or, more scientifically, the fulfilment of what can act and what can be acted on, as such)-generally and again in each particular case, building, healing, &c. A similar definition will apply to each of the other kinds of motion.

BOOK_3|CH_4

4

-

The science of nature is concerned with spatial magnitudes and motion and time, and each of these at least is necessarily infinite or finite, even if some things dealt with by the science are not, e.g. a quality or a point-it is not necessary perhaps that such things should be put under either head. Hence it is incumbent on the person who specializes in physics to discuss the infinite and to inquire whether there is such a thing or not, and, if there is, what it is.

The appropriateness to the science of this problem is clearly indicated. All who have touched on this kind of science in a way worth considering have formulated views about the infinite, and indeed, to a

man, make it a principle of things.

(1) Some, as the Pythagoreans and Plato, make the infinite a principle in the sense of a self-subsistent substance, and not as a mere attribute of some other thing. Only the Pythagoreans place the infinite among the objects of sense (they do not regard number as separable from these), and assert that what is outside the heaven is infinite. Plato, on the other hand, holds that there is no body outside (the Forms are not outside because they are nowhere), yet that the infinite is present not only in the objects of sense but in the Forms also.

Further, the Pythagoreans identify the infinite with the even. For this, they say, when it is cut off and shut in by the odd, provides things with the element of infinity. An indication of this is what happens with numbers. If the gnomons are placed round the one, and without the one, in the one construction the figure that results is always different, in the other it is always the same. But Plato has two infinities, the Great and the Small.

The physicists, on the other hand, all of them, always regard the infinite as an attribute of a substance which is different from it and belongs to the class of the so-called elements—water or air or what is intermediate between them. Those who make them limited in number never make them infinite in amount. But those who make the elements infinite in number, as Anaxagoras and Democritus do, say that the infinite is continuous by contact—compounded of the homogeneous parts according to the one, of the seed-mass of the atomic shapes according to the other.

Further, Anaxagoras held that any part is a mixture in the same way as the All, on the ground of the observed fact that anything comes out of anything. For it is probably for this reason that he maintains that once upon a time all things were together. (This flesh and this bone were together, and so of any thing: therefore all things: and at the same time too.) For there is a beginning of separation, not only for each thing, but for all. Each thing that comes to be comes from a similar body, and there is a coming to be of all things, though not, it is true, at the same time. Hence there must also be an origin of coming to be. One such source there is which he calls Mind, and Mind begins its work of thinking from some starting-point. So necessarily all things must have been together at a certain time, and must have begun to be moved at a certain time.

Democritus, for his part, asserts the contrary, namely that no element arises from another element. Nevertheless for him the common body is a source of all things, differing from part to part in size and in shape.

It is clear then from these considerations that the inquiry concerns the physicist. Nor is it without reason that they all make it a principle or source. We cannot say that the infinite has no effect,

and the only effectiveness which we can ascribe to it is that of a principle. Everything is either a source or derived from a source. But there cannot be a source of the infinite or limitless, for that would be a limit of it. Further, as it is a beginning, it is both uncreatable and indestructible. For there must be a point at which what has come to be reaches completion, and also a termination of all passing away. That is why, as we say, there is no principle of this, but it is this which is held to be the principle of other things, and to encompass all and to steer all, as those assert who do not recognize, alongside the infinite, other causes, such as Mind or Friendship. Further they identify it with the Divine, for it is 'deathless and imperishable' as Anaximander says, with the majority of the physicists.

Belief in the existence of the infinite comes mainly from five considerations:

(1) From the nature of time-for it is infinite.

(2) From the division of magnitudes-for the mathematicians also use the notion of the infinite.

(3) If coming to be and passing away do not give out, it is only because that from which things come to be is infinite.

(4) Because the limited always finds its limit in something, so that there must be no limit, if everything is always limited by something different from itself.

(5) Most of all, a reason which is peculiarly appropriate and presents the difficulty that is felt by everybody-not only number but also mathematical magnitudes and what is outside the heaven are supposed to be infinite because they never give out in our thought.

The last fact (that what is outside is infinite) leads people to suppose that body also is infinite, and that there is an infinite number of worlds. Why should there be body in one part of the void rather than in another? Grant only that mass is anywhere and it follows that it must be everywhere. Also, if void and place are infinite, there must be infinite body too, for in the case of eternal things what may be must be. But the problem of the infinite is difficult: many contradictions result whether we suppose it to exist or not to exist. If it exists, we have still to ask how it exists; as a substance or as the essential attribute of some entity? Or in neither way, yet none the less is there something which is infinite or some things which are infinitely many?

The problem, however, which specially belongs to the physicist is to investigate whether there is a sensible magnitude which is infinite.

We must begin by distinguishing the various senses in which the term 'infinite' is used.

(1) What is incapable of being gone through, because it is not in its nature to be gone through (the sense in which the voice is

'invisible').

(2) What admits of being gone through, the process however having no termination, or what scarcely admits of being gone through.

(3) What naturally admits of being gone through, but is not actually gone through or does not actually reach an end.

Further, everything that is infinite may be so in respect of addition or division or both.

BOOK_3|CH_5

5

-

Now it is impossible that the infinite should be a thing which is itself infinite, separable from sensible objects. If the infinite is neither a magnitude nor an aggregate, but is itself a substance and not an attribute, it will be indivisible; for the divisible must be either a magnitude or an aggregate. But if indivisible, then not infinite, except in the sense (1) in which the voice is 'invisible'. But this is not the sense in which it is used by those who say that the infinite exists, nor that in which we are investigating it, namely as (2) 'that which cannot be gone through'. But if the infinite exists as an attribute, it would not be, qua infinite an element in substances, any more than the invisible would be an element of speech, though the voice is invisible.

Further, how can the infinite be itself any thing, unless both number and magnitude, of which it is an essential attribute, exist in that way? If they are not substances, a fortiori the infinite is not.

It is plain, too, that the infinite cannot be an actual thing and a substance and principle. For any part of it that is taken will be infinite, if it has parts: for 'to be infinite' and 'the infinite' are the same, if it is a substance and not predicated of a subject. Hence it will be either indivisible or divisible into infinities. But the same thing cannot be many infinities. (Yet just as part of air is air, so a part of the infinite would be infinite, if it is supposed to be a substance and principle.) Therefore the infinite must be without parts and indivisible. But this cannot be true of what is infinite in full completion: for it must be a definite quantity.

Suppose then that infinity belongs to substance as an attribute. But, if so, it cannot, as we have said, be described as a principle, but rather that of which it is an attribute—the air or the even number.

Thus the view of those who speak after the manner of the Pythagoreans is absurd. With the same breath they treat the infinite as substance, and divide it into parts.

This discussion, however, involves the more general question whether

the infinite can be present in mathematical objects and things which are intelligible and do not have extension, as well as among sensible objects. Our inquiry (as physicists) is limited to its special subject-matter, the objects of sense, and we have to ask whether there is or is not among them a body which is infinite in the direction of increase.

We may begin with a dialectical argument and show as follows that there is no such thing. If 'bounded by a surface' is the definition of body there cannot be an infinite body either intelligible or sensible. Nor can number taken in abstraction be infinite, for number or that which has number is numerable. If then the numerable can be numbered, it would also be possible to go through the infinite.

If, on the other hand, we investigate the question more in accordance with principles appropriate to physics, we are led as follows to the same result.

The infinite body must be either (1) compound, or (2) simple; yet neither alternative is possible.

(1) Compound the infinite body will not be, if the elements are finite in number. For they must be more than one, and the contraries must always balance, and no one of them can be infinite. If one of the bodies falls in any degree short of the other in potency-suppose fire is finite in amount while air is infinite and a given quantity of fire exceeds in power the same amount of air in any ratio provided it is numerically definite-the infinite body will obviously prevail over and annihilate the finite body. On the other hand, it is impossible that each should be infinite. 'Body' is what has extension in all directions and the infinite is what is boundlessly extended, so that the infinite body would be extended in all directions ad infinitum.

Nor (2) can the infinite body be one and simple, whether it is, as some hold, a thing over and above the elements (from which they generate the elements) or is not thus qualified.

(a) We must consider the former alternative; for there are some people who make this the infinite, and not air or water, in order that the other elements may not be annihilated by the element which is infinite. They have contrariety with each other-air is cold, water moist, fire hot; if one were infinite, the others by now would have ceased to be. As it is, they say, the infinite is different from them and is their source.

It is impossible, however, that there should be such a body; not because it is infinite on that point a general proof can be given which applies equally to all, air, water, or anything else-but simply because there is, as a matter of fact, no such sensible body, alongside the so-called elements. Everything can be resolved into the elements of which it is composed. Hence the body in question would

have been present in our world here, alongside air and fire and earth and water: but nothing of the kind is observed.

(b) Nor can fire or any other of the elements be infinite. For generally, and apart from the question of how any of them could be infinite, the All, even if it were limited, cannot either be or become one of them, as Heraclitus says that at some time all things become fire. (The same argument applies also to the one which the physicists suppose to exist alongside the elements: for everything changes from contrary to contrary, e.g. from hot to cold).

The preceding consideration of the various cases serves to show us whether it is or is not possible that there should be an infinite sensible body. The following arguments give a general demonstration that it is not possible.

It is the nature of every kind of sensible body to be somewhere, and there is a place appropriate to each, the same for the part and for the whole, e.g. for the whole earth and for a single clod, and for fire and for a spark.

Suppose (a) that the infinite sensible body is homogeneous. Then each part will be either immovable or always being carried along. Yet neither is possible. For why downwards rather than upwards or in any other direction? I mean, e.g. if you take a clod, where will it be moved or where will it be at rest? For ex hypothesi the place of the body akin to it is infinite. Will it occupy the whole place, then? And how? What then will be the nature of its rest and of its movement, or where will they be? It will either be at home everywhere-then it will not be moved; or it will be moved everywhere-then it will not come to rest.

But if (b) the All has dissimilar parts, the proper places of the parts will be dissimilar also, and the body of the All will have no unity except that of contact. Then, further, the parts will be either finite or infinite in variety of kind. (i) Finite they cannot be, for if the All is to be infinite, some of them would have to be infinite, while the others were not, e.g. fire or water will be infinite. But, as we have seen before, such an element would destroy what is contrary to it. (This indeed is the reason why none of the physicists made fire or earth the one infinite body, but either water or air or what is intermediate between them, because the abode of each of the two was plainly determinate, while the others have an ambiguous place between up and down.)

But (ii) if the parts are infinite in number and simple, their proper places too will be infinite in number, and the same will be true of the elements themselves. If that is impossible, and the places are finite, the whole too must be finite; for the place and the body cannot but fit each other. Neither is the whole place larger than what can be filled by the body (and then the body would no longer be

infinite), nor is the body larger than the place; for either there would be an empty space or a body whose nature it is to be nowhere.

Anaxagoras gives an absurd account of why the infinite is at rest. He says that the infinite itself is the cause of its being fixed. This because it is in itself, since nothing else contains it-on the assumption that wherever anything is, it is there by its own nature. But this is not true: a thing could be somewhere by compulsion, and not where it is its nature to be.

Even if it is true as true can be that the whole is not moved (for what is fixed by itself and is in itself must be immovable), yet we must explain why it is not its nature to be moved. It is not enough just to make this statement and then decamp. Anything else might be in a state of rest, but there is no reason why it should not be its nature to be moved. The earth is not carried along, and would not be carried along if it were infinite, provided it is held together by the centre. But it would not be because there was no other region in which it could be carried along that it would remain at the centre, but because this is its nature. Yet in this case also we may say that it fixes itself. If then in the case of the earth, supposed to be infinite, it is at rest, not because it is infinite, but because it has weight and what is heavy rests at the centre and the earth is at the centre, similarly the infinite also would rest in itself, not because it is infinite and fixes itself, but owing to some other cause.

Another difficulty emerges at the same time. Any part of the infinite body ought to remain at rest. Just as the infinite remains at rest in itself because it fixes itself, so too any part of it you may take will remain in itself. The appropriate places of the whole and of the part are alike, e.g. of the whole earth and of a clod the appropriate place is the lower region; of fire as a whole and of a spark, the upper region. If, therefore, to be in itself is the place of the infinite, that also will be appropriate to the part. Therefore it will remain in itself.

In general, the view that there is an infinite body is plainly incompatible with the doctrine that there is necessarily a proper place for each kind of body, if every sensible body has either weight or lightness, and if a body has a natural locomotion towards the centre if it is heavy, and upwards if it is light. This would need to be true of the infinite also. But neither character can belong to it: it cannot be either as a whole, nor can it be half the one and half the other. For how should you divide it? or how can the infinite have the one part up and the other down, or an extremity and a centre?

Further, every sensible body is in place, and the kinds or differences of place are up-down, before-behind, right-left; and these

distinctions hold not only in relation to us and by arbitrary agreement, but also in the whole itself. But in the infinite body they cannot exist. In general, if it is impossible that there should be an infinite place, and if every body is in place, there cannot be an infinite body.

Surely what is in a special place is in place, and what is in place is in a special place. Just, then, as the infinite cannot be quantity-that would imply that it has a particular quantity, e.g, two or three cubits; quantity just means these-so a thing's being in place means that it is somewhere, and that is either up or down or in some other of the six differences of position: but each of these is a limit.

It is plain from these arguments that there is no body which is actually infinite.

BOOK_3|CH_6

6

-

But on the other hand to suppose that the infinite does not exist in any way leads obviously to many impossible consequences: there will be a beginning and an end of time, a magnitude will not be divisible into magnitudes, number will not be infinite. If, then, in view of the above considerations, neither alternative seems possible, an arbiter must be called in; and clearly there is a sense in which the infinite exists and another in which it does not.

We must keep in mind that the word 'is' means either what potentially is or what fully is. Further, a thing is infinite either by addition or by division.

Now, as we have seen, magnitude is not actually infinite. But by division it is infinite. (There is no difficulty in refuting the theory of indivisible lines.) The alternative then remains that the infinite has a potential existence.

But the phrase 'potential existence' is ambiguous. When we speak of the potential existence of a statue we mean that there will be an actual statue. It is not so with the infinite. There will not be an actual infinite. The word 'is' has many senses, and we say that the infinite 'is' in the sense in which we say 'it is day' or 'it is the games', because one thing after another is always coming into existence. For of these things too the distinction between potential and actual existence holds. We say that there are Olympic games, both in the sense that they may occur and that they are actually occurring.

The infinite exhibits itself in different ways-in time, in the generations of man, and in the division of magnitudes. For generally the infinite has this mode of existence: one thing is always being

taken after another, and each thing that is taken is always finite, but always different. Again, 'being' has more than one sense, so that we must not regard the infinite as a 'this', such as a man or a horse, but must suppose it to exist in the sense in which we speak of the day or the games as existing things whose being has not come to them like that of a substance, but consists in a process of coming to be or passing away; definite if you like at each stage, yet always different.

But when this takes place in spatial magnitudes, what is taken persists, while in the succession of time and of men it takes place by the passing away of these in such a way that the source of supply never gives out.

In a way the infinite by addition is the same thing as the infinite by division. In a finite magnitude, the infinite by addition comes about in a way inverse to that of the other. For in proportion as we see division going on, in the same proportion we see addition being made to what is already marked off. For if we take a determinate part of a finite magnitude and add another part determined by the same ratio (not taking in the same amount of the original whole), and so on, we shall not traverse the given magnitude. But if we increase the ratio of the part, so as always to take in the same amount, we shall traverse the magnitude, for every finite magnitude is exhausted by means of any determinate quantity however small.

The infinite, then, exists in no other way, but in this way it does exist, potentially and by reduction. It exists fully in the sense in which we say 'it is day' or 'it is the games'; and potentially as matter exists, not independently as what is finite does.

By addition then, also, there is potentially an infinite, namely, what we have described as being in a sense the same as the infinite in respect of division. For it will always be possible to take something *ad extra*. Yet the sum of the parts taken will not exceed every determinate magnitude, just as in the direction of division every determinate magnitude is surpassed in smallness and there will be a smaller part.

But in respect of addition there cannot be an infinite which even potentially exceeds every assignable magnitude, unless it has the attribute of being actually infinite, as the physicists hold to be true of the body which is outside the world, whose essential nature is air or something of the kind. But if there cannot be in this way a sensible body which is infinite in the full sense, evidently there can no more be a body which is potentially infinite in respect of addition, except as the inverse of the infinite by division, as we have said. It is for this reason that Plato also made the infinities two in number, because it is supposed to be possible to exceed all

limits and to proceed ad infinitum in the direction both of increase and of reduction. Yet though he makes the infinities two, he does not use them. For in the numbers the infinite in the direction of reduction is not present, as the monad is the smallest; nor is the infinite in the direction of increase, for the parts number only up to the decad.

The infinite turns out to be the contrary of what it is said to be. It is not what has nothing outside it that is infinite, but what always has something outside it. This is indicated by the fact that rings also that have no bezel are described as 'endless', because it is always possible to take a part which is outside a given part. The description depends on a certain similarity, but it is not true in the full sense of the word. This condition alone is not sufficient: it is necessary also that the next part which is taken should never be the same. In the circle, the latter condition is not satisfied: it is only the adjacent part from which the new part is different.

Our definition then is as follows:

A quantity is infinite if it is such that we can always take a part outside what has been already taken. On the other hand, what has nothing outside it is complete and whole. For thus we define the whole-that from which nothing is wanting, as a whole man or a whole box. What is true of each particular is true of the whole as such-the whole is that of which nothing is outside. On the other hand that from which something is absent and outside, however small that may be, is not 'all'. 'Whole' and 'complete' are either quite identical or closely akin. Nothing is complete (teleion) which has no end (telos); and the end is a limit.

Hence Parmenides must be thought to have spoken better than Melissus. The latter says that the whole is infinite, but the former describes it as limited, 'equally balanced from the middle'. For to connect the infinite with the all and the whole is not like joining two pieces of string; for it is from this they get the dignity they ascribe to the infinite-its containing all things and holding the all in itself-from its having a certain similarity to the whole. It is in fact the matter of the completeness which belongs to size, and what is potentially a whole, though not in the full sense. It is divisible both in the direction of reduction and of the inverse addition. It is a whole and limited; not, however, in virtue of its own nature, but in virtue of what is other than it. It does not contain, but, in so far as it is infinite, is contained. Consequently, also, it is unknowable, qua infinite; for the matter has no form. (Hence it is plain that the infinite stands in the relation of part rather than of whole. For the matter is part of the whole, as the bronze is of the bronze statue.) If it contains in the case of sensible things, in the case of intelligible things the great and

the small ought to contain them. But it is absurd and impossible to suppose that the unknowable and indeterminate should contain and determine.

BOOK_3|CH_7

7

-

It is reasonable that there should not be held to be an infinite in respect of addition such as to surpass every magnitude, but that there should be thought to be such an infinite in the direction of division. For the matter and the infinite are contained inside what contains them, while it is the form which contains. It is natural too to suppose that in number there is a limit in the direction of the minimum, and that in the other direction every assigned number is surpassed. In magnitude, on the contrary, every assigned magnitude is surpassed in the direction of smallness, while in the other direction there is no infinite magnitude. The reason is that what is one is indivisible whatever it may be, e.g. a man is one man, not many. Number on the other hand is a plurality of 'ones' and a certain quantity of them. Hence number must stop at the indivisible: for 'two' and 'three' are merely derivative terms, and so with each of the other numbers. But in the direction of largeness it is always possible to think of a larger number: for the number of times a magnitude can be bisected is infinite. Hence this infinite is potential, never actual: the number of parts that can be taken always surpasses any assigned number. But this number is not separable from the process of bisection, and its infinity is not a permanent actuality but consists in a process of coming to be, like time and the number of time.

With magnitudes the contrary holds. What is continuous is divided ad infinitum, but there is no infinite in the direction of increase. For the size which it can potentially be, it can also actually be. Hence since no sensible magnitude is infinite, it is impossible to exceed every assigned magnitude; for if it were possible there would be something bigger than the heavens.

The infinite is not the same in magnitude and movement and time, in the sense of a single nature, but its secondary sense depends on its primary sense, i.e. movement is called infinite in virtue of the magnitude covered by the movement (or alteration or growth), and time because of the movement. (I use these terms for the moment. Later I shall explain what each of them means, and also why every magnitude is divisible into magnitudes.)

Our account does not rob the mathematicians of their science, by disproving the actual existence of the infinite in the direction of increase, in the sense of the untraversable. In point of fact they

do not need the infinite and do not use it. They postulate only that the finite straight line may be produced as far as they wish. It is possible to have divided in the same ratio as the largest quantity another magnitude of any size you like. Hence, for the purposes of proof, it will make no difference to them to have such an infinite instead, while its existence will be in the sphere of real magnitudes.

In the fourfold scheme of causes, it is plain that the infinite is a cause in the sense of matter, and that its essence is privation, the subject as such being what is continuous and sensible. All the other thinkers, too, evidently treat the infinite as matter—that is why it is inconsistent in them to make it what contains, and not what is contained.

BOOK_3|CH_8

8

-

It remains to dispose of the arguments which are supposed to support the view that the infinite exists not only potentially but as a separate thing. Some have no cogency; others can be met by fresh objections that are valid.

(1) In order that coming to be should not fail, it is not necessary that there should be a sensible body which is actually infinite. The passing away of one thing may be the coming to be of another, the All being limited.

(2) There is a difference between touching and being limited. The former is relative to something and is the touching of something (for everything that touches touches something), and further is an attribute of some one of the things which are limited. On the other hand, what is limited is not limited in relation to anything. Again, contact is not necessarily possible between any two things taken at random.

(3) To rely on mere thinking is absurd, for then the excess or defect is not in the thing but in the thought. One might think that one of us is bigger than he is and magnify him *ad infinitum*. But it does not follow that he is bigger than the size we are, just because some one thinks he is, but only because he is the size he is. The thought is an accident.

(a) Time indeed and movement are infinite, and also thinking, in the sense that each part that is taken passes in succession out of existence.

(b) Magnitude is not infinite either in the way of reduction or of magnification in thought.

This concludes my account of the way in which the infinite exists, and of the way in which it does not exist, and of what it is.

-

THE physicist must have a knowledge of Place, too, as well as of the infinite-namely, whether there is such a thing or not, and the manner of its existence and what it is-both because all suppose that things which exist are somewhere (the non-existent is nowhere--where is the goat-stag or the sphinx?), and because 'motion' in its most general and primary sense is change of place, which we call 'locomotion'.

The question, what is place? presents many difficulties. An examination of all the relevant facts seems to lead to divergent conclusions. Moreover, we have inherited nothing from previous thinkers, whether in the way of a statement of difficulties or of a solution.

The existence of place is held to be obvious from the fact of mutual replacement. Where water now is, there in turn, when the water has gone out as from a vessel, air is present. When therefore another body occupies this same place, the place is thought to be different from all the bodies which come to be in it and replace one another. What now contains air formerly contained water, so that clearly the place or space into which and out of which they passed was something different from both.

Further, the typical locomotions of the elementary natural bodies-namely, fire, earth, and the like-show not only that place is something, but also that it exerts a certain influence. Each is carried to its own place, if it is not hindered, the one up, the other down. Now these are regions or kinds of place-up and down and the rest of the six directions. Nor do such distinctions (up and down and right and left, &c.) hold only in relation to us. To us they are not always the same but change with the direction in which we are turned: that is why the same thing may be both right and left, up and down, before and behind. But in nature each is distinct, taken apart by itself. It is not every chance direction which is 'up', but where fire and what is light are carried; similarly, too, 'down' is not any chance direction but where what has weight and what is made of earth are carried-the implication being that these places do not differ merely in relative position, but also as possessing distinct potencies. This is made plain also by the objects studied by mathematics. Though they have no real place, they nevertheless, in respect of their position relatively to us, have a right and left as attributes ascribed to them only in consequence of their relative position, not having by nature these various characteristics. Again, the theory that the void exists involves the existence of place: for

one would define void as place bereft of body.

These considerations then would lead us to suppose that place is something distinct from bodies, and that every sensible body is in place. Hesiod too might be held to have given a correct account of it when he made chaos first. At least he says:

-

'First of all things came chaos to being, then broad-breasted earth,'

-

implying that things need to have space first, because he thought, with most people, that everything is somewhere and in place. If this is its nature, the potency of place must be a marvellous thing, and take precedence of all other things. For that without which nothing else can exist, while it can exist without the others, must needs be first; for place does not pass out of existence when the things in it are annihilated.

True, but even if we suppose its existence settled, the question of its nature presents difficulty-whether it is some sort of 'bulk' of body or some entity other than that, for we must first determine its genus.

(1) Now it has three dimensions, length, breadth, depth, the dimensions by which all body also is bounded. But the place cannot be body; for if it were there would be two bodies in the same place.

(2) Further, if body has a place and space, clearly so too have surface and the other limits of body; for the same statement will apply to them: where the bounding planes of the water were, there in turn will be those of the air. But when we come to a point we cannot make a distinction between it and its place. Hence if the place of a point is not different from the point, no more will that of any of the others be different, and place will not be something different from each of them.

(3) What in the world then are we to suppose place to be? If it has the sort of nature described, it cannot be an element or composed of elements, whether these be corporeal or incorporeal: for while it has size, it has not body. But the elements of sensible bodies are bodies, while nothing that has size results from a combination of intelligible elements.

(4) Also we may ask: of what in things is space the cause? None of the four modes of causation can be ascribed to it. It is neither in the sense of the matter of existents (for nothing is composed of it), nor as the form and definition of things, nor as end, nor does it move existents.

(5) Further, too, if it is itself an existent, where will it be? Zeno's difficulty demands an explanation: for if everything that exists has a place, place too will have a place, and so on ad

infinitum.

(6) Again, just as every body is in place, so, too, every place has a body in it. What then shall we say about growing things? It follows from these premisses that their place must grow with them, if their place is neither less nor greater than they are.

By asking these questions, then, we must raise the whole problem about place-not only as to what it is, but even whether there is such a thing.

BOOK_4|CH_2

2

-

We may distinguish generally between predicating B of A because it (A) is itself, and because it is something else; and particularly between place which is common and in which all bodies are, and the special place occupied primarily by each. I mean, for instance, that you are now in the heavens because you are in the air and it is in the heavens; and you are in the air because you are on the earth; and similarly on the earth because you are in this place which contains no more than you.

Now if place is what primarily contains each body, it would be a limit, so that the place would be the form or shape of each body by which the magnitude or the matter of the magnitude is defined: for this is the limit of each body.

If, then, we look at the question in this way the place of a thing is its form. But, if we regard the place as the extension of the magnitude, it is the matter. For this is different from the magnitude: it is what is contained and defined by the form, as by a bounding plane. Matter or the indeterminate is of this nature; when the boundary and attributes of a sphere are taken away, nothing but the matter is left.

This is why Plato in the *Timaeus* says that matter and space are the same; for the 'participant' and space are identical. (It is true, indeed, that the account he gives there of the 'participant' is different from what he says in his so-called 'unwritten teaching'. Nevertheless, he did identify place and space.) I mention Plato because, while all hold place to be something, he alone tried to say what it is.

In view of these facts we should naturally expect to find difficulty in determining what place is, if indeed it is one of these two things, matter or form. They demand a very close scrutiny, especially as it is not easy to recognize them apart.

But it is at any rate not difficult to see that place cannot be either of them. The form and the matter are not separate from the thing, whereas the place can be separated. As we pointed out, where

air was, water in turn comes to be, the one replacing the other; and similarly with other bodies. Hence the place of a thing is neither a part nor a state of it, but is separable from it. For place is supposed to be something like a vessel-the vessel being a transportable place. But the vessel is no part of the thing.

In so far then as it is separable from the thing, it is not the form: qua containing, it is different from the matter.

Also it is held that what is anywhere is both itself something and that there is a different thing outside it. (Plato of course, if we may digress, ought to tell us why the form and the numbers are not in place, if 'what participates' is place-whether what participates is the Great and the Small or the matter, as he called it in writing in the Timaeus.)

Further, how could a body be carried to its own place, if place was the matter or the form? It is impossible that what has no reference to motion or the distinction of up and down can be place. So place must be looked for among things which have these characteristics.

If the place is in the thing (it must be if it is either shape or matter) place will have a place: for both the form and the indeterminate undergo change and motion along with the thing, and are not always in the same place, but are where the thing is. Hence the place will have a place.

Further, when water is produced from air, the place has been destroyed, for the resulting body is not in the same place. What sort of destruction then is that?

This concludes my statement of the reasons why space must be something, and again of the difficulties that may be raised about its essential nature.

BOOK_4|CH_3

3

-

The next step we must take is to see in how many senses one thing is said to be 'in' another.

- (1) As the finger is 'in' the hand and generally the part 'in' the whole.
- (2) As the whole is 'in' the parts: for there is no whole over and above the parts.
- (3) As man is 'in' animal and generally species 'in' genus.
- (4) As the genus is 'in' the species and generally the part of the specific form 'in' the definition of the specific form.
- (5) As health is 'in' the hot and the cold and generally the form 'in' the matter.
- (6) As the affairs of Greece centre 'in' the king, and generally

events centre 'in' their primary motive agent.

(7) As the existence of a thing centres 'in its good and generally 'in' its end, i.e. in 'that for the sake of which' it exists.

(8) In the strictest sense of all, as a thing is 'in' a vessel, and generally 'in' place.

One might raise the question whether a thing can be in itself, or whether nothing can be in itself-everything being either nowhere or in something else.

The question is ambiguous; we may mean the thing qua itself or qua something else.

When there are parts of a whole-the one that in which a thing is, the other the thing which is in it-the whole will be described as being in itself. For a thing is described in terms of its parts, as well as in terms of the thing as a whole, e.g. a man is said to be white because the visible surface of him is white, or to be scientific because his thinking faculty has been trained. The jar then will not be in itself and the wine will not be in itself. But the jar of wine will: for the contents and the container are both parts of the same whole.

In this sense then, but not primarily, a thing can be in itself, namely, as 'white' is in body (for the visible surface is in body), and science is in the mind.

It is from these, which are 'parts' (in the sense at least of being 'in' the man), that the man is called white, &c. But the jar and the wine in separation are not parts of a whole, though together they are. So when there are parts, a thing will be in itself, as 'white' is in man because it is in body, and in body because it resides in the visible surface. We cannot go further and say that it is in surface in virtue of something other than itself. (Yet it is not in itself: though these are in a way the same thing,) they differ in essence, each having a special nature and capacity, 'surface' and 'white'.

Thus if we look at the matter inductively we do not find anything to be 'in' itself in any of the senses that have been distinguished; and it can be seen by argument that it is impossible. For each of two things will have to be both, e.g. the jar will have to be both vessel and wine, and the wine both wine and jar, if it is possible for a thing to be in itself; so that, however true it might be that they were in each other, the jar will receive the wine in virtue not of its being wine but of the wine's being wine, and the wine will be in the jar in virtue not of its being a jar but of the jar's being a jar. Now that they are different in respect of their essence is evident; for 'that in which something is' and 'that which is in it' would be differently defined.

Nor is it possible for a thing to be in itself even incidentally:

for two things would at the same time in the same thing. The jar would be in itself-if a thing whose nature it is to receive can be in itself; and that which it receives, namely (if wine) wine, will be in it.

Obviously then a thing cannot be in itself primarily.

Zeno's problem-that if Place is something it must be in something-is not difficult to solve. There is nothing to prevent the first place from being 'in' something else-not indeed in that as 'in' place, but as health is 'in' the hot as a positive determination of it or as the hot is 'in' body as an affection. So we escape the infinite regress.

Another thing is plain: since the vessel is no part of what is in it (what contains in the strict sense is different from what is contained), place could not be either the matter or the form of the thing contained, but must differ-for the latter, both the matter and the shape, are parts of what is contained.

This then may serve as a critical statement of the difficulties involved.

BOOK_4|CH_4

4

-

What then after all is place? The answer to this question may be elucidated as follows.

Let us take for granted about it the various characteristics which are supposed correctly to belong to it essentially. We assume then-

- (1) Place is what contains that of which it is the place.
- (2) Place is no part of the thing.
- (3) The immediate place of a thing is neither less nor greater than the thing.
- (4) Place can be left behind by the thing and is separable. In addition:
- (5) All place admits of the distinction of up and down, and each of the bodies is naturally carried to its appropriate place and rests there, and this makes the place either up or down.

Having laid these foundations, we must complete the theory. We ought to try to make our investigation such as will render an account of place, and will not only solve the difficulties connected with it, but will also show that the attributes supposed to belong to it do really belong to it, and further will make clear the cause of the trouble and of the difficulties about it. Such is the most satisfactory kind of exposition.

First then we must understand that place would not have been thought of, if there had not been a special kind of motion, namely that with respect to place. It is chiefly for this reason that we suppose the heaven also to be in place, because it is in constant movement. Of

this kind of change there are two species-locomotion on the one hand and, on the other, increase and diminution. For these too involve variation of place: what was then in this place has now in turn changed to what is larger or smaller.

Again, when we say a thing is 'moved', the predicate either (1) belongs to it actually, in virtue of its own nature, or (2) in virtue of something conjoined with it. In the latter case it may be either (a) something which by its own nature is capable of being moved, e.g. the parts of the body or the nail in the ship, or (b) something which is not in itself capable of being moved, but is always moved through its conjunction with something else, as 'whiteness' or 'science'. These have changed their place only because the subjects to which they belong do so.

We say that a thing is in the world, in the sense of in place, because it is in the air, and the air is in the world; and when we say it is in the air, we do not mean it is in every part of the air, but that it is in the air because of the outer surface of the air which surrounds it; for if all the air were its place, the place of a thing would not be equal to the thing-which it is supposed to be, and which the primary place in which a thing is actually is.

When what surrounds, then, is not separate from the thing, but is in continuity with it, the thing is said to be in what surrounds it, not in the sense of in place, but as a part in a whole. But when the thing is separate and in contact, it is immediately 'in' the inner surface of the surrounding body, and this surface is neither a part of what is in it nor yet greater than its extension, but equal to it; for the extremities of things which touch are coincident.

Further, if one body is in continuity with another, it is not moved in that but with that. On the other hand it is moved in that if it is separate. It makes no difference whether what contains is moved or not.

Again, when it is not separate it is described as a part in a whole, as the pupil in the eye or the hand in the body: when it is separate, as the water in the cask or the wine in the jar. For the hand is moved with the body and the water in the cask.

It will now be plain from these considerations what place is. There are just four things of which place must be one-the shape, or the matter, or some sort of extension between the bounding surfaces of the containing body, or this boundary itself if it contains no extension over and above the bulk of the body which comes to be in it.

Three of these it obviously cannot be:

(1) The shape is supposed to be place because it surrounds, for the extremities of what contains and of what is contained are coincident. Both the shape and the place, it is true, are boundaries. But not of the same thing: the form is the boundary of the

thing, the place is the boundary of the body which contains it.

(2) The extension between the extremities is thought to be something, because what is contained and separate may often be changed while the container remains the same (as water may be poured from a vessel)-the assumption being that the extension is something over and above the body displaced. But there is no such extension. One of the bodies which change places and are naturally capable of being in contact with the container falls in whichever it may chance to be.

If there were an extension which were such as to exist independently and be permanent, there would be an infinity of places in the same thing. For when the water and the air change places, all the portions of the two together will play the same part in the whole which was previously played by all the water in the vessel; at the same time the place too will be undergoing change; so that there will be another place which is the place of the place, and many places will be coincident. There is not a different place of the part, in which it is moved, when the whole vessel changes its place: it is always the same: for it is in the (proximate) place where they are that the air and the water (or the parts of the water) succeed each other, not in that place in which they come to be, which is part of the place which is the place of the whole world.

(3) The matter, too, might seem to be place, at least if we consider it in what is at rest and is thus separate but in continuity. For just as in change of quality there is something which was formerly black and is now white, or formerly soft and now hard-this is just why we say that the matter exists-so place, because it presents a similar phenomenon, is thought to exist-only in the one case we say so because what was air is now water, in the other because where air formerly was there a is now water. But the matter, as we said before, is neither separable from the thing nor contains it, whereas place has both characteristics.

Well, then, if place is none of the three-neither the form nor the matter nor an extension which is always there, different from, and over and above, the extension of the thing which is displaced-place necessarily is the one of the four which is left, namely, the boundary of the containing body at which it is in contact with the contained body. (By the contained body is meant what can be moved by way of locomotion.)

Place is thought to be something important and hard to grasp, both because the matter and the shape present themselves along with it, and because the displacement of the body that is moved takes place in a stationary container, for it seems possible that there should be an interval which is other than the bodies which are moved. The air, too, which is thought to be incorporeal, contributes something to the belief: it is not only the boundaries of the vessel which seem to be

place, but also what is between them, regarded as empty. Just, in fact, as the vessel is transportable place, so place is a non-portable vessel. So when what is within a thing which is moved, is moved and changes its place, as a boat on a river, what contains plays the part of a vessel rather than that of place. Place on the other hand is rather what is motionless: so it is rather the whole river that is place, because as a whole it is motionless.

Hence we conclude that the innermost motionless boundary of what contains is place.

This explains why the middle of the heaven and the surface which faces us of the rotating system are held to be 'up' and 'down' in the strict and fullest sense for all men: for the one is always at rest, while the inner side of the rotating body remains always coincident with itself. Hence since the light is what is naturally carried up, and the heavy what is carried down, the boundary which contains in the direction of the middle of the universe, and the middle itself, are down, and that which contains in the direction of the outermost part of the universe, and the outermost part itself, are up.

For this reason, too, place is thought to be a kind of surface, and as it were a vessel, i.e. a container of the thing.

Further, place is coincident with the thing, for boundaries are coincident with the bounded.

BOOK_4|CH_5

5

-

If then a body has another body outside it and containing it, it is in place, and if not, not. That is why, even if there were to be water which had not a container, the parts of it, on the one hand, will be moved (for one part is contained in another), while, on the other hand, the whole will be moved in one sense, but not in another. For as a whole it does not simultaneously change its place, though it will be moved in a circle: for this place is the place of its parts. (Some things are moved, not up and down, but in a circle; others up and down, such things namely as admit of condensation and rarefaction.)

As was explained, some things are potentially in place, others actually. So, when you have a homogeneous substance which is continuous, the parts are potentially in place: when the parts are separated, but in contact, like a heap, they are actually in place.

Again, (1) some things are per se in place, namely every body which is movable either by way of locomotion or by way of increase is per se somewhere, but the heaven, as has been said, is not anywhere as a whole, nor in any place, if at least, as we must suppose, no body

contains it. On the line on which it is moved, its parts have place: for each is contiguous the next.

But (2) other things are in place indirectly, through something conjoined with them, as the soul and the heaven. The latter is, in a way, in place, for all its parts are: for on the orb one part contains another. That is why the upper part is moved in a circle, while the All is not anywhere. For what is somewhere is itself something, and there must be alongside it some other thing wherein it is and which contains it. But alongside the All or the Whole there is nothing outside the All, and for this reason all things are in the heaven; for the heaven, we may say, is the All. Yet their place is not the same as the heaven. It is part of it, the innermost part of it, which is in contact with the movable body; and for this reason the earth is in water, and this in the air, and the air in the aether, and the aether in heaven, but we cannot go on and say that the heaven is in anything else.

It is clear, too, from these considerations that all the problems which were raised about place will be solved when it is explained in this way:

(1) There is no necessity that the place should grow with the body in it,

(2) Nor that a point should have a place,

(3) Nor that two bodies should be in the same place,

(4) Nor that place should be a corporeal interval: for what is between the boundaries of the place is any body which may chance to be there, not an interval in body.

Further, (5) place is also somewhere, not in the sense of being in a place, but as the limit is in the limited; for not everything that is in place, but only movable body.

Also (6) it is reasonable that each kind of body should be carried to its own place. For a body which is next in the series and in contact (not by compulsion) is akin, and bodies which are united do not affect each other, while those which are in contact interact on each other.

Nor (7) is it without reason that each should remain naturally in its proper place. For this part has the same relation to its place, as a separable part to its whole, as when one moves a part of water or air: so, too, air is related to water, for the one is like matter, the other form-water is the matter of air, air as it were the actuality of water, for water is potentially air, while air is potentially water, though in another way.

These distinctions will be drawn more carefully later. On the present occasion it was necessary to refer to them: what has now been stated obscurely will then be made more clear. If the matter and the fulfilment are the same thing (for water is both, the one

potentially, the other completely), water will be related to air in a way as part to whole. That is why these have contact: it is organic union when both become actually one.

This concludes my account of place-both of its existence and of its nature.

BOOK_4|CH_6

6

-

The investigation of similar questions about the void, also, must be held to belong to the physicist-namely whether it exists or not, and how it exists or what it is-just as about place. The views taken of it involve arguments both for and against, in much the same sort of way. For those who hold that the void exists regard it as a sort of place or vessel which is supposed to be 'full' when it holds the bulk which it is capable of containing, 'void' when it is deprived of that-as if 'void' and 'full' and 'place' denoted the same thing, though the essence of the three is different.

We must begin the inquiry by putting down the account given by those who say that it exists, then the account of those who say that it does not exist, and third the current view on these questions.

Those who try to show that the void does not exist do not disprove what people really mean by it, but only their erroneous way of speaking; this is true of Anaxagoras and of those who refute the existence of the void in this way. They merely give an ingenious demonstration that air is something--by straining wine-skins and showing the resistance of the air, and by cutting it off in clepsydras. But people really mean that there is an empty interval in which there is no sensible body. They hold that everything which is in body is body and say that what has nothing in it at all is void (so what is full of air is void). It is not then the existence of air that needs to be proved, but the non-existence of an interval, different from the bodies, either separable or actual-an interval which divides the whole body so as to break its continuity, as Democritus and Leucippus hold, and many other physicists-or even perhaps as something which is outside the whole body, which remains continuous.

These people, then, have not reached even the threshold of the problem, but rather those who say that the void exists.

(1) They argue, for one thing, that change in place (i.e. locomotion and increase) would not be. For it is maintained that motion would seem not to exist, if there were no void, since what is full cannot contain anything more. If it could, and there were two bodies in the same place, it would also be true that any number of bodies could be together; for it is impossible to draw a line of division beyond which the statement would become untrue. If this were possible, it would

follow also that the smallest body would contain the greatest; for 'many a little makes a mickle': thus if many equal bodies can be together, so also can many unequal bodies.

Melissus, indeed, infers from these considerations that the All is immovable; for if it were moved there must, he says, be void, but void is not among the things that exist.

This argument, then, is one way in which they show that there is a void.

(2) They reason from the fact that some things are observed to contract and be compressed, as people say that a cask will hold the wine which formerly filled it, along with the skins into which the wine has been decanted, which implies that the compressed body contracts into the voids present in it.

Again (3) increase, too, is thought to take always by means of void, for nutriment is body, and it is impossible for two bodies to be together. A proof of this they find also in what happens to ashes, which absorb as much water as the empty vessel.

The Pythagoreans, too, (4) held that void exists and that it enters the heaven itself, which as it were inhales it, from the infinite air. Further it is the void which distinguishes the natures of things, as if it were like what separates and distinguishes the terms of a series. This holds primarily in the numbers, for the void distinguishes their nature.

These, then, and so many, are the main grounds on which people have argued for and against the existence of the void.

BOOK_4|CH_7

7

-

As a step towards settling which view is true, we must determine the meaning of the name.

The void is thought to be place with nothing in it. The reason for this is that people take what exists to be body, and hold that while every body is in place, void is place in which there is no body, so that where there is no body, there must be void.

Every body, again, they suppose to be tangible; and of this nature is whatever has weight or lightness.

Hence, by a syllogism, what has nothing heavy or light in it, is void.

This result, then, as I have said, is reached by syllogism. It would be absurd to suppose that the point is void; for the void must be place which has in it an interval in tangible body.

But at all events we observe then that in one way the void is described as what is not full of body perceptible to touch; and what has heaviness and lightness is perceptible to touch. So we would raise

the question: what would they say of an interval that has colour or sound-is it void or not? Clearly they would reply that if it could receive what is tangible it was void, and if not, not.

In another way void is that in which there is no 'this' or corporeal substance. So some say that the void is the matter of the body (they identify the place, too, with this), and in this they speak incorrectly; for the matter is not separable from the things, but they are inquiring about the void as about something separable.

Since we have determined the nature of place, and void must, if it exists, be place deprived of body, and we have stated both in what sense place exists and in what sense it does not, it is plain that on this showing void does not exist, either unseparated or separated; the void is meant to be, not body but rather an interval in body. This is why the void is thought to be something, viz. because place is, and for the same reasons. For the fact of motion in respect of place comes to the aid both of those who maintain that place is something over and above the bodies that come to occupy it, and of those who maintain that the void is something. They state that the void is the condition of movement in the sense of that in which movement takes place; and this would be the kind of thing that some say place is.

But there is no necessity for there being a void if there is movement. It is not in the least needed as a condition of movement in general, for a reason which, incidentally, escaped Melissus; viz. that the full can suffer qualitative change.

But not even movement in respect of place involves a void; for bodies may simultaneously make room for one another, though there is no interval separate and apart from the bodies that are in movement. And this is plain even in the rotation of continuous things, as in that of liquids.

And things can also be compressed not into a void but because they squeeze out what is contained in them (as, for instance, when water is compressed the air within it is squeezed out); and things can increase in size not only by the entrance of something but also by qualitative change; e.g. if water were to be transformed into air.

In general, both the argument about increase of size and that about water poured on to the ashes get in their own way. For either not any and every part of the body is increased, or bodies may be increased otherwise than by the addition of body, or there may be two bodies in the same place (in which case they are claiming to solve a quite general difficulty, but are not proving the existence of void), or the whole body must be void, if it is increased in every part and is increased by means of void. The same argument applies to the ashes.

It is evident, then, that it is easy to refute the arguments by

which they prove the existence of the void.

BOOK_4|CH_8

8

-

Let us explain again that there is no void existing separately, as some maintain. If each of the simple bodies has a natural locomotion, e.g. fire upward and earth downward and towards the middle of the universe, it is clear that it cannot be the void that is the condition of locomotion. What, then, will the void be the condition of? It is thought to be the condition of movement in respect of place, and it is not the condition of this.

Again, if void is a sort of place deprived of body, when there is a void where will a body placed in it move to? It certainly cannot move into the whole of the void. The same argument applies as against those who think that place is something separate, into which things are carried; viz. how will what is placed in it move, or rest? Much the same argument will apply to the void as to the 'up' and 'down' in place, as is natural enough since those who maintain the existence of the void make it a place.

And in what way will things be present either in place-or in the void? For the expected result does not take place when a body is placed as a whole in a place conceived of as separate and permanent; for a part of it, unless it be placed apart, will not be in a place but in the whole. Further, if separate place does not exist, neither will void.

If people say that the void must exist, as being necessary if there is to be movement, what rather turns out to be the case, if one the matter, is the opposite, that not a single thing can be moved if there is a void; for as with those who for a like reason say the earth is at rest, so, too, in the void things must be at rest; for there is no place to which things can move more or less than to another; since the void in so far as it is void admits no difference.

The second reason is this: all movement is either compulsory or according to nature, and if there is compulsory movement there must also be natural (for compulsory movement is contrary to nature, and movement contrary to nature is posterior to that according to nature, so that if each of the natural bodies has not a natural movement, none of the other movements can exist); but how can there be natural movement if there is no difference throughout the void or the infinite? For in so far as it is infinite, there will be no up or down or middle, and in so far as it is a void, up differs no whit from down; for as there is no difference in what is nothing, there is none in the void (for the void seems to be a non-existent and a privation of being), but natural locomotion seems to be

differentiated, so that the things that exist by nature must be differentiated. Either, then, nothing has a natural locomotion, or else there is no void.

Further, in point of fact things that are thrown move though that which gave them their impulse is not touching them, either by reason of mutual replacement, as some maintain, or because the air that has been pushed pushes them with a movement quicker than the natural locomotion of the projectile wherewith it moves to its proper place. But in a void none of these things can take place, nor can anything be moved save as that which is carried is moved.

Further, no one could say why a thing once set in motion should stop anywhere; for why should it stop here rather than here? So that a thing will either be at rest or must be moved ad infinitum, unless something more powerful get in its way.

Further, things are now thought to move into the void because it yields; but in a void this quality is present equally everywhere, so that things should move in all directions.

Further, the truth of what we assert is plain from the following considerations. We see the same weight or body moving faster than another for two reasons, either because there is a difference in what it moves through, as between water, air, and earth, or because, other things being equal, the moving body differs from the other owing to excess of weight or of lightness.

Now the medium causes a difference because it impedes the moving thing, most of all if it is moving in the opposite direction, but in a secondary degree even if it is at rest; and especially a medium that is not easily divided, i.e. a medium that is somewhat dense. A, then, will move through B in time G, and through D, which is thinner, in time E (if the length of B is equal to D), in proportion to the density of the hindering body. For let B be water and D air; then by so much as air is thinner and more incorporeal than water, A will move through D faster than through B. Let the speed have the same ratio to the speed, then, that air has to water. Then if air is twice as thin, the body will traverse B in twice the time that it does D, and the time G will be twice the time E. And always, by so much as the medium is more incorporeal and less resistant and more easily divided, the faster will be the movement.

Now there is no ratio in which the void is exceeded by body, as there is no ratio of 0 to a number. For if 4 exceeds 3 by 1, and 2 by more than 1, and 1 by still more than it exceeds 2, still there is no ratio by which it exceeds 0; for that which exceeds must be divisible into the excess + that which is exceeded, so that will be what it exceeds 0 by + 0. For this reason, too, a line does not exceed a point unless it is composed of points! Similarly the void can bear no ratio to the full, and therefore neither can movement through the

one to movement through the other, but if a thing moves through the thickest medium such and such a distance in such and such a time, it moves through the void with a speed beyond any ratio. For let Z be void, equal in magnitude to B and to D. Then if A is to traverse and move through it in a certain time, H, a time less than E, however, the void will bear this ratio to the full. But in a time equal to H, A will traverse the part O of A. And it will surely also traverse in that time any substance Z which exceeds air in thickness in the ratio which the time E bears to the time H. For if the body Z be as much thinner than D as E exceeds H, A, if it moves through Z, will traverse it in a time inverse to the speed of the movement, i.e. in a time equal to H. If, then, there is no body in Z, A will traverse Z still more quickly. But we supposed that its traverse of Z when Z was void occupied the time H. So that it will traverse Z in an equal time whether Z be full or void. But this is impossible. It is plain, then, that if there is a time in which it will move through any part of the void, this impossible result will follow: it will be found to traverse a certain distance, whether this be full or void, in an equal time; for there will be some body which is in the same ratio to the other body as the time is to the time.

To sum the matter up, the cause of this result is obvious, viz. that between any two movements there is a ratio (for they occupy time, and there is a ratio between any two times, so long as both are finite), but there is no ratio of void to full.

These are the consequences that result from a difference in the media; the following depend upon an excess of one moving body over another. We see that bodies which have a greater impulse either of weight or of lightness, if they are alike in other respects, move faster over an equal space, and in the ratio which their magnitudes bear to each other. Therefore they will also move through the void with this ratio of speed. But that is impossible; for why should one move faster? (In moving through plena it must be so; for the greater divides them faster by its force. For a moving thing cleaves the medium either by its shape, or by the impulse which the body that is carried along or is projected possesses.) Therefore all will possess equal velocity. But this is impossible.

It is evident from what has been said, then, that, if there is a void, a result follows which is the very opposite of the reason for which those who believe in a void set it up. They think that if movement in respect of place is to exist, the void cannot exist, separated all by itself; but this is the same as to say that place is a separate cavity; and this has already been stated to be impossible.

But even if we consider it on its own merits the so-called vacuum will be found to be really vacuous. For as, if one puts a cube in

water, an amount of water equal to the cube will be displaced; so too in air; but the effect is imperceptible to sense. And indeed always in the case of any body that can be displaced, must, if it is not compressed, be displaced in the direction in which it is its nature to be displaced-always either down, if its locomotion is downwards as in the case of earth, or up, if it is fire, or in both directions-whatever be the nature of the inserted body. Now in the void this is impossible; for it is not body; the void must have penetrated the cube to a distance equal to that which this portion of void formerly occupied in the void, just as if the water or air had not been displaced by the wooden cube, but had penetrated right through it.

But the cube also has a magnitude equal to that occupied by the void; a magnitude which, if it is also hot or cold, or heavy or light, is none the less different in essence from all its attributes, even if it is not separable from them; I mean the volume of the wooden cube. So that even if it were separated from everything else and were neither heavy nor light, it will occupy an equal amount of void, and fill the same place, as the part of place or of the void equal to itself. How then will the body of the cube differ from the void or place that is equal to it? And if there can be two such things, why cannot there be any number coinciding?

This, then, is one absurd and impossible implication of the theory. It is also evident that the cube will have this same volume even if it is displaced, which is an attribute possessed by all other bodies also. Therefore if this differs in no respect from its place, why need we assume a place for bodies over and above the volume of each, if their volume be conceived of as free from attributes? It contributes nothing to the situation if there is an equal interval attached to it as well. [Further it ought to be clear by the study of moving things what sort of thing void is. But in fact it is found nowhere in the world. For air is something, though it does not seem to be so-nor, for that matter, would water, if fishes were made of iron; for the discrimination of the tangible is by touch.]

It is clear, then, from these considerations that there is no separate void.

BOOK_4|CH_9

9

-

There are some who think that the existence of rarity and density shows that there is a void. If rarity and density do not exist, they say, neither can things contract and be compressed. But if this were not to take place, either there would be no movement at all, or the universe would bulge, as Xuthus said, or air and water must always

change into equal amounts (e.g. if air has been made out of a cupful of water, at the same time out of an equal amount of air a cupful of water must have been made), or void must necessarily exist; for compression and expansion cannot take place otherwise.

Now, if they mean by the rare that which has many voids existing separately, it is plain that if void cannot exist separate any more than a place can exist with an extension all to itself, neither can the rare exist in this sense. But if they mean that there is void, not separately existent, but still present in the rare, this is less impossible, yet, first, the void turns out not to be a condition of all movement, but only of movement upwards (for the rare is light, which is the reason why they say fire is rare); second, the void turns out to be a condition of movement not as that in which it takes place, but in that the void carries things up as skins by being carried up themselves carry up what is continuous with them. Yet how can void have a local movement or a place? For thus that into which void moves is till then void of a void.

Again, how will they explain, in the case of what is heavy, its movement downwards? And it is plain that if the rarer and more void a thing is the quicker it will move upwards, if it were completely void it would move with a maximum speed! But perhaps even this is impossible, that it should move at all; the same reason which showed that in the void all things are incapable of moving shows that the void cannot move, viz. the fact that the speeds are incomparable.

Since we deny that a void exists, but for the rest the problem has been truly stated, that either there will be no movement, if there is not to be condensation and rarefaction, or the universe will bulge, or a transformation of water into air will always be balanced by an equal transformation of air into water (for it is clear that the air produced from water is bulkier than the water): it is necessary therefore, if compression does not exist, either that the next portion will be pushed outwards and make the outermost part bulge, or that somewhere else there must be an equal amount of water produced out of air, so that the entire bulk of the whole may be equal, or that nothing moves. For when anything is displaced this will always happen, unless it comes round in a circle; but locomotion is not always circular, but sometimes in a straight line.

These then are the reasons for which they might say that there is a void; our statement is based on the assumption that there is a single matter for contraries, hot and cold and the other natural contrarieties, and that what exists actually is produced from a potential existent, and that matter is not separable from the contraries but its being is different, and that a single matter may serve for colour and heat and cold.

The same matter also serves for both a large and a small body.

This is evident; for when air is produced from water, the same matter has become something different, not by acquiring an addition to it, but has become actually what it was potentially, and, again, water is produced from air in the same way, the change being sometimes from smallness to greatness, and sometimes from greatness to smallness. Similarly, therefore, if air which is large in extent comes to have a smaller volume, or becomes greater from being smaller, it is the matter which is potentially both that comes to be each of the two.

For as the same matter becomes hot from being cold, and cold from being hot, because it was potentially both, so too from hot it can become more hot, though nothing in the matter has become hot that was not hot when the thing was less hot; just as, if the arc or curve of a greater circle becomes that of a smaller, whether it remains the same or becomes a different curve, convexity has not come to exist in anything that was not convex but straight (for differences of degree do not depend on an intermission of the quality); nor can we get any portion of a flame, in which both heat and whiteness are not present. So too, then, is the earlier heat related to the later. So that the greatness and smallness, also, of the sensible volume are extended, not by the matter's acquiring anything new, but because the matter is potentially matter for both states; so that the same thing is dense and rare, and the two qualities have one matter.

The dense is heavy, and the rare is light. [Again, as the arc of a circle when contracted into a smaller space does not acquire a new part which is convex, but what was there has been contracted; and as any part of fire that one takes will be hot; so, too, it is all a question of contraction and expansion of the same matter.] There are two types in each case, both in the dense and in the rare; for both the heavy and the hard are thought to be dense, and contrariwise both the light and the soft are rare; and weight and hardness fail to coincide in the case of lead and iron.

From what has been said it is evident, then, that void does not exist either separate (either absolutely separate or as a separate element in the rare) or potentially, unless one is willing to call the condition of movement void, whatever it may be. At that rate the matter of the heavy and the light, qua matter of them, would be the void; for the dense and the rare are productive of locomotion in virtue of this contrariety, and in virtue of their hardness and softness productive of passivity and impassivity, i.e. not of locomotion but rather of qualitative change.

So much, then, for the discussion of the void, and of the sense in which it exists and the sense in which it does not exist.

Next for discussion after the subjects mentioned is Time. The best plan will be to begin by working out the difficulties connected with it, making use of the current arguments. First, does it belong to the class of things that exist or to that of things that do not exist? Then secondly, what is its nature? To start, then: the following considerations would make one suspect that it either does not exist at all or barely, and in an obscure way. One part of it has been and is not, while the other is going to be and is not yet. Yet time-both infinite time and any time you like to take-is made up of these. One would naturally suppose that what is made up of things which do not exist could have no share in reality.

Further, if a divisible thing is to exist, it is necessary that, when it exists, all or some of its parts must exist. But of time some parts have been, while others have to be, and no part of it is though it is divisible. For what is 'now' is not a part: a part is a measure of the whole, which must be made up of parts. Time, on the other hand, is not held to be made up of 'nows'.

Again, the 'now' which seems to bound the past and the future-does it always remain one and the same or is it always other and other? It is hard to say.

(1) If it is always different and different, and if none of the parts in time which are other and other are simultaneous (unless the one contains and the other is contained, as the shorter time is by the longer), and if the 'now' which is not, but formerly was, must have ceased-to-be at some time, the 'nows' too cannot be simultaneous with one another, but the prior 'now' must always have ceased-to-be. But the prior 'now' cannot have ceased-to-be in itself (since it then existed); yet it cannot have ceased-to-be in another 'now'. For we may lay it down that one 'now' cannot be next to another, any more than point to point. If then it did not cease-to-be in the next 'now' but in another, it would exist simultaneously with the innumerable 'nows' between the two-which is impossible.

Yes, but (2) neither is it possible for the 'now' to remain always the same. No determinate divisible thing has a single termination, whether it is continuously extended in one or in more than one dimension: but the 'now' is a termination, and it is possible to cut off a determinate time. Further, if coincidence in time (i.e. being neither prior nor posterior) means to be 'in one and the same "now"', then, if both what is before and what is after are in this same 'now', things which happened ten thousand years ago would be simultaneous with what has happened to-day, and nothing would be before or after anything else.

This may serve as a statement of the difficulties about the

attributes of time.

As to what time is or what is its nature, the traditional accounts give us as little light as the preliminary problems which we have worked through.

Some assert that it is (1) the movement of the whole, others that it is (2) the sphere itself.

(1) Yet part, too, of the revolution is a time, but it certainly is not a revolution: for what is taken is part of a revolution, not a revolution. Besides, if there were more heavens than one, the movement of any of them equally would be time, so that there would be many times at the same time.

(2) Those who said that time is the sphere of the whole thought so, no doubt, on the ground that all things are in time and all things are in the sphere of the whole. The view is too naive for it to be worth while to consider the impossibilities implied in it.

But as time is most usually supposed to be (3) motion and a kind of change, we must consider this view.

Now (a) the change or movement of each thing is only in the thing which changes or where the thing itself which moves or changes may chance to be. But time is present equally everywhere and with all things.

Again, (b) change is always faster or slower, whereas time is not: for 'fast' and 'slow' are defined by time-'fast' is what moves much in a short time, 'slow' what moves little in a long time; but time is not defined by time, by being either a certain amount or a certain kind of it.

Clearly then it is not movement. (We need not distinguish at present between 'movement' and 'change'.)

BOOK_4|CH_11

11

-

But neither does time exist without change; for when the state of our own minds does not change at all, or we have not noticed its changing, we do not realize that time has elapsed, any more than those who are fabled to sleep among the heroes in Sardinia do when they are awakened; for they connect the earlier 'now' with the later and make them one, cutting out the interval because of their failure to notice it. So, just as, if the 'now' were not different but one and the same, there would not have been time, so too when its difference escapes our notice the interval does not seem to be time. If, then, the non-realization of the existence of time happens to us when we do not distinguish any change, but the soul seems to stay in one indivisible state, and when we perceive and distinguish we say time has elapsed, evidently time is not independent of movement and change.

It is evident, then, that time is neither movement nor independent of movement.

We must take this as our starting-point and try to discover-since we wish to know what time is-what exactly it has to do with movement.

Now we perceive movement and time together: for even when it is dark and we are not being affected through the body, if any movement takes place in the mind we at once suppose that some time also has elapsed; and not only that but also, when some time is thought to have passed, some movement also along with it seems to have taken place. Hence time is either movement or something that belongs to movement. Since then it is not movement, it must be the other.

But what is moved is moved from something to something, and all magnitude is continuous. Therefore the movement goes with the magnitude. Because the magnitude is continuous, the movement too must be continuous, and if the movement, then the time; for the time that has passed is always thought to be in proportion to the movement.

The distinction of 'before' and 'after' holds primarily, then, in place; and there in virtue of relative position. Since then 'before' and 'after' hold in magnitude, they must hold also in movement, these corresponding to those. But also in time the distinction of 'before' and 'after' must hold, for time and movement always correspond with each other. The 'before' and 'after' in motion is identical in substratum with motion yet differs from it in definition, and is not identical with motion.

But we apprehend time only when we have marked motion, marking it by 'before' and 'after'; and it is only when we have perceived 'before' and 'after' in motion that we say that time has elapsed. Now we mark them by judging that A and B are different, and that some third thing is intermediate to them. When we think of the extremes as different from the middle and the mind pronounces that the 'nows' are two, one before and one after, it is then that we say that there is time, and this that we say is time. For what is bounded by the 'now' is thought to be time-we may assume this.

When, therefore, we perceive the 'now' one, and neither as before and after in a motion nor as an identity but in relation to a 'before' and an 'after', no time is thought to have elapsed, because there has been no motion either. On the other hand, when we do perceive a 'before' and an 'after', then we say that there is time. For time is just this-number of motion in respect of 'before' and 'after'.

Hence time is not movement, but only movement in so far as it admits of enumeration. A proof of this: we discriminate the more or the less by number, but more or less movement by time. Time then is a kind of number. (Number, we must note, is used in two senses-both of what is counted or the countable and also of that with which we count. Time obviously is what is counted, not that with which we count: there

are different kinds of thing.) Just as motion is a perpetual succession, so also is time. But every simultaneous time is self-identical; for the 'now' as a subject is an identity, but it accepts different attributes. The 'now' measures time, in so far as time involves the 'before and after'.

The 'now' in one sense is the same, in another it is not the same. In so far as it is in succession, it is different (which is just what its being was supposed to mean), but its substratum is an identity: for motion, as was said, goes with magnitude, and time, as we maintain, with motion. Similarly, then, there corresponds to the point the body which is carried along, and by which we are aware of the motion and of the 'before and after' involved in it. This is an identical substratum (whether a point or a stone or something else of the kind), but it has different attributes as the sophists assume that Coriscus' being in the Lyceum is a different thing from Coriscus' being in the market-place. And the body which is carried along is different, in so far as it is at one time here and at another there. But the 'now' corresponds to the body that is carried along, as time corresponds to the motion. For it is by means of the body that is carried along that we become aware of the 'before and after' the motion, and if we regard these as countable we get the 'now'. Hence in these also the 'now' as substratum remains the same (for it is what is before and after in movement), but what is predicated of it is different; for it is in so far as the 'before and after' is numerable that we get the 'now'. This is what is most knowable: for, similarly, motion is known because of that which is moved, locomotion because of that which is carried. what is carried is a real thing, the movement is not. Thus what is called 'now' in one sense is always the same; in another it is not the same: for this is true also of what is carried.

Clearly, too, if there were no time, there would be no 'now', and vice versa. just as the moving body and its locomotion involve each other mutually, so too do the number of the moving body and the number of its locomotion. For the number of the locomotion is time, while the 'now' corresponds to the moving body, and is like the unit of number.

Time, then, also is both made continuous by the 'now' and divided at it. For here too there is a correspondence with the locomotion and the moving body. For the motion or locomotion is made one by the thing which is moved, because it is one-not because it is one in its own nature (for there might be pauses in the movement of such a thing)-but because it is one in definition: for this determines the movement as 'before' and 'after'. Here, too there is a correspondence with the point; for the point also both connects and terminates the length-it is the beginning of one and the end of another. But when you take it in this way, using the one point as two, a pause is necessary, if

the same point is to be the beginning and the end. The 'now' on the other hand, since the body carried is moving, is always different.

Hence time is not number in the sense in which there is 'number' of the same point because it is beginning and end, but rather as the extremities of a line form a number, and not as the parts of the line do so, both for the reason given (for we can use the middle point as two, so that on that analogy time might stand still), and further because obviously the 'now' is no part of time nor the section any part of the movement, any more than the points are parts of the line-for it is two lines that are parts of one line.

In so far then as the 'now' is a boundary, it is not time, but an attribute of it; in so far as it numbers, it is number; for boundaries belong only to that which they bound, but number (e.g. ten) is the number of these horses, and belongs also elsewhere.

It is clear, then, that time is 'number of movement in respect of the before and after', and is continuous since it is an attribute of what is continuous.

BOOK_4|CH_12

12

-

The smallest number, in the strict sense of the word 'number', is two. But of number as concrete, sometimes there is a minimum, sometimes not: e.g. of a 'line', the smallest in respect of multiplicity is two (or, if you like, one), but in respect of size there is no minimum; for every line is divided ad infinitum. Hence it is so with time. In respect of number the minimum is one (or two); in point of extent there is no minimum.

It is clear, too, that time is not described as fast or slow, but as many or few and as long or short. For as continuous it is long or short and as a number many or few, but it is not fast or slow-any more than any number with which we number is fast or slow.

Further, there is the same time everywhere at once, but not the same time before and after, for while the present change is one, the change which has happened and that which will happen are different. Time is not number with which we count, but the number of things which are counted, and this according as it occurs before or after is always different, for the 'nows' are different. And the number of a hundred horses and a hundred men is the same, but the things numbered are different-the horses from the men. Further, as a movement can be one and the same again and again, so too can time, e.g. a year or a spring or an autumn.

Not only do we measure the movement by the time, but also the time by the movement, because they define each other. The time marks the movement, since it is its number, and the movement the time. We

describe the time as much or little, measuring it by the movement, just as we know the number by what is numbered, e.g. the number of the horses by one horse as the unit. For we know how many horses there are by the use of the number; and again by using the one horse as unit we know the number of the horses itself. So it is with the time and the movement; for we measure the movement by the time and vice versa. It is natural that this should happen; for the movement goes with the distance and the time with the movement, because they are quanta and continuous and divisible. The movement has these attributes because the distance is of this nature, and the time has them because of the movement. And we measure both the distance by the movement and the movement by the distance; for we say that the road is long, if the journey is long, and that this is long, if the road is long-the time, too, if the movement, and the movement, if the time.

Time is a measure of motion and of being moved, and it measures the motion by determining a motion which will measure exactly the whole motion, as the cubit does the length by determining an amount which will measure out the whole. Further 'to be in time' means for movement, that both it and its essence are measured by time (for simultaneously it measures both the movement and its essence, and this is what being in time means for it, that its essence should be measured).

Clearly then 'to be in time' has the same meaning for other things also, namely, that their being should be measured by time. 'To be in time' is one of two things: (1) to exist when time exists, (2) as we say of some things that they are 'in number'. The latter means either what is a part or mode of number-in general, something which belongs to number-or that things have a number.

Now, since time is number, the 'now' and the 'before' and the like are in time, just as 'unit' and 'odd' and 'even' are in number, i.e. in the sense that the one set belongs to number, the other to time. But things are in time as they are in number. If this is so, they are contained by time as things in place are contained by place.

Plainly, too, to be in time does not mean to co-exist with time, any more than to be in motion or in place means to co-exist with motion or place. For if 'to be in something' is to mean this, then all things will be in anything, and the heaven will be in a grain; for when the grain is, then also is the heaven. But this is a merely incidental conjunction, whereas the other is necessarily involved: that which is in time necessarily involves that there is time when it is, and that which is in motion that there is motion when it is.

Since what is 'in time' is so in the same sense as what is in number is so, a time greater than everything in time can be found. So it is necessary that all the things in time should be contained by time, just like other things also which are 'in anything', e.g. the things

'in place' by place.

A thing, then, will be affected by time, just as we are accustomed to say that time wastes things away, and that all things grow old through time, and that there is oblivion owing to the lapse of time, but we do not say the same of getting to know or of becoming young or fair. For time is by its nature the cause rather of decay, since it is the number of change, and change removes what is.

Hence, plainly, things which are always are not, as such, in time, for they are not contained time, nor is their being measured by time. A proof of this is that none of them is affected by time, which indicates that they are not in time.

Since time is the measure of motion, it will be the measure of rest too-indirectly. For all rest is in time. For it does not follow that what is in time is moved, though what is in motion is necessarily moved. For time is not motion, but 'number of motion': and what is at rest, also, can be in the number of motion. Not everything that is not in motion can be said to be 'at rest'-but only that which can be moved, though it actually is not moved, as was said above.

'To be in number' means that there is a number of the thing, and that its being is measured by the number in which it is. Hence if a thing is 'in time' it will be measured by time. But time will measure what is moved and what is at rest, the one qua moved, the other qua at rest; for it will measure their motion and rest respectively.

Hence what is moved will not be measurable by the time simply in so far as it has quantity, but in so far as its motion has quantity. Thus none of the things which are neither moved nor at rest are in time: for 'to be in time' is 'to be measured by time', while time is the measure of motion and rest.

Plainly, then, neither will everything that does not exist be in time, i.e. those non-existent things that cannot exist, as the diagonal cannot be commensurate with the side.

Generally, if time is directly the measure of motion and indirectly of other things, it is clear that a thing whose existence is measured by it will have its existence in rest or motion. Those things therefore which are subject to perishing and becoming-generally, those which at one time exist, at another do not-are necessarily in time: for there is a greater time which will extend both beyond their existence and beyond the time which measures their existence. Of things which do not exist but are contained by time some were, e.g. Homer once was, some will be, e.g. a future event; this depends on the direction in which time contains them; if on both, they have both modes of existence. As to such things as it does not contain in any way, they neither were nor are nor will be. These are those nonexistents whose opposites always are, as

the incommensurability of the diagonal always is-and this will not be in time. Nor will the commensurability, therefore; hence this eternally is not, because it is contrary to what eternally is. A thing whose contrary is not eternal can be and not be, and it is of such things that there is coming to be and passing away.

BOOK_4|CH_13

13

-

The 'now' is the link of time, as has been said (for it connects past and future time), and it is a limit of time (for it is the beginning of the one and the end of the other). But this is not obvious as it is with the point, which is fixed. It divides potentially, and in so far as it is dividing the 'now' is always different, but in so far as it connects it is always the same, as it is with mathematical lines. For the intellect it is not always one and the same point, since it is other and other when one divides the line; but in so far as it is one, it is the same in every respect.

So the 'now' also is in one way a potential dividing of time, in another the termination of both parts, and their unity. And the dividing and the uniting are the same thing and in the same reference, but in essence they are not the same.

So one kind of 'now' is described in this way: another is when the time is near this kind of 'now'. 'He will come now' because he will come to-day; 'he has come now' because he came to-day. But the things in the Iliad have not happened 'now', nor is the flood 'now'-not that the time from now to them is not continuous, but because they are not near.

'At some time' means a time determined in relation to the first of the two types of 'now', e.g. 'at some time' Troy was taken, and 'at some time' there will be a flood; for it must be determined with reference to the 'now'. There will thus be a determinate time from this 'now' to that, and there was such in reference to the past event. But if there be no time which is not 'sometime', every time will be determined.

Will time then fail? Surely not, if motion always exists. Is time then always different or does the same time recur? Clearly time is, in the same way as motion is. For if one and the same motion sometimes recurs, it will be one and the same time, and if not, not.

Since the 'now' is an end and a beginning of time, not of the same time however, but the end of that which is past and the beginning of that which is to come, it follows that, as the circle has its convexity and its concavity, in a sense, in the same thing, so time is always at a beginning and at an end. And for this reason it seems to be always different; for the 'now' is not the beginning and the end of

the same thing; if it were, it would be at the same time and in the same respect two opposites. And time will not fail; for it is always at a beginning.

'Presently' or 'just' refers to the part of future time which is near the indivisible present 'now' ('When do you walk? 'Presently', because the time in which he is going to do so is near), and to the part of past time which is not far from the 'now' ('When do you walk?' 'I have just been walking'). But to say that Troy has just been taken—we do not say that, because it is too far from the 'now'. 'Lately', too, refers to the part of past time which is near the present 'now'. 'When did you go?' 'Lately', if the time is near the existing now. 'Long ago' refers to the distant past.

'Suddenly' refers to what has departed from its former condition in a time imperceptible because of its smallness; but it is the nature of all change to alter things from their former condition. In time all things come into being and pass away; for which reason some called it the wisest of all things, but the Pythagorean Paron called it the most stupid, because in it we also forget; and his was the truer view. It is clear then that it must be in itself, as we said before, the condition of destruction rather than of coming into being (for change, in itself, makes things depart from their former condition), and only incidentally of coming into being, and of being. A sufficient evidence of this is that nothing comes into being without itself moving somehow and acting, but a thing can be destroyed even if it does not move at all. And this is what, as a rule, we chiefly mean by a thing's being destroyed by time. Still, time does not work even this change; even this sort of change takes place incidentally in time.

We have stated, then, that time exists and what it is, and in how many senses we speak of the 'now', and what 'at some time', 'lately', 'presently' or 'just', 'long ago', and 'suddenly' mean.

BOOK_4|CH_14

14

-

These distinctions having been drawn, it is evident that every change and everything that moves is in time; for the distinction of faster and slower exists in reference to all change, since it is found in every instance. In the phrase 'moving faster' I refer to that which changes before another into the condition in question, when it moves over the same interval and with a regular movement; e.g. in the case of locomotion, if both things move along the circumference of a circle, or both along a straight line; and similarly in all other cases. But what is before is in time; for we say 'before' and 'after' with reference to the distance from the 'now', and the 'now'

is the boundary of the past and the future; so that since 'nows' are in time, the before and the after will be in time too; for in that in which the 'now' is, the distance from the 'now' will also be. But 'before' is used contrariwise with reference to past and to future time; for in the past we call 'before' what is farther from the 'now', and 'after' what is nearer, but in the future we call the nearer 'before' and the farther 'after'. So that since the 'before' is in time, and every movement involves a 'before', evidently every change and every movement is in time.

It is also worth considering how time can be related to the soul; and why time is thought to be in everything, both in earth and in sea and in heaven. Is because it is an attribute, or state, or movement (since it is the number of movement) and all these things are movable (for they are all in place), and time and movement are together, both in respect of potentiality and in respect of actuality?

Whether if soul did not exist time would exist or not, is a question that may fairly be asked; for if there cannot be some one to count there cannot be anything that can be counted, so that evidently there cannot be number; for number is either what has been, or what can be, counted. But if nothing but soul, or in soul reason, is qualified to count, there would not be time unless there were soul, but only that of which time is an attribute, i.e. if movement can exist without soul, and the before and after are attributes of movement, and time is these qua numerable.

One might also raise the question what sort of movement time is the number of. Must we not say 'of any kind'? For things both come into being in time and pass away, and grow, and are altered in time, and are moved locally; thus it is of each movement qua movement that time is the number. And so it is simply the number of continuous movement, not of any particular kind of it.

But other things as well may have been moved now, and there would be a number of each of the two movements. Is there another time, then, and will there be two equal times at once? Surely not. For a time that is both equal and simultaneous is one and the same time, and even those that are not simultaneous are one in kind; for if there were dogs, and horses, and seven of each, it would be the same number. So, too, movements that have simultaneous limits have the same time, yet the one may in fact be fast and the other not, and one may be locomotion and the other alteration; still the time of the two changes is the same if their number also is equal and simultaneous; and for this reason, while the movements are different and separate, the time is everywhere the same, because the number of equal and simultaneous movements is everywhere one and the same.

Now there is such a thing as locomotion, and in locomotion there is included circular movement, and everything is measured by some

one thing homogeneous with it, units by a unit, horses by a horse, and similarly times by some definite time, and, as we said, time is measured by motion as well as motion by time (this being so because by a motion definite in time the quantity both of the motion and of the time is measured): if, then, what is first is the measure of everything homogeneous with it, regular circular motion is above all else the measure, because the number of this is the best known. Now neither alteration nor increase nor coming into being can be regular, but locomotion can be. This also is why time is thought to be the movement of the sphere, viz. because the other movements are measured by this, and time by this movement.

This also explains the common saying that human affairs form a circle, and that there is a circle in all other things that have a natural movement and coming into being and passing away. This is because all other things are discriminated by time, and end and begin as though conforming to a cycle; for even time itself is thought to be a circle. And this opinion again is held because time is the measure of this kind of locomotion and is itself measured by such. So that to say that the things that come into being form a circle is to say that there is a circle of time; and this is to say that it is measured by the circular movement; for apart from the measure nothing else to be measured is observed; the whole is just a plurality of measures.

It is said rightly, too, that the number of the sheep and of the dogs is the same number if the two numbers are equal, but not the same decad or the same ten; just as the equilateral and the scalene are not the same triangle, yet they are the same figure, because they are both triangles. For things are called the same so-and-so if they do not differ by a differentia of that thing, but not if they do; e.g. triangle differs from triangle by a differentia of triangle, therefore they are different triangles; but they do not differ by a differentia of figure, but are in one and the same division of it. For a figure of the one kind is a circle and a figure of another kind of triangle, and a triangle of one kind is equilateral and a triangle of another kind scalene. They are the same figure, then, that, triangle, but not the same triangle. Therefore the number of two groups also-is the same number (for their number does not differ by a differentia of number), but it is not the same decad; for the things of which it is asserted differ; one group are dogs, and the other horses.

We have now discussed time-both time itself and the matters appropriate to the consideration of it.

EVERYTHING which changes does so in one of three senses. It may change (1) accidentally, as for instance when we say that something musical walks, that which walks being something in which aptitude for music is an accident. Again (2) a thing is said without qualification to change because something belonging to it changes, i.e. in statements which refer to part of the thing in question: thus the body is restored to health because the eye or the chest, that is to say a part of the whole body, is restored to health. And above all there is (3) the case of a thing which is in motion neither accidentally nor in respect of something else belonging to it, but in virtue of being itself directly in motion. Here we have a thing which is essentially movable: and that which is so is a different thing according to the particular variety of motion: for instance it may be a thing capable of alteration: and within the sphere of alteration it is again a different thing according as it is capable of being restored to health or capable of being heated. And there are the same distinctions in the case of the mover: (1) one thing causes motion accidentally, (2) another partially (because something belonging to it causes motion), (3) another of itself directly, as, for instance, the physician heals, the hand strikes. We have, then, the following factors: (a) on the one hand that which directly causes motion, and (b) on the other hand that which is in motion: further, we have (c) that in which motion takes place, namely time, and (distinct from these three) (d) that from which and (e) that to which it proceeds: for every motion proceeds from something and to something, that which is directly in motion being distinct from that to which it is in motion and that from which it is in motion: for instance, we may take the three things 'wood', 'hot', and 'cold', of which the first is that which is in motion, the second is that to which the motion proceeds, and the third is that from which it proceeds. This being so, it is clear that the motion is in the wood, not in its form: for the motion is neither caused nor experienced by the form or the place or the quantity. So we are left with a mover, a moved, and a goal of motion. I do not include the starting-point of motion: for it is the goal rather than the starting-point of motion that gives its name to a particular process of change. Thus 'perishing' is change to not-being, though it is also true that that which perishes changes from being: and 'becoming' is change to being, though it is also change from not-being.

Now a definition of motion has been given above, from which it will be seen that every goal of motion, whether it be a form, an affection, or a place, is immovable, as, for instance, knowledge and heat. Here, however, a difficulty may be raised. Affections, it may be

said, are motions, and whiteness is an affection: thus there may be change to a motion. To this we may reply that it is not whiteness but whitening that is a motion. Here also the same distinctions are to be observed: a goal of motion may be so accidentally, or partially and with reference to something other than itself, or directly and with no reference to anything else: for instance, a thing which is becoming white changes accidentally to an object of thought, the colour being only accidentally the object of thought; it changes to colour, because white is a part of colour, or to Europe, because Athens is a part of Europe; but it changes essentially to white colour. It is now clear in what sense a thing is in motion essentially, accidentally, or in respect of something other than itself, and in what sense the phrase 'itself directly' is used in the case both of the mover and of the moved: and it is also clear that the motion is not in the form but in that which is in motion, that is to say 'the movable in activity'. Now accidental change we may leave out of account: for it is to be found in everything, at any time, and in any respect. Change which is not accidental on the other hand is not to be found in everything, but only in contraries, in things intermediate contraries, and in contradictories, as may be proved by induction. An intermediate may be a starting-point of change, since for the purposes of the change it serves as contrary to either of two contraries: for the intermediate is in a sense the extremes. Hence we speak of the intermediate as in a sense a contrary relatively to the extremes and of either extreme as a contrary relatively to the intermediate: for instance, the central note is low relatively-to the highest and high relatively to the lowest, and grey is light relatively to black and dark relatively to white.

And since every change is from something to something-as the word itself (metabole) indicates, implying something 'after' (meta) something else, that is to say something earlier and something later-that which changes must change in one of four ways: from subject to subject, from subject to nonsubject, from non-subject to subject, or from non-subject to non-subject, where by 'subject' I mean what is affirmatively expressed. So it follows necessarily from what has been said above that there are only three kinds of change, that from subject to subject, that from subject to non-subject, and that from non-subject to subject: for the fourth conceivable kind, that from non-subject to nonsubject, is not change, as in that case there is no opposition either of contraries or of contradictories.

Now change from non-subject to subject, the relation being that of contradiction, is 'coming to be'-'unqualified coming to be' when the change takes place in an unqualified way, 'particular coming to be' when the change is change in a particular character: for instance, a change from not-white to white is a coming to be of the particular

thing, white, while change from unqualified not-being to being is coming to be in an unqualified way, in respect of which we say that a thing 'comes to be' without qualification, not that it 'comes to be' some particular thing. Change from subject to non-subject is 'perishing'-'unqualified perishing' when the change is from being to not-being, 'particular perishing' when the change is to the opposite negation, the distinction being the same as that made in the case of coming to be.

Now the expression 'not-being' is used in several senses: and there can be motion neither of that which 'is not' in respect of the affirmation or negation of a predicate, nor of that which 'is not' in the sense that it only potentially 'is', that is to say the opposite of that which actually 'is' in an unqualified sense: for although that which is 'not-white' or 'not-good' may nevertheless be in motion accidentally (for example that which is 'not-white' might be a man), yet that which is without qualification 'not-so-and-so' cannot in any sense be in motion: therefore it is impossible for that which is not to be in motion. This being so, it follows that 'becoming' cannot be a motion: for it is that which 'is not' that 'becomes'. For however true it may be that it accidentally 'becomes', it is nevertheless correct to say that it is that which 'is not' that in an unqualified sense 'becomes'. And similarly it is impossible for that which 'is not' to be at rest.

There are these difficulties, then, in the way of the assumption that that which 'is not' can be in motion: and it may be further objected that, whereas everything which is in motion is in space, that which 'is not' is not in space: for then it would be somewhere.

So, too, 'perishing' is not a motion: for a motion has for its contrary either another motion or rest, whereas 'perishing' is the contrary of 'becoming'.

Since, then, every motion is a kind of change, and there are only the three kinds of change mentioned above, and since of these three those which take the form of 'becoming' and 'perishing', that is to say those which imply a relation of contradiction, are not motions: it necessarily follows that only change from subject to subject is motion. And every such subject is either a contrary or an intermediate (for a privation may be allowed to rank as a contrary) and can be affirmatively expressed, as naked, toothless, or black. If, then, the categories are severally distinguished as Being, Quality, Place, Time, Relation, Quantity, and Activity or Passivity, it necessarily follows that there are three kinds of motion-qualitative, quantitative, and local.

-

In respect of Substance there is no motion, because Substance has no contrary among things that are. Nor is there motion in respect of Relation: for it may happen that when one correlative changes, the other, although this does not itself change, is no longer applicable, so that in these cases the motion is accidental. Nor is there motion in respect of Agent and Patient-in fact there can never be motion of mover and moved, because there cannot be motion of motion or becoming of becoming or in general change of change.

For in the first place there are two senses in which motion of motion is conceivable. (1) The motion of which there is motion might be conceived as subject; e.g. a man is in motion because he changes from fair to dark. Can it be that in this sense motion grows hot or cold, or changes place, or increases or decreases? Impossible: for change is not a subject. Or (2) can there be motion of motion in the sense that some other subject changes from a change to another mode of being, as e.g. a man changes from falling ill to getting well? Even this is possible only in an accidental sense. For, whatever the subject may be, movement is change from one form to another. (And the same holds good of becoming and perishing, except that in these processes we have a change to a particular kind of opposite, while the other, motion, is a change to a different kind.) So, if there is to be motion of motion, that which is changing from health to sickness must simultaneously be changing from this very change to another. It is clear, then, that by the time that it has become sick, it must also have changed to whatever may be the other change concerned (for that it should be at rest, though logically possible, is excluded by the theory). Moreover this other can never be any casual change, but must be a change from something definite to some other definite thing. So in this case it must be the opposite change, viz. convalescence. It is only accidentally that there can be change of change, e.g. there is a change from remembering to forgetting only because the subject of this change changes at one time to knowledge, at another to ignorance.

In the second place, if there is to be change of change and becoming of becoming, we shall have an infinite regress. Thus if one of a series of changes is to be a change of change, the preceding change must also be so: e.g. if simple becoming was ever in process of becoming, then that which was becoming simple becoming was also in process of becoming, so that we should not yet have arrived at what was in process of simple becoming but only at what was already in process of becoming in process of becoming. And this again was sometime in process of becoming, so that even then we should not have arrived at what was in process of simple becoming. And since in an infinite series there is no first term, here there will be no first stage and therefore no following stage either. On this hypothesis,

then, nothing can become or be moved or change.

Thirdly, if a thing is capable of any particular motion, it is also capable of the corresponding contrary motion or the corresponding coming to rest, and a thing that is capable of becoming is also capable of perishing: consequently, if there be becoming of becoming, that which is in process of becoming is in process of perishing at the very moment when it has reached the stage of becoming: since it cannot be in process of perishing when it is just beginning to become or after it has ceased to become: for that which is in process of perishing must be in existence.

Fourthly, there must be a substrate underlying all processes of becoming and changing. What can this be in the present case? It is either the body or the soul that undergoes alteration: what is it that correspondingly becomes motion or becoming? And again what is the goal of their motion? It must be the motion or becoming of something from something to something else. But in what sense can this be so? For the becoming of learning cannot be learning: so neither can the becoming of becoming be becoming, nor can the becoming of any process be that process.

Finally, since there are three kinds of motion, the substratum and the goal of motion must be one or other of these, e.g. locomotion will have to be altered or to be locally moved.

To sum up, then, since everything that is moved is moved in one of three ways, either accidentally, or partially, or essentially, change can change only accidentally, as e.g. when a man who is being restored to health runs or learns: and accidental change we have long ago decided to leave out of account.

Since, then, motion can belong neither to Being nor to Relation nor to Agent and Patient, it remains that there can be motion only in respect of Quality, Quantity, and Place: for with each of these we have a pair of contraries. Motion in respect of Quality let us call alteration, a general designation that is used to include both contraries: and by Quality I do not here mean a property of substance (in that sense that which constitutes a specific distinction is a quality) but a passive quality in virtue of which a thing is said to be acted on or to be incapable of being acted on. Motion in respect of Quantity has no name that includes both contraries, but it is called increase or decrease according as one or the other is designated: that is to say motion in the direction of complete magnitude is increase, motion in the contrary direction is decrease. Motion in respect of Place has no name either general or particular: but we may designate it by the general name of locomotion, though strictly the term 'locomotion' is applicable to things that change their place only when they have not the power to come to a stand, and to things that do not move themselves locally.

Change within the same kind from a lesser to a greater or from a greater to a lesser degree is alteration: for it is motion either from a contrary or to a contrary, whether in an unqualified or in a qualified sense: for change to a lesser degree of a quality will be called change to the contrary of that quality, and change to a greater degree of a quality will be regarded as change from the contrary of that quality to the quality itself. It makes no difference whether the change be qualified or unqualified, except that in the former case the contraries will have to be contrary to one another only in a qualified sense: and a thing's possessing a quality in a greater or in a lesser degree means the presence or absence in it of more or less of the opposite quality. It is now clear, then, that there are only these three kinds of motion.

The term 'immovable' we apply in the first place to that which is absolutely incapable of being moved (just as we correspondingly apply the term invisible to sound); in the second place to that which is moved with difficulty after a long time or whose movement is slow at the start—in fact, what we describe as hard to move; and in the third place to that which is naturally designed for and capable of motion, but is not in motion when, where, and as it naturally would be so. This last is the only kind of immovable thing of which I use the term 'being at rest': for rest is contrary to motion, so that rest will be negation of motion in that which is capable of admitting motion.

The foregoing remarks are sufficient to explain the essential nature of motion and rest, the number of kinds of change, and the different varieties of motion.

BOOK_5|CH_3

3

-

Let us now proceed to define the terms 'together' and 'apart', 'in contact', 'between', 'in succession', 'contiguous', and 'continuous', and to show in what circumstances each of these terms is naturally applicable.

Things are said to be together in place when they are in one place (in the strictest sense of the word 'place') and to be apart when they are in different places.

Things are said to be in contact when their extremities are together.

That which a changing thing, if it changes continuously in a natural manner, naturally reaches before it reaches that to which it changes last, is between. Thus 'between' implies the presence of at least three things: for in a process of change it is the contrary that is 'last': and a thing is moved continuously if it leaves no gap or

only the smallest possible gap in the material-not in the time (for a gap in the time does not prevent things having a 'between', while, on the other hand, there is nothing to prevent the highest note sounding immediately after the lowest) but in the material in which the motion takes place. This is manifestly true not only in local changes but in every other kind as well. (Now every change implies a pair of opposites, and opposites may be either contraries or contradictories; since then contradiction admits of no mean term, it is obvious that 'between' must imply a pair of contraries) That is locally contrary which is most distant in a straight line: for the shortest line is definitely limited, and that which is definitely limited constitutes a measure.

A thing is 'in succession' when it is after the beginning in position or in form or in some other respect in which it is definitely so regarded, and when further there is nothing of the same kind as itself between it and that to which it is in succession, e.g. a line or lines if it is a line, a unit or units if it is a unit, a house if it is a house (there is nothing to prevent something of a different kind being between). For that which is in succession is in succession to a particular thing, and is something posterior: for one is not 'in succession' to two, nor is the first day of the month to be second: in each case the latter is 'in succession' to the former.

A thing that is in succession and touches is 'contiguous'. The 'continuous' is a subdivision of the contiguous: things are called continuous when the touching limits of each become one and the same and are, as the word implies, contained in each other: continuity is impossible if these extremities are two. This definition makes it plain that continuity belongs to things that naturally in virtue of their mutual contact form a unity. And in whatever way that which holds them together is one, so too will the whole be one, e.g. by a rivet or glue or contact or organic union.

It is obvious that of these terms 'in succession' is first in order of analysis: for that which touches is necessarily in succession, but not everything that is in succession touches: and so succession is a property of things prior in definition, e.g. numbers, while contact is not. And if there is continuity there is necessarily contact, but if there is contact, that alone does not imply continuity: for the extremities of things may be 'together' without necessarily being one: but they cannot be one without being necessarily together. So natural junction is last in coming to be: for the extremities must necessarily come into contact if they are to be naturally joined: but things that are in contact are not all naturally joined, while there is no contact clearly there is no natural junction either. Hence, if as some say 'point' and 'unit' have an independent

existence of their own, it is impossible for the two to be identical: for points can touch while units can only be in succession. Moreover, there can always be something between points (for all lines are intermediate between points), whereas it is not necessary that there should possibly be anything between units: for there can be nothing between the numbers one and two.

We have now defined what is meant by 'together' and 'apart', 'contact', 'between' and 'in succession', 'contiguous' and 'continuous': and we have shown in what circumstances each of these terms is applicable.

BOOK_5|CH_4

4

-

There are many senses in which motion is said to be 'one': for we use the term 'one' in many senses.

Motion is one generically according to the different categories to which it may be assigned: thus any locomotion is one generically with any other locomotion, whereas alteration is different generically from locomotion.

Motion is one specifically when besides being one generically it also takes place in a species incapable of subdivision: e.g. colour has specific differences: therefore blackening and whitening differ specifically; but at all events every whitening will be specifically the same with every other whitening and every blackening with every other blackening. But white is not further subdivided by specific differences: hence any whitening is specifically one with any other whitening. Where it happens that the genus is at the same time a species, it is clear that the motion will then in a sense be one specifically though not in an unqualified sense: learning is an example of this, knowledge being on the one hand a species of apprehension and on the other hand a genus including the various knowledges. A difficulty, however, may be raised as to whether a motion is specifically one when the same thing changes from the same to the same, e.g. when one point changes again and again from a particular place to a particular place: if this motion is specifically one, circular motion will be the same as rectilinear motion, and rolling the same as walking. But is not this difficulty removed by the principle already laid down that if that in which the motion takes place is specifically different (as in the present instance the circular path is specifically different from the straight) the motion itself is also different? We have explained, then, what is meant by saying that motion is one generically or one specifically.

Motion is one in an unqualified sense when it is one essentially or numerically: and the following distinctions will make clear what

this kind of motion is. There are three classes of things in connexion with which we speak of motion, the 'that which', the 'that in which', and the 'that during which'. I mean that there must be something that is in motion, e.g. a man or gold, and it must be in motion in something, e.g. a place or an affection, and during something, for all motion takes place during a time. Of these three it is the thing in which the motion takes place that makes it one generically or specifically, it is the thing moved that makes the motion one in subject, and it is the time that makes it consecutive: but it is the three together that make it one without qualification: to effect this, that in which the motion takes place (the species) must be one and incapable of subdivision, that during which it takes place (the time) must be one and unintermittent, and that which is in motion must be one—not in an accidental sense (i.e. it must be one as the white that blackens is one or Coriscus who walks is one, not in the accidental sense in which Coriscus and white may be one), nor merely in virtue of community of nature (for there might be a case of two men being restored to health at the same time in the same way, e.g. from inflammation of the eye, yet this motion is not really one, but only specifically one).

Suppose, however, that Socrates undergoes an alteration specifically the same but at one time and again at another: in this case if it is possible for that which ceased to be again to come into being and remain numerically the same, then this motion too will be one: otherwise it will be the same but not one. And akin to this difficulty there is another; viz. is health one? and generally are the states and affections in bodies severally one in essence although (as is clear) the things that contain them are obviously in motion and in flux? Thus if a person's health at daybreak and at the present moment is one and the same, why should not this health be numerically one with that which he recovers after an interval? The same argument applies in each case. There is, however, we may answer, this difference: that if the states are two then it follows simply from this fact that the activities must also in point of number be two (for only that which is numerically one can give rise to an activity that is numerically one), but if the state is one, this is not in itself enough to make us regard the activity also as one: for when a man ceases walking, the walking no longer is, but it will again be if he begins to walk again. But, be this as it may, if in the above instance the health is one and the same, then it must be possible for that which is one and the same to come to be and to cease to be many times. However, these difficulties lie outside our present inquiry.

Since every motion is continuous, a motion that is one in an unqualified sense must (since every motion is divisible) be continuous, and a continuous motion must be one. There will not be

continuity between any motion and any other indiscriminately any more than there is between any two things chosen at random in any other sphere: there can be continuity only when the extremities of the two things are one. Now some things have no extremities at all: and the extremities of others differ specifically although we give them the same name of 'end': how should e.g. the 'end' of a line and the 'end' of walking touch or come to be one? Motions that are not the same either specifically or generically may, it is true, be consecutive (e.g. a man may run and then at once fall ill of a fever), and again, in the torch-race we have consecutive but not continuous locomotion: for according to our definition there can be continuity only when the ends of the two things are one. Hence motions may be consecutive or successive in virtue of the time being continuous, but there can be continuity only in virtue of the motions themselves being continuous, that is when the end of each is one with the end of the other. Motion, therefore, that is in an unqualified sense continuous and one must be specifically the same, of one thing, and in one time. Unity is required in respect of time in order that there may be no interval of immobility, for where there is intermission of motion there must be rest, and a motion that includes intervals of rest will be not one but many, so that a motion that is interrupted by stationariness is not one or continuous, and it is so interrupted if there is an interval of time. And though of a motion that is not specifically one (even if the time is unintermittent) the time is one, the motion is specifically different, and so cannot really be one, for motion that is one must be specifically one, though motion that is specifically one is not necessarily one in an unqualified sense. We have now explained what we mean when we call a motion one without qualification.

Further, a motion is also said to be one generically, specifically, or essentially when it is complete, just as in other cases completeness and wholeness are characteristics of what is one: and sometimes a motion even if incomplete is said to be one, provided only that it is continuous.

And besides the cases already mentioned there is another in which a motion is said to be one, viz. when it is regular: for in a sense a motion that is irregular is not regarded as one, that title belonging rather to that which is regular, as a straight line is regular, the irregular being as such divisible. But the difference would seem to be one of degree. In every kind of motion we may have regularity or irregularity: thus there may be regular alteration, and locomotion in a regular path, e.g. in a circle or on a straight line, and it is the same with regard to increase and decrease. The difference that makes a motion irregular is sometimes to be found in its path: thus a motion cannot be regular if its path is an

irregular magnitude, e.g. a broken line, a spiral, or any other magnitude that is not such that any part of it taken at random fits on to any other that may be chosen. Sometimes it is found neither in the place nor in the time nor in the goal but in the manner of the motion: for in some cases the motion is differentiated by quickness and slowness: thus if its velocity is uniform a motion is regular, if not it is irregular. So quickness and slowness are not species of motion nor do they constitute specific differences of motion, because this distinction occurs in connexion with all the distinct species of motion. The same is true of heaviness and lightness when they refer to the same thing: e.g. they do not specifically distinguish earth from itself or fire from itself. Irregular motion, therefore, while in virtue of being continuous it is one, is so in a lesser degree, as is the case with locomotion in a broken line: and a lesser degree of something always means an admixture of its contrary. And since every motion that is one can be both regular and irregular, motions that are consecutive but not specifically the same cannot be one and continuous: for how should a motion composed of alteration and locomotion be regular? If a motion is to be regular its parts ought to fit one another.

BOOK_5|CH_5

5

-

We have further to determine what motions are contrary to each other, and to determine similarly how it is with rest. And we have first to decide whether contrary motions are motions respectively from and to the same thing, e.g. a motion from health and a motion to health (where the opposition, it would seem, is of the same kind as that between coming to be and ceasing to be); or motions respectively from contraries, e.g. a motion from health and a motion from disease; or motions respectively to contraries, e.g. a motion to health and a motion to disease; or motions respectively from a contrary and to the opposite contrary, e.g. a motion from health and a motion to disease; or motions respectively from a contrary to the opposite contrary and from the latter to the former, e.g. a motion from health to disease and a motion from disease to health: for motions must be contrary to one another in one or more of these ways, as there is no other way in which they can be opposed.

Now motions respectively from a contrary and to the opposite contrary, e.g. a motion from health and a motion to disease, are not contrary motions: for they are one and the same. (Yet their essence is not the same, just as changing from health is different from changing to disease.) Nor are motion respectively from a contrary and from the opposite contrary motions, for a motion from a

contrary is at the same time a motion to a contrary or to an intermediate (of this, however, we shall speak later), but changing to a contrary rather than changing from a contrary would seem to be the cause of the contrariety of motions, the latter being the loss, the former the gain, of contrariness. Moreover, each several motion takes its name rather from the goal than from the starting-point of change, e.g. motion to health we call convalescence, motion to disease sickening. Thus we are left with motions respectively to contraries, and motions respectively to contraries from the opposite contraries. Now it would seem that motions to contraries are at the same time motions from contraries (though their essence may not be the same; 'to health' is distinct, I mean, from 'from disease', and 'from health' from 'to disease').

Since then change differs from motion (motion being change from a particular subject to a particular subject), it follows that contrary motions are motions respectively from a contrary to the opposite contrary and from the latter to the former, e.g. a motion from health to disease and a motion from disease to health. Moreover, the consideration of particular examples will also show what kinds of processes are generally recognized as contrary: thus falling ill is regarded as contrary to recovering one's health, these processes having contrary goals, and being taught as contrary to being led into error by another, it being possible to acquire error, like knowledge, either by one's own agency or by that of another. Similarly we have upward locomotion and downward locomotion, which are contrary lengthwise, locomotion to the right and locomotion to the left, which are contrary breadthwise, and forward locomotion and backward locomotion, which too are contraries. On the other hand, a process simply to a contrary, e.g. that denoted by the expression 'becoming white', where no starting-point is specified, is a change but not a motion. And in all cases of a thing that has no contrary we have as contraries change from and change to the same thing. Thus coming to be is contrary to ceasing to be, and losing to gaining. But these are changes and not motions. And wherever a pair of contraries admit of an intermediate, motions to that intermediate must be held to be in a sense motions to one or other of the contraries: for the intermediate serves as a contrary for the purposes of the motion, in whichever direction the change may be, e.g. grey in a motion from grey to white takes the place of black as starting-point, in a motion from white to grey it takes the place of black as goal, and in a motion from black to grey it takes the place of white as goal: for the middle is opposed in a sense to either of the extremes, as has been said above. Thus we see that two motions are contrary to each other only when one is a motion from a contrary to the opposite contrary and the other is a motion from the latter to the

former.

BOOK_5|CH_6

6

-

But since a motion appears to have contrary to it not only another motion but also a state of rest, we must determine how this is so. A motion has for its contrary in the strict sense of the term another motion, but it also has for an opposite a state of rest (for rest is the privation of motion and the privation of anything may be called its contrary), and motion of one kind has for its opposite rest of that kind, e.g. local motion has local rest. This statement, however, needs further qualification: there remains the question, is the opposite of remaining at a particular place motion from or motion to that place? It is surely clear that since there are two subjects between which motion takes place, motion from one of these (A) to its contrary (B) has for its opposite remaining in A while the reverse motion has for its opposite remaining in B. At the same time these two are also contrary to each other: for it would be absurd to suppose that there are contrary motions and not opposite states of rest. States of rest in contraries are opposed. To take an example, a state of rest in health is (1) contrary to a state of rest in disease, and (2) the motion to which it is contrary is that from health to disease. For (2) it would be absurd that its contrary motion should be that from disease to health, since motion to that in which a thing is at rest is rather a coming to rest, the coming to rest being found to come into being simultaneously with the motion; and one of these two motions it must be. And (1) rest in whiteness is of course not contrary to rest in health.

Of all things that have no contraries there are opposite changes (viz. change from the thing and change to the thing, e.g. change from being and change to being), but no motion. So, too, of such things there is no remaining though there is absence of change. Should there be a particular subject, absence of change in its being will be contrary to absence of change in its not-being. And here a difficulty may be raised: if not-being is not a particular something, what is it, it may be asked, that is contrary to absence of change in a thing's being? and is this absence of change a state of rest? If it is, then either it is not true that every state of rest is contrary to a motion or else coming to be and ceasing to be are motion. It is clear then that, since we exclude these from among motions, we must not say that this absence of change is a state of rest: we must say that it is similar to a state of rest and call it absence of change. And it will have for its contrary either nothing or absence of change in the thing's not-being, or the ceasing to be of

the thing: for such ceasing to be is change from it and the thing's coming to be is change to it.

Again, a further difficulty may be raised. How is it, it may be asked, that whereas in local change both remaining and moving may be natural or unnatural, in the other changes this is not so? e.g. alteration is not now natural and now unnatural, for convalescence is no more natural or unnatural than falling ill, whitening no more natural or unnatural than blackening; so, too, with increase and decrease: these are not contrary to each other in the sense that either of them is natural while the other is unnatural, nor is one increase contrary to another in this sense; and the same account may be given of becoming and perishing: it is not true that becoming is natural and perishing unnatural (for growing old is natural), nor do we observe one becoming to be natural and another unnatural. We answer that if what happens under violence is unnatural, then violent perishing is unnatural and as such contrary to natural perishing. Are there then also some becomings that are violent and not the result of natural necessity, and are therefore contrary to natural becomings, and violent increases and decreases, e.g. the rapid growth to maturity of profligates and the rapid ripening of seeds even when not packed close in the earth? And how is it with alterations? Surely just the same: we may say that some alterations are violent while others are natural, e.g. patients alter naturally or unnaturally according as they throw off fevers on the critical days or not. But, it may be objected, then we shall have perishings contrary to one another, not to becoming. Certainly: and why should not this in a sense be so? Thus it is so if one perishing is pleasant and another painful: and so one perishing will be contrary to another not in an unqualified sense, but in so far as one has this quality and the other that.

Now motions and states of rest universally exhibit contrariety in the manner described above, e.g. upward motion and rest above are respectively contrary to downward motion and rest below, these being instances of local contrariety; and upward locomotion belongs naturally to fire and downward to earth, i.e. the locomotions of the two are contrary to each other. And again, fire moves up naturally and down unnaturally: and its natural motion is certainly contrary to its unnatural motion. Similarly with remaining: remaining above is contrary to motion from above downwards, and to earth this remaining comes unnaturally, this motion naturally. So the unnatural remaining of a thing is contrary to its natural motion, just as we find a similar contrariety in the motion of the same thing: one of its motions, the upward or the downward, will be natural, the other unnatural.

Here, however, the question arises, has every state of rest that is not permanent a becoming, and is this becoming a coming to a

standstill? If so, there must be a becoming of that which is at rest unnaturally, e.g. of earth at rest above: and therefore this earth during the time that it was being carried violently upward was coming to a standstill. But whereas the velocity of that which comes to a standstill seems always to increase, the velocity of that which is carried violently seems always to decrease: so it will be in a state of rest without having become so. Moreover 'coming to a standstill' is generally recognized to be identical or at least concomitant with the locomotion of a thing to its proper place.

There is also another difficulty involved in the view that remaining in a particular place is contrary to motion from that place. For when a thing is moving from or discarding something, it still appears to have that which is being discarded, so that if a state of rest is itself contrary to the motion from the state of rest to its contrary, the contraries rest and motion will be simultaneously predicable of the same thing. May we not say, however, that in so far as the thing is still stationary it is in a state of rest in a qualified sense? For, in fact, whenever a thing is in motion, part of it is at the starting-point while part is at the goal to which it is changing: and consequently a motion finds its true contrary rather in another motion than in a state of rest.

With regard to motion and rest, then, we have now explained in what sense each of them is one and under what conditions they exhibit contrariety.

[With regard to coming to a standstill the question may be raised whether there is an opposite state of rest to unnatural as well as to natural motions. It would be absurd if this were not the case: for a thing may remain still merely under violence: thus we shall have a thing being in a non-permanent state of rest without having become so. But it is clear that it must be the case: for just as there is unnatural motion, so, too, a thing may be in an unnatural state of rest. Further, some things have a natural and an unnatural motion, e.g. fire has a natural upward motion and an unnatural downward motion: is it, then, this unnatural downward motion or is it the natural downward motion of earth that is contrary to the natural upward motion? Surely it is clear that both are contrary to it though not in the same sense: the natural motion of earth is contrary inasmuch as the motion of fire is also natural, whereas the upward motion of fire as being natural is contrary to the downward motion of fire as being unnatural. The same is true of the corresponding cases of remaining. But there would seem to be a sense in which a state of rest and a motion are opposites.]

Now if the terms 'continuous', 'in contact', and 'in succession' are understood as defined above things being 'continuous' if their extremities are one, 'in contact' if their extremities are together, and 'in succession' if there is nothing of their own kind intermediate between them-nothing that is continuous can be composed 'of indivisibles': e.g. a line cannot be composed of points, the line being continuous and the point indivisible. For the extremities of two points can neither be one (since of an indivisible there can be no extremity as distinct from some other part) nor together (since that which has no parts can have no extremity, the extremity and the thing of which it is the extremity being distinct).

Moreover, if that which is continuous is composed of points, these points must be either continuous or in contact with one another: and the same reasoning applies in the case of all indivisibles. Now for the reason given above they cannot be continuous: and one thing can be in contact with another only if whole is in contact with whole or part with part or part with whole. But since indivisibles have no parts, they must be in contact with one another as whole with whole. And if they are in contact with one another as whole with whole, they will not be continuous: for that which is continuous has distinct parts: and these parts into which it is divisible are different in this way, i.e. spatially separate.

Nor, again, can a point be in succession to a point or a moment to a moment in such a way that length can be composed of points or time of moments: for things are in succession if there is nothing of their own kind intermediate between them, whereas that which is intermediate between points is always a line and that which is intermediate between moments is always a period of time.

Again, if length and time could thus be composed of indivisibles, they could be divided into indivisibles, since each is divisible into the parts of which it is composed. But, as we saw, no continuous thing is divisible into things without parts. Nor can there be anything of any other kind intermediate between the parts or between the moments: for if there could be any such thing it is clear that it must be either indivisible or divisible, and if it is divisible, it must be divisible either into indivisibles or into divisibles that are infinitely divisible, in which case it is continuous.

Moreover, it is plain that everything continuous is divisible into divisibles that are infinitely divisible: for if it were divisible into indivisibles, we should have an indivisible in contact with an indivisible, since the extremities of things that are continuous with one another are one and are in contact.

The same reasoning applies equally to magnitude, to time, and to motion: either all of these are composed of indivisibles and are divisible into indivisibles, or none. This may be made clear as follows. If a magnitude is composed of indivisibles, the motion over that magnitude must be composed of corresponding indivisible motions: e.g. if the magnitude ABG is composed of the indivisibles A, B, G, each corresponding part of the motion DEZ of O over ABG is indivisible. Therefore, since where there is motion there must be something that is in motion, and where there is something in motion there must be motion, therefore the being-moved will also be composed of indivisibles. So O traversed A when its motion was D, B when its motion was E, and G similarly when its motion was Z. Now a thing that is in motion from one place to another cannot at the moment when it was in motion both be in motion and at the same time have completed its motion at the place to which it was in motion: e.g. if a man is walking to Thebes, he cannot be walking to Thebes and at the same time have completed his walk to Thebes: and, as we saw, O traverses a the partless section A in virtue of the presence of the motion D. Consequently, if O actually passed through A after being in process of passing through, the motion must be divisible: for at the time when O was passing through, it neither was at rest nor had completed its passage but was in an intermediate state: while if it is passing through and has completed its passage at the same moment, then that which is walking will at the moment when it is walking have completed its walk and will be in the place to which it is walking; that is to say, it will have completed its motion at the place to which it is in motion. And if a thing is in motion over the whole KBG and its motion is the three D, E, and Z, and if it is not in motion at all over the partless section A but has completed its motion over it, then the motion will consist not of motions but of starts, and will take place by a thing's having completed a motion without being in motion: for on this assumption it has completed its passage through A without passing through it. So it will be possible for a thing to have completed a walk without ever walking: for on this assumption it has completed a walk over a particular distance without walking over that distance. Since, then, everything must be either at rest or in motion, and O is therefore at rest in each of the sections A, B, and G, it follows that a thing can be continuously at rest and at the same time in motion: for, as we saw, O is in motion over the whole ABG and at rest in any part (and consequently in the whole) of it. Moreover, if the indivisibles composing DEZ are motions, it would be possible for a thing in spite of the presence in it of motion to be not in motion but at rest, while if they are not motions, it would be possible for motion to be composed of something other than motions.

And if length and motion are thus indivisible, it is neither more nor less necessary that time also be similarly indivisible, that is to say be composed of indivisible moments: for if the whole distance is divisible and an equal velocity will cause a thing to pass through less of it in less time, the time must also be divisible, and conversely, if the time in which a thing is carried over the section A is divisible, this section A must also be divisible.

BOOK_6|CH_2

2

-

And since every magnitude is divisible into magnitudes-for we have shown that it is impossible for anything continuous to be composed of indivisible parts, and every magnitude is continuous-it necessarily follows that the quicker of two things traverses a greater magnitude in an equal time, an equal magnitude in less time, and a greater magnitude in less time, in conformity with the definition sometimes given of 'the quicker'. Suppose that A is quicker than B. Now since of two things that which changes sooner is quicker, in the time ZH, in which A has changed from G to D, B will not yet have arrived at D but will be short of it: so that in an equal time the quicker will pass over a greater magnitude. More than this, it will pass over a greater magnitude in less time: for in the time in which A has arrived at D, B being the slower has arrived, let us say, at E. Then since A has occupied the whole time ZH in arriving at D, will have arrived at O in less time than this, say ZK. Now the magnitude GO that A has passed over is greater than the magnitude GE, and the time ZK is less than the whole time ZH: so that the quicker will pass over a greater magnitude in less time. And from this it is also clear that the quicker will pass over an equal magnitude in less time than the slower. For since it passes over the greater magnitude in less time than the slower, and (regarded by itself) passes over LM the greater in more time than LX the lesser, the time PRh in which it passes over LM will be more than the time PS, which it passes over LX: so that, the time PRh being less than the time PCh in which the slower passes over LX, the time PS will also be less than the time PX: for it is less than the time PRh, and that which is less than something else that is less than a thing is also itself less than that thing. Hence it follows that the quicker will traverse an equal magnitude in less time than the slower. Again, since the motion of anything must always occupy either an equal time or less or more time in comparison with that of another thing, and since, whereas a thing is slower if its motion occupies more time and of equal velocity if its motion occupies an equal time, the quicker is neither of equal velocity nor slower, it follows that the motion of the quicker can

occupy neither an equal time nor more time. It can only be, then, that it occupies less time, and thus we get the necessary consequence that the quicker will pass over an equal magnitude (as well as a greater) in less time than the slower.

And since every motion is in time and a motion may occupy any time, and the motion of everything that is in motion may be either quicker or slower, both quicker motion and slower motion may occupy any time: and this being so, it necessarily follows that time also is continuous. By continuous I mean that which is divisible into divisibles that are infinitely divisible: and if we take this as the definition of continuous, it follows necessarily that time is continuous. For since it has been shown that the quicker will pass over an equal magnitude in less time than the slower, suppose that A is quicker and B slower, and that the slower has traversed the magnitude GD in the time ZH. Now it is clear that the quicker will traverse the same magnitude in less time than this: let us say in the time ZO. Again, since the quicker has passed over the whole D in the time ZO, the slower will in the same time pass over GK, say, which is less than GD. And since B, the slower, has passed over GK in the time ZO, the quicker will pass over it in less time: so that the time ZO will again be divided. And if this is divided the magnitude GK will also be divided just as GD was: and again, if the magnitude is divided, the time will also be divided. And we can carry on this process for ever, taking the slower after the quicker and the quicker after the slower alternately, and using what has been demonstrated at each stage as a new point of departure: for the quicker will divide the time and the slower will divide the length. If, then, this alternation always holds good, and at every turn involves a division, it is evident that all time must be continuous. And at the same time it is clear that all magnitude is also continuous; for the divisions of which time and magnitude respectively are susceptible are the same and equal.

Moreover, the current popular arguments make it plain that, if time is continuous, magnitude is continuous also, inasmuch as a thing passes over half a given magnitude in half the time taken to cover the whole: in fact without qualification it passes over a less magnitude in less time; for the divisions of time and of magnitude will be the same. And if either is infinite, so is the other, and the one is so in the same way as the other; i.e. if time is infinite in respect of its extremities, length is also infinite in respect of its extremities: if time is infinite in respect of divisibility, length is also infinite in respect of divisibility: and if time is infinite in both respects, magnitude is also infinite in both respects.

Hence Zeno's argument makes a false assumption in asserting that

it is impossible for a thing to pass over or severally to come in contact with infinite things in a finite time. For there are two senses in which length and time and generally anything continuous are called 'infinite': they are called so either in respect of divisibility or in respect of their extremities. So while a thing in a finite time cannot come in contact with things quantitatively infinite, it can come in contact with things infinite in respect of divisibility: for in this sense the time itself is also infinite: and so we find that the time occupied by the passage over the infinite is not a finite but an infinite time, and the contact with the infinities is made by means of moments not finite but infinite in number.

The passage over the infinite, then, cannot occupy a finite time, and the passage over the finite cannot occupy an infinite time: if the time is infinite the magnitude must be infinite also, and if the magnitude is infinite, so also is the time. This may be shown as follows. Let AB be a finite magnitude, and let us suppose that it is traversed in infinite time G, and let a finite period GD of the time be taken. Now in this period the thing in motion will pass over a certain segment of the magnitude: let BE be the segment that it has thus passed over. (This will be either an exact measure of AB or less or greater than an exact measure: it makes no difference which it is.) Then, since a magnitude equal to BE will always be passed over in an equal time, and BE measures the whole magnitude, the whole time occupied in passing over AB will be finite: for it will be divisible into periods equal in number to the segments into which the magnitude is divisible. Moreover, if it is the case that infinite time is not occupied in passing over every magnitude, but it is possible to pass over some magnitude, say BE, in a finite time, and if this BE measures the whole of which it is a part, and if an equal magnitude is passed over in an equal time, then it follows that the time like the magnitude is finite. That infinite time will not be occupied in passing over BE is evident if the time be taken as limited in one direction: for as the part will be passed over in less time than the whole, the time occupied in traversing this part must be finite, the limit in one direction being given. The same reasoning will also show the falsity of the assumption that infinite length can be traversed in a finite time. It is evident, then, from what has been said that neither a line nor a surface nor in fact anything continuous can be indivisible.

This conclusion follows not only from the present argument but from the consideration that the opposite assumption implies the divisibility of the indivisible. For since the distinction of quicker and slower may apply to motions occupying any period of time and in an equal time the quicker passes over a greater length, it

may happen that it will pass over a length twice, or one and a half times, as great as that passed over by the slower: for their respective velocities may stand to one another in this proportion. Suppose, then, that the quicker has in the same time been carried over a length one and a half times as great as that traversed by the slower, and that the respective magnitudes are divided, that of the quicker, the magnitude ABGD, into three indivisibles, and that of the slower into the two indivisibles EZ, ZH. Then the time may also be divided into three indivisibles, for an equal magnitude will be passed over in an equal time. Suppose then that it is thus divided into KL, LM, MN. Again, since in the same time the slower has been carried over EZ, ZH, the time may also be similarly divided into two. Thus the indivisible will be divisible, and that which has no parts will be passed over not in an indivisible but in a greater time. It is evident, therefore, that nothing continuous is without parts.

BOOK_6|CH_3

3

-

The present also is necessarily indivisible—the present, that is, not in the sense in which the word is applied to one thing in virtue of another, but in its proper and primary sense; in which sense it is inherent in all time. For the present is something that is an extremity of the past (no part of the future being on this side of it) and also of the future (no part of the past being on the other side of it): it is, as we have said, a limit of both. And if it is once shown that it is essentially of this character and one and the same, it will at once be evident also that it is indivisible.

Now the present that is the extremity of both times must be one and the same: for if each extremity were different, the one could not be in succession to the other, because nothing continuous can be composed of things having no parts: and if the one is apart from the other, there will be time intermediate between them, because everything continuous is such that there is something intermediate between its limits and described by the same name as itself. But if the intermediate thing is time, it will be divisible: for all time has been shown to be divisible. Thus on this assumption the present is divisible. But if the present is divisible, there will be part of the past in the future and part of the future in the past: for past time will be marked off from future time at the actual point of division. Also the present will be a present not in the proper sense but in virtue of something else: for the division which yields it will not be a division proper. Furthermore, there will be a part of the present that is past and a part that is future, and it will not always be the same part that is past or future: in fact one and the same

present will not be simultaneous: for the time may be divided at many points. If, therefore, the present cannot possibly have these characteristics, it follows that it must be the same present that belongs to each of the two times. But if this is so it is evident that the present is also indivisible: for if it is divisible it will be involved in the same implications as before. It is clear, then, from what has been said that time contains something indivisible, and this is what we call a present.

We will now show that nothing can be in motion in a present. For if this is possible, there can be both quicker and slower motion in the present. Suppose then that in the present N the quicker has traversed the distance AB. That being so, the slower will in the same present traverse a distance less than AB, say AG. But since the slower will have occupied the whole present in traversing AG, the quicker will occupy less than this in traversing it. Thus we shall have a division of the present, whereas we found it to be indivisible. It is impossible, therefore, for anything to be in motion in a present.

Nor can anything be at rest in a present: for, as we were saying, only can be at rest which is naturally designed to be in motion but is not in motion when, where, or as it would naturally be so: since, therefore, nothing is naturally designed to be in motion in a present, it is clear that nothing can be at rest in a present either.

Moreover, inasmuch as it is the same present that belongs to both the times, and it is possible for a thing to be in motion throughout one time and to be at rest throughout the other, and that which is in motion or at rest for the whole of a time will be in motion or at rest as the case may be in any part of it in which it is naturally designed to be in motion or at rest: this being so, the assumption that there can be motion or rest in a present will carry with it the implication that the same thing can at the same time be at rest and in motion: for both the times have the same extremity, viz. the present.

Again, when we say that a thing is at rest, we imply that its condition in whole and in part is at the time of speaking uniform with what it was previously: but the present contains no 'previously': consequently, there can be no rest in it.

It follows then that the motion of that which is in motion and the rest of that which is at rest must occupy time.

BOOK_6|CH_4

4

-

Further, everything that changes must be divisible. For since every change is from something to something, and when a thing is at the goal of its change it is no longer changing, and when both it

itself and all its parts are at the starting-point of its change it is not changing (for that which is in whole and in part in an unvarying condition is not in a state of change); it follows, therefore, that part of that which is changing must be at the starting-point and part at the goal: for as a whole it cannot be in both or in neither. (Here by 'goal of change' I mean that which comes first in the process of change: e.g. in a process of change from white the goal in question will be grey, not black: for it is not necessary that that which is changing should be at either of the extremes.) It is evident, therefore, that everything that changes must be divisible.

Now motion is divisible in two senses. In the first place it is divisible in virtue of the time that it occupies. In the second place it is divisible according to the motions of the several parts of that which is in motion: e.g. if the whole AG is in motion, there will be a motion of AB and a motion of BG. That being so, let DE be the motion of the part AB and EZ the motion of the part BG. Then the whole DZ must be the motion of AG: for DZ must constitute the motion of AG inasmuch as DE and EZ severally constitute the motions of each of its parts. But the motion of a thing can never be constituted by the motion of something else: consequently the whole motion is the motion of the whole magnitude.

Again, since every motion is a motion of something, and the whole motion DZ is not the motion of either of the parts (for each of the parts DE, EZ is the motion of one of the parts AB, BG) or of anything else (for, the whole motion being the motion of a whole, the parts of the motion are the motions of the parts of that whole: and the parts of DZ are the motions of AB, BG and of nothing else: for, as we saw, a motion that is one cannot be the motion of more things than one): since this is so, the whole motion will be the motion of the magnitude ABG.

Again, if there is a motion of the whole other than DZ, say TI, the motion of each of the parts may be subtracted from it: and these motions will be equal to DE, EZ respectively: for the motion of that which is one must be one. So if the whole motion TI may be divided into the motions of the parts, TI will be equal to DZ: if on the other hand there is any remainder, say KI, this will be a motion of nothing: for it can be the motion neither of the whole nor of the parts (as the motion of that which is one must be one) nor of anything else: for a motion that is continuous must be the motion of things that are continuous. And the same result follows if the division of TI reveals a surplus on the side of the motions of the parts. Consequently, if this is impossible, the whole motion must be the same as and equal to DZ.

This then is what is meant by the division of motion according to the motions of the parts: and it must be applicable to everything that

is divisible into parts.

Motion is also susceptible of another kind of division, that according to time. For since all motion is in time and all time is divisible, and in less time the motion is less, it follows that every motion must be divisible according to time. And since everything that is in motion is in motion in a certain sphere and for a certain time and has a motion belonging to it, it follows that the time, the motion, the being-in-motion, the thing that is in motion, and the sphere of the motion must all be susceptible of the same divisions (though spheres of motion are not all divisible in a like manner: thus quantity is essentially, quality accidentally divisible). For suppose that A is the time occupied by the motion B. Then if all the time has been occupied by the whole motion, it will take less of the motion to occupy half the time, less again to occupy a further subdivision of the time, and so on to infinity. Again, the time will be divisible similarly to the motion: for if the whole motion occupies all the time half the motion will occupy half the time, and less of the motion again will occupy less of the time.

In the same way the being-in-motion will also be divisible. For let G be the whole being-in-motion. Then the being-in-motion that corresponds to half the motion will be less than the whole being-in-motion, that which corresponds to a quarter of the motion will be less again, and so on to infinity. Moreover by setting out successively the being-in-motion corresponding to each of the two motions DG (say) and GE, we may argue that the whole being-in-motion will correspond to the whole motion (for if it were some other being-in-motion that corresponded to the whole motion, there would be more than one being-in motion corresponding to the same motion), the argument being the same as that whereby we showed that the motion of a thing is divisible into the motions of the parts of the thing: for if we take separately the being-in motion corresponding to each of the two motions, we shall see that the whole being-in motion is continuous.

The same reasoning will show the divisibility of the length, and in fact of everything that forms a sphere of change (though some of these are only accidentally divisible because that which changes is so): for the division of one term will involve the division of all. So, too, in the matter of their being finite or infinite, they will all alike be either the one or the other. And we now see that in most cases the fact that all the terms are divisible or infinite is a direct consequence of the fact that the thing that changes is divisible or infinite: for the attributes 'divisible' and 'infinite' belong in the first instance to the thing that changes. That divisibility does so we have already shown: that infinity does so will be made clear in what follows?

-

Since everything that changes changes from something to something, that which has changed must at the moment when it has first changed be in that to which it has changed. For that which changes retires from or leaves that from which it changes: and leaving, if not identical with changing, is at any rate a consequence of it. And if leaving is a consequence of changing, having left is a consequence of having changed: for there is a like relation between the two in each case.

One kind of change, then, being change in a relation of contradiction, where a thing has changed from not-being to being it has left not-being. Therefore it will be in being: for everything must either be or not be. It is evident, then, that in contradictory change that which has changed must be in that to which it has changed. And if this is true in this kind of change, it will be true in all other kinds as well: for in this matter what holds good in the case of one will hold good likewise in the case of the rest.

Moreover, if we take each kind of change separately, the truth of our conclusion will be equally evident, on the ground that that which has changed must be somewhere or in something. For, since it has left that from which it has changed and must be somewhere, it must be either in that to which it has changed or in something else. If, then, that which has changed to B is in something other than B, say G, it must again be changing from G to B: for it cannot be assumed that there is no interval between G and B, since change is continuous. Thus we have the result that the thing that has changed, at the moment when it has changed, is changing to that to which it has changed, which is impossible: that which has changed, therefore, must be in that to which it has changed. So it is evident likewise that that which has come to be, at the moment when it has come to be, will be, and that which has ceased to be will not-be: for what we have said applies universally to every kind of change, and its truth is most obvious in the case of contradictory change. It is clear, then, that that which has changed, at the moment when it has first changed, is in that to which it has changed.

We will now show that the 'primary when' in which that which has changed effected the completion of its change must be indivisible, where by 'primary' I mean possessing the characteristics in question of itself and not in virtue of the possession of them by something else belonging to it. For let AG be divisible, and let it be divided at B. If then the completion of change has been effected in AB or again in BG, AG cannot be the primary thing in which the completion of change has been effected. If, on the other hand, it has been

changing in both AB and BG (for it must either have changed or be changing in each of them), it must have been changing in the whole AG: but our assumption was that AG contains only the completion of the change. It is equally impossible to suppose that one part of AG contains the process and the other the completion of the change: for then we shall have something prior to what is primary. So that in which the completion of change has been effected must be indivisible. It is also evident, therefore, that that in which that which has ceased to be has ceased to be and that in which that which has come to be has come to be are indivisible.

But there are two senses of the expression 'the primary when in which something has changed'. On the one hand it may mean the primary when containing the completion of the process of change- the moment when it is correct to say 'it has changed': on the other hand it may mean the primary when containing the beginning of the process of change. Now the primary when that has reference to the end of the change is something really existent: for a change may really be completed, and there is such a thing as an end of change, which we have in fact shown to be indivisible because it is a limit. But that which has reference to the beginning is not existent at all: for there is no such thing as a beginning of a process of change, and the time occupied by the change does not contain any primary when in which the change began. For suppose that AD is such a primary when. Then it cannot be indivisible: for, if it were, the moment immediately preceding the change and the moment in which the change begins would be consecutive (and moments cannot be consecutive). Again, if the changing thing is at rest in the whole preceding time GA (for we may suppose that it is at rest), it is at rest in A also: so if AD is without parts, it will simultaneously be at rest and have changed: for it is at rest in A and has changed in D. Since then AD is not without parts, it must be divisible, and the changing thing must have changed in every part of it (for if it has changed in neither of the two parts into which AD is divided, it has not changed in the whole either: if, on the other hand, it is in process of change in both parts, it is likewise in process of change in the whole: and if, again, it has changed in one of the two parts, the whole is not the primary when in which it has changed: it must therefore have changed in every part). It is evident, then, that with reference to the beginning of change there is no primary when in which change has been effected: for the divisions are infinite.

So, too, of that which has changed there is no primary part that has changed. For suppose that of AE the primary part that has changed is AZ (everything that changes having been shown to be divisible): and let TI be the time in which DZ has changed. If, then, in the whole time DZ has changed, in half the time there will be a part that has

changed, less than and therefore prior to DZ: and again there will be another part prior to this, and yet another, and so on to infinity. Thus of that which changes there cannot be any primary part that has changed. It is evident, then, from what has been said, that neither of that which changes nor of the time in which it changes is there any primary part.

With regard, however, to the actual subject of change—that is to say that in respect of which a thing changes—there is a difference to be observed. For in a process of change we may distinguish three terms—that which changes, that in which it changes, and the actual subject of change, e.g. the man, the time, and the fair complexion. Of these the man and the time are divisible: but with the fair complexion it is otherwise (though they are all divisible accidentally, for that in which the fair complexion or any other quality is an accident is divisible). For of actual subjects of change it will be seen that those which are classed as essentially, not accidentally, divisible have no primary part. Take the case of magnitudes: let AB be a magnitude, and suppose that it has moved from B to a primary 'where' G. Then if BG is taken to be indivisible, two things without parts will have to be contiguous (which is impossible): if on the other hand it is taken to be divisible, there will be something prior to G to which the magnitude has changed, and something else again prior to that, and so on to infinity, because the process of division may be continued without end. Thus there can be no primary 'where' to which a thing has changed. And if we take the case of quantitative change, we shall get a like result, for here too the change is in something continuous. It is evident, then, that only in qualitative motion can there be anything essentially indivisible.

BOOK_6|CH_6

6

-

Now everything that changes changes time, and that in two senses: for the time in which a thing is said to change may be the primary time, or on the other hand it may have an extended reference, as e.g. when we say that a thing changes in a particular year because it changes in a particular day. That being so, that which changes must be changing in any part of the primary time in which it changes. This is clear from our definition of 'primary', in which the word is said to express just this: it may also, however, be made evident by the following argument. Let ChRh be the primary time in which that which is in motion is in motion: and (as all time is divisible) let it be divided at K. Now in the time ChK it either is in motion or is not in motion, and the same is likewise true of the time KRh. Then if it is in motion in neither of the two parts, it will be at rest

in the whole: for it is impossible that it should be in motion in a time in no part of which it is in motion. If on the other hand it is in motion in only one of the two parts of the time, ChRh cannot be the primary time in which it is in motion: for its motion will have reference to a time other than ChRh. It must, then, have been in motion in any part of ChRh.

And now that this has been proved, it is evident that everything that is in motion must have been in motion before. For if that which is in motion has traversed the distance KL in the primary time ChRh, in half the time a thing that is in motion with equal velocity and began its motion at the same time will have traversed half the distance. But if this second thing whose velocity is equal has traversed a certain distance in a certain time, the original thing that is in motion must have traversed the same distance in the same time. Hence that which is in motion must have been in motion before.

Again, if by taking the extreme moment of the time-for it is the moment that defines the time, and time is that which is intermediate between moments-we are enabled to say that motion has taken place in the whole time ChRh or in fact in any period of it, motion may likewise be said to have taken place in every other such period. But half the time finds an extreme in the point of division. Therefore motion will have taken place in half the time and in fact in any part of it: for as soon as any division is made there is always a time defined by moments. If, then, all time is divisible, and that which is intermediate between moments is time, everything that is changing must have completed an infinite number of changes.

Again, since a thing that changes continuously and has not perished or ceased from its change must either be changing or have changed in any part of the time of its change, and since it cannot be changing in a moment, it follows that it must have changed at every moment in the time: consequently, since the moments are infinite in number, everything that is changing must have completed an infinite number of changes.

And not only must that which is changing have changed, but that which has changed must also previously have been changing, since everything that has changed from something to something has changed in a period of time. For suppose that a thing has changed from A to B in a moment. Now the moment in which it has changed cannot be the same as that in which it is at A (since in that case it would be in A and B at once): for we have shown above that that which has changed, when it has changed, is not in that from which it has changed. If, on the other hand, it is a different moment, there will be a period of time intermediate between the two: for, as we saw, moments are not consecutive. Since, then, it has changed in a period of time, and all time is divisible, in half the time it will have completed another

change, in a quarter another, and so on to infinity: consequently when it has changed, it must have previously been changing.

Moreover, the truth of what has been said is more evident in the case of magnitude, because the magnitude over which what is changing changes is continuous. For suppose that a thing has changed from G to D. Then if GD is indivisible, two things without parts will be consecutive. But since this is impossible, that which is intermediate between them must be a magnitude and divisible into an infinite number of segments: consequently, before the change is completed, the thing changes to those segments. Everything that has changed, therefore, must previously have been changing: for the same proof also holds good of change with respect to what is not continuous, changes, that is to say, between contraries and between contradictories. In such cases we have only to take the time in which a thing has changed and again apply the same reasoning. So that which has changed must have been changing and that which is changing must have changed, and a process of change is preceded by a completion of change and a completion by a process: and we can never take any stage and say that it is absolutely the first. The reason of this is that no two things without parts can be contiguous, and therefore in change the process of division is infinite, just as lines may be infinitely divided so that one part is continually increasing and the other continually decreasing.

So it is evident also that that which has become must previously have been in process of becoming, and that which is in process of becoming must previously have become, everything (that is) that is divisible and continuous: though it is not always the actual thing that is in process of becoming of which this is true: sometimes it is something else, that is to say, some part of the thing in question, e.g. the foundation-stone of a house. So, too, in the case of that which is perishing and that which has perished: for that which becomes and that which perishes must contain an element of infiniteness as an immediate consequence of the fact that they are continuous things: and so a thing cannot be in process of becoming without having become or have become without having been in process of becoming. So, too, in the case of perishing and having perished: perishing must be preceded by having perished, and having perished must be preceded by perishing. It is evident, then, that that which has become must previously have been in process of becoming, and that which is in process of becoming must previously have become: for all magnitudes and all periods of time are infinitely divisible.

Consequently no absolutely first stage of change can be represented by any particular part of space or time which the changing thing may occupy.

-

Now since the motion of everything that is in motion occupies a period of time, and a greater magnitude is traversed in a longer time, it is impossible that a thing should undergo a finite motion in an infinite time, if this is understood to mean not that the same motion or a part of it is continually repeated, but that the whole infinite time is occupied by the whole finite motion. In all cases where a thing is in motion with uniform velocity it is clear that the finite magnitude is traversed in a finite time. For if we take a part of the motion which shall be a measure of the whole, the whole motion is completed in as many equal periods of the time as there are parts of the motion. Consequently, since these parts are finite, both in size individually and in number collectively, the whole time must also be finite: for it will be a multiple of the portion, equal to the time occupied in completing the aforesaid part multiplied by the number of the parts.

But it makes no difference even if the velocity is not uniform. For let us suppose that the line AB represents a finite stretch over which a thing has been moved in the given time, and let GD be the infinite time. Now if one part of the stretch must have been traversed before another part (this is clear, that in the earlier and in the later part of the time a different part of the stretch has been traversed: for as the time lengthens a different part of the motion will always be completed in it, whether the thing in motion changes with uniform velocity or not: and whether the rate of motion increases or diminishes or remains stationary this is none the less so), let us then take AE a part of the whole stretch of motion AB which shall be a measure of AB. Now this part of the motion occupies a certain period of the infinite time: it cannot itself occupy an infinite time, for we are assuming that that is occupied by the whole AB. And if again I take another part equal to AE, that also must occupy a finite time in consequence of the same assumption. And if I go on taking parts in this way, on the one hand there is no part which will be a measure of the infinite time (for the infinite cannot be composed of finite parts whether equal or unequal, because there must be some unity which will be a measure of things finite in multitude or in magnitude, which, whether they are equal or unequal, are none the less limited in magnitude); while on the other hand the finite stretch of motion AB is a certain multiple of AE: consequently the motion AB must be accomplished in a finite time. Moreover it is the same with coming to rest as with motion. And so it is impossible for one and the same thing to be infinitely in process of becoming or of perishing. The reasoning he will prove

that in a finite time there cannot be an infinite extent of motion or of coming to rest, whether the motion is regular or irregular. For if we take a part which shall be a measure of the whole time, in this part a certain fraction, not the whole, of the magnitude will be traversed, because we assume that the traversing of the whole occupies all the time. Again, in another equal part of the time another part of the magnitude will be traversed: and similarly in each part of the time that we take, whether equal or unequal to the part originally taken. It makes no difference whether the parts are equal or not, if only each is finite: for it is clear that while the time is exhausted by the subtraction of its parts, the infinite magnitude will not be thus exhausted, since the process of subtraction is finite both in respect of the quantity subtracted and of the number of times a subtraction is made. Consequently the infinite magnitude will not be traversed in finite time: and it makes no difference whether the magnitude is infinite in only one direction or in both: for the same reasoning will hold good.

This having been proved, it is evident that neither can a finite magnitude traverse an infinite magnitude in a finite time, the reason being the same as that given above: in part of the time it will traverse a finite magnitude and in each several part likewise, so that in the whole time it will traverse a finite magnitude.

And since a finite magnitude will not traverse an infinite in a finite time, it is clear that neither will an infinite traverse a finite in a finite time. For if the infinite could traverse the finite, the finite could traverse the infinite; for it makes no difference which of the two is the thing in motion; either case involves the traversing of the infinite by the finite. For when the infinite magnitude A is in motion a part of it, say GD, will occupy the finite and then another, and then another, and so on to infinity. Thus the two results will coincide: the infinite will have completed a motion over the finite and the finite will have traversed the infinite: for it would seem to be impossible for the motion of the infinite over the finite to occur in any way other than by the finite traversing the infinite either by locomotion over it or by measuring it. Therefore, since this is impossible, the infinite cannot traverse the finite.

Nor again will the infinite traverse the infinite in a finite time. Otherwise it would also traverse the finite, for the infinite includes the finite. We can further prove this in the same way by taking the time as our starting-point.

Since, then, it is established that in a finite time neither will the finite traverse the infinite, nor the infinite the finite, nor the infinite the infinite, it is evident also that in a finite time there cannot be infinite motion: for what difference does it make

whether we take the motion or the magnitude to be infinite? If either of the two is infinite, the other must be so likewise: for all locomotion is in space.

BOOK_6|CH_8

8

-

Since everything to which motion or rest is natural is in motion or at rest in the natural time, place, and manner, that which is coming to a stand, when it is coming to a stand, must be in motion: for if it is not in motion it must be at rest: but that which is at rest cannot be coming to rest. From this it evidently follows that coming to a stand must occupy a period of time: for the motion of that which is in motion occupies a period of time, and that which is coming to a stand has been shown to be in motion: consequently coming to a stand must occupy a period of time.

Again, since the terms 'quicker' and 'slower' are used only of that which occupies a period of time, and the process of coming to a stand may be quicker or slower, the same conclusion follows.

And that which is coming to a stand must be coming to a stand in any part of the primary time in which it is coming to a stand. For if it is coming to a stand in neither of two parts into which the time may be divided, it cannot be coming to a stand in the whole time, with the result that that which is coming to a stand will not be coming to a stand. If on the other hand it is coming to a stand in only one of the two parts of the time, the whole cannot be the primary time in which it is coming to a stand: for it is coming to a stand in the whole time not primarily but in virtue of something distinct from itself, the argument being the same as that which we used above about things in motion.

And just as there is no primary time in which that which is in motion is in motion, so too there is no primary time in which that which is coming to a stand is coming to a stand, there being no primary stage either of being in motion or of coming to a stand. For let AB be the primary time in which a thing is coming to a stand. Now AB cannot be without parts: for there cannot be motion in that which is without parts, because the moving thing would necessarily have been already moved for part of the time of its movement: and that which is coming to a stand has been shown to be in motion. But since AB is therefore divisible, the thing is coming to a stand in every one of the parts of AB: for we have shown above that it is coming to a stand in every one of the parts in which it is primarily coming to a stand. Since then, that in which primarily a thing is coming to a stand must be a period of time and not something indivisible, and since all time is infinitely divisible, there cannot be anything in

which primarily it is coming to a stand.

Nor again can there be a primary time at which the being at rest of that which is at rest occurred: for it cannot have occurred in that which has no parts, because there cannot be motion in that which is indivisible, and that in which rest takes place is the same as that in which motion takes place: for we defined a state of rest to be the state of a thing to which motion is natural but which is not in motion when (that is to say in that in which) motion would be natural to it. Again, our use of the phrase 'being at rest' also implies that the previous state of a thing is still unaltered, not one point only but two at least being thus needed to determine its presence: consequently that in which a thing is at rest cannot be without parts. Since, then it is divisible, it must be a period of time, and the thing must be at rest in every one of its parts, as may be shown by the same method as that used above in similar demonstrations.

So there can be no primary part of the time: and the reason is that rest and motion are always in a period of time, and a period of time has no primary part any more than a magnitude or in fact anything continuous: for everything continuous is divisible into an infinite number of parts.

And since everything that is in motion is in motion in a period of time and changes from something to something, when its motion is comprised within a particular period of time essentially-that is to say when it fills the whole and not merely a part of the time in question-it is impossible that in that time that which is in motion should be over against some particular thing primarily. For if a thing-itself and each of its parts-occupies the same space for a definite period of time, it is at rest: for it is in just these circumstances that we use the term 'being at rest'-when at one moment after another it can be said with truth that a thing, itself and its parts, occupies the same space. So if this is being at rest it is impossible for that which is changing to be as a whole, at the time when it is primarily changing, over against any particular thing (for the whole period of time is divisible), so that in one part of it after another it will be true to say that the thing, itself and its parts, occupies the same space. If this is not so and the aforesaid proposition is true only at a single moment, then the thing will be over against a particular thing not for any period of time but only at a moment that limits the time. It is true that at any moment it is always over against something stationary: but it is not at rest: for at a moment it is not possible for anything to be either in motion or at rest. So while it is true to say that that which is in motion is at a moment not in motion and is opposite some particular thing, it cannot in a period of time be over against that which is at rest: for that would involve the conclusion that that which is in locomotion

is at rest.

-

Zeno's reasoning, however, is fallacious, when he says that if everything when it occupies an equal space is at rest, and if that which is in locomotion is always occupying such a space at any moment, the flying arrow is therefore motionless. This is false, for time is not composed of indivisible moments any more than any other magnitude is composed of indivisibles.

Zeno's arguments about motion, which cause so much disquietude to those who try to solve the problems that they present, are four in number. The first asserts the non-existence of motion on the ground that that which is in locomotion must arrive at the half-way stage before it arrives at the goal. This we have discussed above.

The second is the so-called 'Achilles', and it amounts to this, that in a race the quickest runner can never overtake the slowest, since the pursuer must first reach the point whence the pursued started, so that the slower must always hold a lead. This argument is the same in principle as that which depends on bisection, though it differs from it in that the spaces with which we successively have to deal are not divided into halves. The result of the argument is that the slower is not overtaken: but it proceeds along the same lines as the bisection-argument (for in both a division of the space in a certain way leads to the result that the goal is not reached, though the 'Achilles' goes further in that it affirms that even the quickest runner in legendary tradition must fail in his pursuit of the slowest), so that the solution must be the same. And the axiom that that which holds a lead is never overtaken is false: it is not overtaken, it is true, while it holds a lead: but it is overtaken nevertheless if it is granted that it traverses the finite distance prescribed. These then are two of his arguments.

The third is that already given above, to the effect that the flying arrow is at rest, which result follows from the assumption that time is composed of moments: if this assumption is not granted, the conclusion will not follow.

The fourth argument is that concerning the two rows of bodies, each row being composed of an equal number of bodies of equal size, passing each other on a race-course as they proceed with equal velocity in opposite directions, the one row originally occupying the space between the goal and the middle point of the course and the other that between the middle point and the starting-post. This, he thinks, involves the conclusion that half a given time is equal to double that time. The fallacy of the reasoning lies in the

assumption that a body occupies an equal time in passing with equal velocity a body that is in motion and a body of equal size that is at rest; which is false. For instance (so runs the argument), let A, A...be the stationary bodies of equal size, B, B...the bodies, equal in number and in size to A, A...,originally occupying the half of the course from the starting-post to the middle of the A's, and G, G...those originally occupying the other half from the goal to the middle of the A's, equal in number, size, and velocity to B, B....Then three consequences follow:

First, as the B's and the G's pass one another, the first B reaches the last G at the same moment as the first G reaches the last B. Secondly at this moment the first G has passed all the A's, whereas the first B has passed only half the A's, and has consequently occupied only half the time occupied by the first G, since each of the two occupies an equal time in passing each A. Thirdly, at the same moment all the B's have passed all the G's: for the first G and the first B will simultaneously reach the opposite ends of the course, since (so says Zeno) the time occupied by the first G in passing each of the B's is equal to that occupied by it in passing each of the A's, because an equal time is occupied by both the first B and the first G in passing all the A's. This is the argument, but it presupposed the aforesaid fallacious assumption.

Nor in reference to contradictory change shall we find anything unanswerable in the argument that if a thing is changing from not-white, say, to white, and is in neither condition, then it will be neither white nor not-white: for the fact that it is not wholly in either condition will not preclude us from calling it white or not-white. We call a thing white or not-white not necessarily because it is be one or the other, but cause most of its parts or the most essential parts of it are so: not being in a certain condition is different from not being wholly in that condition. So, too, in the case of being and not-being and all other conditions which stand in a contradictory relation: while the changing thing must of necessity be in one of the two opposites, it is never wholly in either.

Again, in the case of circles and spheres and everything whose motion is confined within the space that it occupies, it is not true to say the motion can be nothing but rest, on the ground that such things in motion, themselves and their parts, will occupy the same position for a period of time, and that therefore they will be at once at rest and in motion. For in the first place the parts do not occupy the same position for any period of time: and in the second place the whole also is always changing to a different position: for if we take the orbit as described from a point A on a circumference, it will not be the same as the orbit as described from B or G or any

other point on the same circumference except in an accidental sense, the sense that is to say in which a musical man is the same as a man. Thus one orbit is always changing into another, and the thing will never be at rest. And it is the same with the sphere and everything else whose motion is confined within the space that it occupies.

BOOK_6|CH_10

10

-

Our next point is that that which is without parts cannot be in motion except accidentally: i.e. it can be in motion only in so far as the body or the magnitude is in motion and the partless is in motion by inclusion therein, just as that which is in a boat may be in motion in consequence of the locomotion of the boat, or a part may be in motion in virtue of the motion of the whole. (It must be remembered, however, that by 'that which is without parts' I mean that which is quantitatively indivisible (and that the case of the motion of a part is not exactly parallel): for parts have motions belonging essentially and severally to themselves distinct from the motion of the whole. The distinction may be seen most clearly in the case of a revolving sphere, in which the velocities of the parts near the centre and of those on the surface are different from one another and from that of the whole; this implies that there is not one motion but many). As we have said, then, that which is without parts can be in motion in the sense in which a man sitting in a boat is in motion when the boat is travelling, but it cannot be in motion of itself. For suppose that it is changing from AB to BG-either from one magnitude to another, or from one form to another, or from some state to its contradictory-and let D be the primary time in which it undergoes the change. Then in the time in which it is changing it must be either in AB or in BG or partly in one and partly in the other: for this, as we saw, is true of everything that is changing. Now it cannot be partly in each of the two: for then it would be divisible into parts. Nor again can it be in BG: for then it will have completed the change, whereas the assumption is that the change is in process. It remains, then, that in the time in which it is changing, it is in AB. That being so, it will be at rest: for, as we saw, to be in the same condition for a period of time is to be at rest. So it is not possible for that which has no parts to be in motion or to change in any way: for only one condition could have made it possible for it to have motion, viz. that time should be composed of moments, in which case at any moment it would have completed a motion or a change, so that it would never be in motion, but would always have been in motion. But this we have already shown above to be impossible: time is

not composed of moments, just as a line is not composed of points, and motion is not composed of starts: for this theory simply makes motion consist of indivisibles in exactly the same way as time is made to consist of moments or a length of points.

Again, it may be shown in the following way that there can be no motion of a point or of any other indivisible. That which is in motion can never traverse a space greater than itself without first traversing a space equal to or less than itself. That being so, it is evident that the point also must first traverse a space equal to or less than itself. But since it is indivisible, there can be no space less than itself for it to traverse first: so it will have to traverse a distance equal to itself. Thus the line will be composed of points, for the point, as it continually traverses a distance equal to itself, will be a measure of the whole line. But since this is impossible, it is likewise impossible for the indivisible to be in motion.

Again, since motion is always in a period of time and never in a moment, and all time is divisible, for everything that is in motion there must be a time less than that in which it traverses a distance as great as itself. For that in which it is in motion will be a time, because all motion is in a period of time; and all time has been shown above to be divisible. Therefore, if a point is in motion, there must be a time less than that in which it has itself traversed any distance. But this is impossible, for in less time it must traverse less distance, and thus the indivisible will be divisible into something less than itself, just as the time is so divisible: the fact being that the only condition under which that which is without parts and indivisible could be in motion would have been the possibility of the infinitely small being in motion in a moment: for in the two questions—that of motion in a moment and that of motion of something indivisible—the same principle is involved.

Our next point is that no process of change is infinite: for every change, whether between contradictories or between contraries, is a change from something to something. Thus in contradictory changes the positive or the negative, as the case may be, is the limit, e.g. being is the limit of coming to be and not-being is the limit of ceasing to be: and in contrary changes the particular contraries are the limits, since these are the extreme points of any such process of change, and consequently of every process of alteration: for alteration is always dependent upon some contraries. Similarly contraries are the extreme points of processes of increase and decrease: the limit of increase is to be found in the complete magnitude proper to the peculiar nature of the thing that is increasing, while the limit of decrease is the complete loss of such magnitude. Locomotion, it is true, we cannot show to be finite in this

way, since it is not always between contraries. But since that which cannot be cut (in the sense that it is inconceivable that it should be cut, the term 'cannot' being used in several senses)-since it is inconceivable that that which in this sense cannot be cut should be in process of being cut, and generally that that which cannot come to be should be in process of coming to be, it follows that it is inconceivable that that which cannot complete a change should be in process of changing to that to which it cannot complete a change. If, then, it is to be assumed that that which is in locomotion is in process of changing, it must be capable of completing the change. Consequently its motion is not infinite, and it will not be in locomotion over an infinite distance, for it cannot traverse such a distance.

It is evident, then, that a process of change cannot be infinite in the sense that it is not defined by limits. But it remains to be considered whether it is possible in the sense that one and the same process of change may be infinite in respect of the time which it occupies. If it is not one process, it would seem that there is nothing to prevent its being infinite in this sense; e.g. if a process of locomotion be succeeded by a process of alteration and that by a process of increase and that again by a process of coming to be: in this way there may be motion for ever so far as the time is concerned, but it will not be one motion, because all these motions do not compose one. If it is to be one process, no motion can be infinite in respect of the time that it occupies, with the single exception of rotatory locomotion.

BOOK_7|CH_1

Book VII

1

-

EVERYTHING that is in motion must be moved by something. For if it has not the source of its motion in itself it is evident that it is moved by something other than itself, for there must be something else that moves it. If on the other hand it has the source of its motion in itself, let AB be taken to represent that which is in motion essentially of itself and not in virtue of the fact that something belonging to it is in motion. Now in the first place to assume that AB, because it is in motion as a whole and is not moved by anything external to itself, is therefore moved by itself-this is just as if, supposing that KL is moving LM and is also itself in motion, we were to deny that KM is moved by anything on the ground that it is not evident which is the part that is moving it and which the part that is moved. In the second place that which is in motion without being moved by anything does not necessarily cease from its motion because

something else is at rest, but a thing must be moved by something if the fact of something else having ceased from its motion causes it to be at rest. Thus, if this is accepted, everything that is in motion must be moved by something. For AB, which has been taken to represent that which is in motion, must be divisible since everything that is in motion is divisible. Let it be divided, then, at G. Now if GB is not in motion, then AB will not be in motion: for if it is, it is clear that AG would be in motion while BG is at rest, and thus AB cannot be in motion essentially and primarily. But ex hypothesi AB is in motion essentially and primarily. Therefore if GB is not in motion AB will be at rest. But we have agreed that that which is at rest if something else is not in motion must be moved by something. Consequently, everything that is in motion must be moved by something: for that which is in motion will always be divisible, and if a part of it is not in motion the whole must be at rest.

Since everything that is in motion must be moved by something, let us take the case in which a thing is in locomotion and is moved by something that is itself in motion, and that again is moved by something else that is in motion, and that by something else, and so on continually: then the series cannot go on to infinity, but there must be some first movent. For let us suppose that this is not so and take the series to be infinite. Let A then be moved by B, B by G, G by D, and so on, each member of the series being moved by that which comes next to it. Then since ex hypothesi the movent while causing motion is also itself in motion, and the motion of the moved and the motion of the movent must proceed simultaneously (for the movent is causing motion and the moved is being moved simultaneously) it is evident that the respective motions of A, B, G, and each of the other moved movents are simultaneous. Let us take the motion of each separately and let E be the motion of A, Z of B, and H and O respectively the motions of G and D: for though they are all moved severally one by another, yet we may still take the motion of each as numerically one, since every motion is from something to something and is not infinite in respect of its extreme points. By a motion that is numerically one I mean a motion that proceeds from something numerically one and the same to something numerically one and the same in a period of time numerically one and the same: for a motion may be the same generically, specifically, or numerically: it is generically the same if it belongs to the same category, e.g. substance or quality: it is specifically the same if it proceeds from something specifically the same to something specifically the same, e.g. from white to black or from good to bad, which is not of a kind specifically distinct: it is numerically the same if it proceeds from something numerically one to something numerically one in the same period of time, e.g. from a particular white to a

particular black, or from a particular place to a particular place, in a particular period of time: for if the period of time were not one and the same, the motion would no longer be numerically one though it would still be specifically one.

We have dealt with this question above. Now let us further take the time in which A has completed its motion, and let it be represented by K. Then since the motion of A is finite the time will also be finite. But since the movents and the things moved are infinite, the motion EZHO, i.e. the motion that is composed of all the individual motions, must be infinite. For the motions of A, B, and the others may be equal, or the motions of the others may be greater: but assuming what is conceivable, we find that whether they are equal or some are greater, in both cases the whole motion is infinite. And since the motion of A and that of each of the others are simultaneous, the whole motion must occupy the same time as the motion of A: but the time occupied by the motion of A is finite: consequently the motion will be infinite in a finite time, which is impossible.

It might be thought that what we set out to prove has thus been shown, but our argument so far does not prove it, because it does not yet prove that anything impossible results from the contrary supposition: for in a finite time there may be an infinite motion, though not of one thing, but of many: and in the case that we are considering this is so: for each thing accomplishes its own motion, and there is no impossibility in many things being in motion simultaneously. But if (as we see to be universally the case) that which primarily is moved locally and corporeally must be either in contact with or continuous with that which moves it, the things moved and the movents must be continuous or in contact with one another, so that together they all form a single unity: whether this unity is finite or infinite makes no difference to our present argument; for in any case since the things in motion are infinite in number the whole motion will be infinite, if, as is theoretically possible, each motion is either equal to or greater than that which follows it in the series: for we shall take as actual that which is theoretically possible. If, then, A, B, G, D form an infinite magnitude that passes through the motion EZHO in the finite time K, this involves the conclusion that an infinite motion is passed through in a finite time: and whether the magnitude in question is finite or infinite this is in either case impossible. Therefore the series must come to an end, and there must be a first movent and a first moved: for the fact that this impossibility results only from the assumption of a particular case is immaterial, since the case assumed is theoretically possible, and the assumption of a theoretically possible case ought not to give rise to any impossible result.

-

That which is the first movement of a thing-in the sense that it supplies not 'that for the sake of which' but the source of the motion-is always together with that which is moved by it by 'together' (I mean that there is nothing intermediate between them). This is universally true wherever one thing is moved by another. And since there are three kinds of motion, local, qualitative, and quantitative, there must also be three kinds of movent, that which causes locomotion, that which causes alteration, and that which causes increase or decrease.

Let us begin with locomotion, for this is the primary motion. Everything that is in locomotion is moved either by itself or by something else. In the case of things that are moved by themselves it is evident that the moved and the movent are together: for they contain within themselves their first movent, so that there is nothing in between. The motion of things that are moved by something else must proceed in one of four ways: for there are four kinds of locomotion caused by something other than that which is in motion, viz. pulling, pushing, carrying, and twirling. All forms of locomotion are reducible to these. Thus pushing on is a form of pushing in which that which is causing motion away from itself follows up that which it pushes and continues to push it: pushing off occurs when the movent does not follow up the thing that it has moved: throwing when the movent causes a motion away from itself more violent than the natural locomotion of the thing moved, which continues its course so long as it is controlled by the motion imparted to it. Again, pushing apart and pushing together are forms respectively of pushing off and pulling: pushing apart is pushing off, which may be a motion either away from the pusher or away from something else, while pushing together is pulling, which may be a motion towards something else as well as the puller. We may similarly classify all the varieties of these last two, e.g. packing and combing: the former is a form of pushing together, the latter a form of pushing apart. The same is true of the other processes of combination and separation (they will all be found to be forms of pushing apart or of pushing together), except such as are involved in the processes of becoming and perishing. (At same time it is evident that there is no other kind of motion but combination and separation: for they may all be apportioned to one or other of those already mentioned.) Again, inhaling is a form of pulling, exhaling a form of pushing: and the same is true of spitting and of all other motions that proceed through the body, whether secretive or assimilative, the assimilative being forms of

pulling, the secretive of pushing off. All other kinds of locomotion must be similarly reduced, for they all fall under one or other of our four heads. And again, of these four, carrying and twirling are to pulling and pushing. For carrying always follows one of the other three methods, for that which is carried is in motion accidentally, because it is in or upon something that is in motion, and that which carries it is in doing so being either pulled or pushed or twirled; thus carrying belongs to all the other three kinds of motion in common. And twirling is a compound of pulling and pushing, for that which is twirling a thing must be pulling one part of the thing and pushing another part, since it impels one part away from itself and another part towards itself. If, therefore, it can be shown that that which is pushing and that which is pulling are adjacent respectively to that which is being pushed and that which is being pulled, it will be evident that in all locomotion there is nothing intermediate between moved and movent. But the former fact is clear even from the definitions of pushing and pulling, for pushing is motion to something else from oneself or from something else, and pulling is motion from something else to oneself or to something else, when the motion of that which is pulling is quicker than the motion that would separate from one another the two things that are continuous: for it is this that causes one thing to be pulled on along with the other. (It might indeed be thought that there is a form of pulling that arises in another way: that wood, e.g. pulls fire in a manner different from that described above. But it makes no difference whether that which pulls is in motion or is stationary when it is pulling: in the latter case it pulls to the place where it is, while in the former it pulls to the place where it was.) Now it is impossible to move anything either from oneself to something else or something else to oneself without being in contact with it: it is evident, therefore, that in all locomotion there is nothing intermediate between moved and movent.

Nor again is there anything intermediate between that which undergoes and that which causes alteration: this can be proved by induction: for in every case we find that the respective extremities of that which causes and that which undergoes alteration are adjacent. For our assumption is that things that are undergoing alteration are altered in virtue of their being affected in respect of their so-called affective qualities, since that which is of a certain quality is altered in so far as it is sensible, and the characteristics in which bodies differ from one another are sensible characteristics: for every body differs from another in possessing a greater or lesser number of sensible characteristics or in possessing the same sensible characteristics in a greater or lesser degree. But the alteration of that which undergoes alteration is

also caused by the above-mentioned characteristics, which are affections of some particular underlying quality. Thus we say that a thing is altered by becoming hot or sweet or thick or dry or white: and we make these assertions alike of what is inanimate and of what is animate, and further, where animate things are in question, we make them both of the parts that have no power of sense-perception and of the senses themselves. For in a way even the senses undergo alteration, since the active sense is a motion through the body in the course of which the sense is affected in a certain way. We see, then, that the animate is capable of every kind of alteration of which the inanimate is capable: but the inanimate is not capable of every kind of alteration of which the animate is capable, since it is not capable of alteration in respect of the senses: moreover the inanimate is unconscious of being affected by alteration, whereas the animate is conscious of it, though there is nothing to prevent the animate also being unconscious of it when the process of the alteration does not concern the senses. Since, then, the alteration of that which undergoes alteration is caused by sensible things, in every case of such alteration it is evident that the respective extremities of that which causes and that which undergoes alteration are adjacent. Thus the air is continuous with that which causes the alteration, and the body that undergoes alteration is continuous with the air. Again, the colour is continuous with the light and the light with the sight. And the same is true of hearing and smelling: for the primary movent in respect to the moved is the air. Similarly, in the case of tasting, the flavour is adjacent to the sense of taste. And it is just the same in the case of things that are inanimate and incapable of sense-perception. Thus there can be nothing intermediate between that which undergoes and that which causes alteration.

Nor, again, can there be anything intermediate between that which suffers and that which causes increase: for the part of the latter that starts the increase does so by becoming attached in such a way to the former that the whole becomes one. Again, the decrease of that which suffers decrease is caused by a part of the thing becoming detached. So that which causes increase and that which causes decrease must be continuous with that which suffers increase and that which suffers decrease respectively: and if two things are continuous with one another there can be nothing intermediate between them.

It is evident, therefore, that between the extremities of the moved and the movent that are respectively first and last in reference to the moved there is nothing intermediate.

-
Everything, we say, that undergoes alteration is altered by sensible causes, and there is alteration only in things that are said to be essentially affected by sensible things. The truth of this is to be seen from the following considerations. Of all other things it would be most natural to suppose that there is alteration in figures and shapes, and in acquired states and in the processes of acquiring and losing these: but as a matter of fact in neither of these two classes of things is there alteration.

In the first place, when a particular formation of a thing is completed, we do not call it by the name of its material: e.g. we do not call the statue 'bronze' or the pyramid 'wax' or the bed 'wood', but we use a derived expression and call them 'of bronze', 'waxen', and 'wooden' respectively. But when a thing has been affected and altered in any way we still call it by the original name: thus we speak of the bronze or the wax being dry or fluid or hard or hot.

And not only so: we also speak of the particular fluid or hot substance as being bronze, giving the material the same name as that which we use to describe the affection.

Since, therefore, having regard to the figure or shape of a thing we no longer call that which has become of a certain figure by the name of the material that exhibits the figure, whereas having regard to a thing's affections or alterations we still call it by the name of its material, it is evident that becomings of the former kind cannot be alterations.

Moreover it would seem absurd even to speak in this way, to speak, that is to say, of a man or house or anything else that has come into existence as having been altered. Though it may be true that every such becoming is necessarily the result of something's being altered, the result, e.g. of the material's being condensed or rarefied or heated or cooled, nevertheless it is not the things that are coming into existence that are altered, and their becoming is not an alteration.

Again, acquired states, whether of the body or of the soul, are not alterations. For some are excellences and others are defects, and neither excellence nor defect is an alteration: excellence is a perfection (for when anything acquires its proper excellence we call it perfect, since it is then if ever that we have a thing in its natural state: e.g. we have a perfect circle when we have one as good as possible), while defect is a perishing of or departure from this condition. So as when speaking of a house we do not call its arrival at perfection an alteration (for it would be absurd to suppose that the coping or the tiling is an alteration or that in receiving its coping or its tiling a house is altered and not perfected), the same also holds good in the case of excellences and defects and of the

persons or things that possess or acquire them: for excellences are perfections of a thing's nature and defects are departures from it: consequently they are not alterations.

Further, we say that all excellences depend upon particular relations. Thus bodily excellences such as health and a good state of body we regard as consisting in a blending of hot and cold elements within the body in due proportion, in relation either to one another or to the surrounding atmosphere: and in like manner we regard beauty, strength, and all the other bodily excellences and defects. Each of them exists in virtue of a particular relation and puts that which possesses it in a good or bad condition with regard to its proper affections, where by 'proper' affections I mean those influences that from the natural constitution of a thing tend to promote or destroy its existence. Since then, relatives are neither themselves alterations nor the subjects of alteration or of becoming or in fact of any change whatever, it is evident that neither states nor the processes of losing and acquiring states are alterations, though it may be true that their becoming or perishing is necessarily, like the becoming or perishing of a specific character or form, the result of the alteration of certain other things, e.g. hot and cold or dry and wet elements or the elements, whatever they may be, on which the states primarily depend. For each several bodily defect or excellence involves a relation with those things from which the possessor of the defect or excellence is naturally subject to alteration: thus excellence disposes its possessor to be unaffected by these influences or to be affected by those of them that ought to be admitted, while defect disposes its possessor to be affected by them or to be unaffected by those of them that ought to be admitted.

And the case is similar in regard to the states of the soul, all of which (like those of body) exist in virtue of particular relations, the excellences being perfections of nature and the defects departures from it: moreover, excellence puts its possessor in good condition, while defect puts its possessor in a bad condition, to meet his proper affections. Consequently these cannot any more than the bodily states be alterations, nor can the processes of losing and acquiring them be so, though their becoming is necessarily the result of an alteration of the sensitive part of the soul, and this is altered by sensible objects: for all moral excellence is concerned with bodily pleasures and pains, which again depend either upon acting or upon remembering or upon anticipating. Now those that depend upon action are determined by sense-perception, i.e. they are stimulated by something sensible: and those that depend upon memory or anticipation are likewise to be traced to sense-perception, for in these cases pleasure is felt either in remembering what one has experienced or in anticipating what one is going to experience. Thus

all pleasure of this kind must be produced by sensible things: and since the presence in any one of moral defect or excellence involves the presence in him of pleasure or pain (with which moral excellence and defect are always concerned), and these pleasures and pains are alterations of the sensitive part, it is evident that the loss and acquisition of these states no less than the loss and acquisition of the states of the body must be the result of the alteration of something else. Consequently, though their becoming is accompanied by an alteration, they are not themselves alterations.

Again, the states of the intellectual part of the soul are not alterations, nor is there any becoming of them. In the first place it is much more true of the possession of knowledge that it depends upon a particular relation. And further, it is evident that there is no becoming of these states. For that which is potentially possessed of knowledge becomes actually possessed of it not by being set in motion at all itself but by reason of the presence of something else: i.e. it is when it meets with the particular object that it knows in a manner the particular through its knowledge of the universal. (Again, there is no becoming of the actual use and activity of these states, unless it is thought that there is a becoming of vision and touching and that the activity in question is similar to these.) And the original acquisition of knowledge is not a becoming or an alteration: for the terms 'knowing' and 'understanding' imply that the intellect has reached a state of rest and come to a standstill, and there is no becoming that leads to a state of rest, since, as we have said above, change at all can have a becoming. Moreover, just as to say, when any one has passed from a state of intoxication or sleep or disease to the contrary state, that he has become possessed of knowledge again is incorrect in spite of the fact that he was previously incapable of using his knowledge, so, too, when any one originally acquires the state, it is incorrect to say that he becomes possessed of knowledge: for the possession of understanding and knowledge is produced by the soul's settling down out of the restlessness natural to it. Hence, too, in learning and in forming judgements on matters relating to their sense-perceptions children are inferior to adults owing to the great amount of restlessness and motion in their souls. Nature itself causes the soul to settle down and come to a state of rest for the performance of some of its functions, while for the performance of others other things do so: but in either case the result is brought about through the alteration of something in the body, as we see in the case of the use and activity of the intellect arising from a man's becoming sober or being awakened. It is evident, then, from the preceding argument that alteration and being altered occur in sensible things and in the sensitive part of the soul, and, except accidentally, in

nothing else.

BOOK_7|CH_4

4

-

A difficulty may be raised as to whether every motion is commensurable with every other or not. Now if they are all commensurable and if two things to have the same velocity must accomplish an equal motion in an equal time, then we may have a circumference equal to a straight line, or, of course, the one may be greater or less than the other. Further, if one thing alters and another accomplishes a locomotion in an equal time, we may have an alteration and a locomotion equal to one another: thus an affection will be equal to a length, which is impossible. But is it not only when an equal motion is accomplished by two things in an equal time that the velocities of the two are equal? Now an affection cannot be equal to a length. Therefore there cannot be an alteration equal to or less than a locomotion: and consequently it is not the case that every motion is commensurable with every other.

But how will our conclusion work out in the case of the circle and the straight line? It would be absurd to suppose that the motion of one in a circle and of another in a straight line cannot be similar, but that the one must inevitably move more quickly or more slowly than the other, just as if the course of one were downhill and of the other uphill. Moreover it does not as a matter of fact make any difference to the argument to say that the one motion must inevitably be quicker or slower than the other: for then the circumference can be greater or less than the straight line; and if so it is possible for the two to be equal. For if in the time A the quicker (B) passes over the distance B' and the slower (G) passes over the distance G', B' will be greater than G': for this is what we took 'quicker' to mean: and so quicker motion also implies that one thing traverses an equal distance in less time than another: consequently there will be a part of A in which B will pass over a part of the circle equal to G', while G will occupy the whole of A in passing over G'. None the less, if the two motions are commensurable, we are confronted with the consequence stated above, viz. that there may be a straight line equal to a circle. But these are not commensurable: and so the corresponding motions are not commensurable either.

But may we say that things are always commensurable if the same terms are applied to them without equivocation? e.g. a pen, a wine, and the highest note in a scale are not commensurable: we cannot say whether any one of them is sharper than any other: and why is this? they are incommensurable because it is only equivocally that the same term 'sharp' is applied to them: whereas the highest note in a

scale is commensurable with the leading-note, because the term 'sharp' has the same meaning as applied to both. Can it be, then, that the term 'quick' has not the same meaning as applied to straight motion and to circular motion respectively? If so, far less will it have the same meaning as applied to alteration and to locomotion.

Or shall we in the first place deny that things are always commensurable if the same terms are applied to them without equivocation? For the term 'much' has the same meaning whether applied to water or to air, yet water and air are not commensurable in respect of it: or, if this illustration is not considered satisfactory, 'double' at any rate would seem to have the same meaning as applied to each (denoting in each case the proportion of two to one), yet water and air are not commensurable in respect of it. But here again may we not take up the same position and say that the term 'much' is equivocal? In fact there are some terms of which even the definitions are equivocal; e.g. if 'much' were defined as 'so much and more', 'so much' would mean something different in different cases: 'equal' is similarly equivocal; and 'one' again is perhaps inevitably an equivocal term; and if 'one' is equivocal, so is 'two'. Otherwise why is it that some things are commensurable while others are not, if the nature of the attribute in the two cases is really one and the same?

Can it be that the incommensurability of two things in respect of any attribute is due to a difference in that which is primarily capable of carrying the attribute? Thus horse and dog are so commensurable that we may say which is the whiter, since that which primarily contains the whiteness is the same in both, viz. the surface: and similarly they are commensurable in respect of size. But water and speech are not commensurable in respect of clearness, since that which primarily contains the attribute is different in the two cases. It would seem, however that we must reject this solution, since clearly we could thus make all equivocal attributes univocal and say merely that that contains each of them is different in different cases: thus 'equality', 'sweetness', and 'whiteness' will severally always be the same, though that which contains them is different in different cases. Moreover, it is not any casual thing that is capable of carrying any attribute: each single attribute can be carried primarily only by one single thing.

Must we then say that, if two things are to be commensurable in respect of any attribute, not only must the attribute in question be applicable to both without equivocation, but there must also be no specific differences either in the attribute itself or in that which contains the attribute—that these, I mean, must not be divisible in the way in which colour is divided into kinds? Thus in this respect one thing will not be commensurable with another, i.e. we cannot say

that one is more coloured than the other where only colour in general and not any particular colour is meant; but they are commensurable in respect of whiteness.

Similarly in the case of motion: two things are of the same velocity if they occupy an equal time in accomplishing a certain equal amount of motion. Suppose, then, that in a certain time an alteration is undergone by one half of a body's length and a locomotion is accomplished the other half: can we say that in this case the alteration is equal to the locomotion and of the same velocity? That would be absurd, and the reason is that there are different species of motion. And if in consequence of this we must say that two things are of equal velocity if they accomplish locomotion over an equal distance in an equal time, we have to admit the equality of a straight line and a circumference. What, then, is the reason of this? Is it that locomotion is a genus or that line is a genus? (We may leave the time out of account, since that is one and the same.) If the lines are specifically different, the locomotions also differ specifically from one another: for locomotion is specifically differentiated according to the specific differentiation of that over which it takes place. (It is also similarly differentiated, it would seem, accordingly as the instrument of the locomotion is different: thus if feet are the instrument, it is walking, if wings it is flying; but perhaps we should rather say that this is not so, and that in this case the differences in the locomotion are merely differences of posture in that which is in motion.) We may say, therefore, that things are of equal velocity in an equal time they traverse the same magnitude: and when I call it 'the same' I mean that it contains no specific difference and therefore no difference in the motion that takes place over it. So we have now to consider how motion is differentiated: and this discussion serves to show that the genus is not a unity but contains a plurality latent in it and distinct from it, and that in the case of equivocal terms sometimes the different senses in which they are used are far removed from one another, while sometimes there is a certain likeness between them, and sometimes again they are nearly related either generically or analogically, with the result that they seem not to be equivocal though they really are.

When, then, is there a difference of species? Is an attribute specifically different if the subject is different while the attribute is the same, or must the attribute itself be different as well? And how are we to define the limits of a species? What will enable us to decide that particular instances of whiteness or sweetness are the same or different? Is it enough that it appears different in one subject from what appears in another? Or must there be no sameness at all? And further, where alteration is in question, how is one

alteration to be of equal velocity with another? One person may be cured quickly and another slowly, and cures may also be simultaneous: so that, recovery of health being an alteration, we have here alterations of equal velocity, since each alteration occupies an equal time. But what alteration? We cannot here speak of an 'equal' alteration: what corresponds in the category of quality to equality in the category of quantity is 'likeness'. However, let us say that there is equal velocity where the same change is accomplished in an equal time. Are we, then, to find the commensurability in the subject of the affection or in the affection itself? In the case that we have just been considering it is the fact that health is one and the same that enables us to arrive at the conclusion that the one alteration is neither more nor less than the other, but that both are alike. If on the other hand the affection is different in the two cases, e.g. when the alterations take the form of becoming white and becoming healthy respectively, here there is no sameness or equality or likeness inasmuch as the difference in the affections at once makes the alterations specifically different, and there is no unity of alteration any more than there would be unity of locomotion under like conditions. So we must find out how many species there are of alteration and of locomotion respectively. Now if the things that are in motion—that is to say, the things to which the motions belong essentially and not accidentally—differ specifically, then their respective motions will also differ specifically: if on the other hand they differ generically or numerically, the motions also will differ generically or numerically as the case may be. But there still remains the question whether, supposing that two alterations are of equal velocity, we ought to look for this equality in the sameness (or likeness) of the affections, or in the things altered, to see e.g. whether a certain quantity of each has become white. Or ought we not rather to look for it in both? That is to say, the alterations are the same or different according as the affections are the same or different, while they are equal or unequal according as the things altered are equal or unequal.

And now we must consider the same question in the case of becoming and perishing: how is one becoming of equal velocity with another? They are of equal velocity if in an equal time there are produced two things that are the same and specifically inseparable, e.g. two men (not merely generically inseparable as e.g. two animals). Similarly one is quicker than the other if in an equal time the product is different in the two cases. I state it thus because we have no pair of terms that will convey this 'difference' in the way in which unlikeness is conveyed. If we adopt the theory that it is number that constitutes being, we may indeed speak of a 'greater number' and a 'lesser number' within the same species, but there is no

common term that will include both relations, nor are there terms to express each of them separately in the same way as we indicate a higher degree or preponderance of an affection by 'more', of a quantity by 'greater.'

BOOK_7|CH_5

5

-

Now since wherever there is a movent, its motion always acts upon something, is always in something, and always extends to something (by 'is always in something' I mean that it occupies a time: and by 'extends to something' I mean that it involves the traversing of a certain amount of distance: for at any moment when a thing is causing motion, it also has caused motion, so that there must always be a certain amount of distance that has been traversed and a certain amount of time that has been occupied). then, A the movement have moved B a distance G in a time D, then in the same time the same force A will move $1/2B$ twice the distance G, and in $1/2D$ it will move $1/2B$ the whole distance for G: thus the rules of proportion will be observed. Again if a given force move a given weight a certain distance in a certain time and half the distance in half the time, half the motive power will move half the weight the same distance in the same time. Let E represent half the motive power A and Z half the weight B: then the ratio between the motive power and the weight in the one case is similar and proportionate to the ratio in the other, so that each force will cause the same distance to be traversed in the same time. But if E move Z a distance G in a time D, it does not necessarily follow that E can move twice Z half the distance G in the same time. If, then, A move B a distance G in a time D, it does not follow that E, being half of A, will in the time D or in any fraction of it cause B to traverse a part of G the ratio between which and the whole of G is proportionate to that between A and E (whatever fraction of AE may be): in fact it might well be that it will cause no motion at all; for it does not follow that, if a given motive power causes a certain amount of motion, half that power will cause motion either of any particular amount or in any length of time: otherwise one man might move a ship, since both the motive power of the ship-haulers and the distance that they all cause the ship to traverse are divisible into as many parts as there are men. Hence Zeno's reasoning is false when he argues that there is no part of the millet that does not make a sound: for there is no reason why any such part should not in any length of time fail to move the air that the whole bushel moves in falling. In fact it does not of itself move even such a quantity of the air as it would move if this part were by itself: for no part even exists

otherwise than potentially.

If on the other hand we have two forces each of which separately moves one of two weights a given distance in a given time, then the forces in combination will move the combined weights an equal distance in an equal time: for in this case the rules of proportion apply.

Then does this hold good of alteration and of increase also? Surely it does, for in any given case we have a definite thing that cause increase and a definite thing that suffers increase, and the one causes and the other suffers a certain amount of increase in a certain amount of time. Similarly we have a definite thing that causes alteration and a definite thing that undergoes alteration, and a certain amount, or rather degree, of alteration is completed in a certain amount of time: thus in twice as much time twice as much alteration will be completed and conversely twice as much alteration will occupy twice as much time: and the alteration of half of its object will occupy half as much time and in half as much time half of the object will be altered: or again, in the same amount of time it will be altered twice as much.

On the other hand if that which causes alteration or increase causes a certain amount of increase or alteration respectively in a certain amount of time, it does not necessarily follow that half the force will occupy twice the time in altering or increasing the object, or that in twice the time the alteration or increase will be completed by it: it may happen that there will be no alteration or increase at all, the case being the same as with the weight.

BOOK_8|CH_1

Book VIII

1

-

IT remains to consider the following question. Was there ever a becoming of motion before which it had no being, and is it perishing again so as to leave nothing in motion? Or are we to say that it never had any becoming and is not perishing, but always was and always will be? Is it in fact an immortal never-failing property of things that are, a sort of life as it were to all naturally constituted things?

Now the existence of motion is asserted by all who have anything to say about nature, because they all concern themselves with the construction of the world and study the question of becoming and perishing, which processes could not come about without the existence of motion. But those who say that there is an infinite number of worlds, some of which are in process of becoming while others are in process of perishing, assert that there is always motion (for these processes of becoming and perishing of the worlds

necessarily involve motion), whereas those who hold that there is only one world, whether everlasting or not, make corresponding assumptions in regard to motion. If then it is possible that at any time nothing should be in motion, this must come about in one of two ways: either in the manner described by Anaxagoras, who says that all things were together and at rest for an infinite period of time, and that then Mind introduced motion and separated them; or in the manner described by Empedocles, according to whom the universe is alternately in motion and at rest-in motion, when Love is making the one out of many, or Strife is making many out of one, and at rest in the intermediate periods of time-his account being as follows:

-

'Since One hath learned to spring from Manifold,
And One disjoined makes manifold arise,
Thus they Become, nor stable is their life:
But since their motion must alternate be,
Thus have they ever Rest upon their round':

-

for we must suppose that he means by this that they alternate from the one motion to the other. We must consider, then, how this matter stands, for the discovery of the truth about it is of importance, not only for the study of nature, but also for the investigation of the First Principle.

Let us take our start from what we have already laid down in our course on Physics. Motion, we say, is the fulfilment of the movable in so far as it is movable. Each kind of motion, therefore, necessarily involves the presence of the things that are capable of that motion. In fact, even apart from the definition of motion, every one would admit that in each kind of motion it is that which is capable of that motion that is in motion: thus it is that which is capable of alteration that is altered, and that which is capable of local change that is in locomotion: and so there must be something capable of being burned before there can be a process of being burned, and something capable of burning before there can be a process of burning. Moreover, these things also must either have a beginning before which they had no being, or they must be eternal. Now if there was a becoming of every movable thing, it follows that before the motion in question another change or motion must have taken place in which that which was capable of being moved or of causing motion had its becoming. To suppose, on the other hand, that these things were in being throughout all previous time without there being any motion appears unreasonable on a moment's thought, and still more unreasonable, we shall find, on further consideration. For if we are to say that, while there are on the one hand things that are movable, and on the other hand things that are motive, there is a time

when there is a first mover and a first moved, and another time when there is no such thing but only something that is at rest, then this thing that is at rest must previously have been in process of change: for there must have been some cause of its rest, rest being the privation of motion. Therefore, before this first change there will be a previous change. For some things cause motion in only one way, while others can produce either of two contrary motions: thus fire causes heating but not cooling, whereas it would seem that knowledge may be directed to two contrary ends while remaining one and the same. Even in the former class, however, there seems to be something similar, for a cold thing in a sense causes heating by turning away and retiring, just as one possessed of knowledge voluntarily makes an error when he uses his knowledge in the reverse way. But at any rate all things that are capable respectively of affecting and being affected, or of causing motion and being moved, are capable of it not under all conditions, but only when they are in a particular condition and approach one another: so it is on the approach of one thing to another that the one causes motion and the other is moved, and when they are present under such conditions as rendered the one mover and the other movable. So if the motion was not always in process, it is clear that they must have been in a condition not such as to render them capable respectively of being moved and of causing motion, and one or other of them must have been in process of change: for in what is relative this is a necessary consequence: e.g. if one thing is double another when before it was not so, one or other of them, if not both, must have been in process of change. It follows then, that there will be a process of change previous to the first.

(Further, how can there be any 'before' and 'after' without the existence of time? Or how can there be any time without the existence of motion? If, then, time is the number of motion or itself a kind of motion, it follows that, if there is always time, motion must also be eternal. But so far as time is concerned we see that all with one exception are in agreement in saying that it is uncreated: in fact, it is just this that enables Democritus to show that all things cannot have had a becoming: for time, he says, is uncreated. Plato alone asserts the creation of time, saying that it had a becoming together with the universe, the universe according to him having had a becoming. Now since time cannot exist and is unthinkable apart from the moment, and the moment a kind of middle-point, uniting as it does in itself both a beginning and an end, a beginning of future time and an end of past time, it follows that there must always be time: for the extremity of the last period of time that we take must be found in some moment, since time contains no point of contact for us except the moment. Therefore, since the

moment is both a beginning and an end, there must always be time on both sides of it. But if this is true of time, it is evident that it must also be true of motion, time being a kind of affection of motion.)

The same reasoning will also serve to show the imperishability of motion: just as a becoming of motion would involve, as we saw, the existence of a process of change previous to the first, in the same way a perishing of motion would involve the existence of a process of change subsequent to the last: for when a thing ceases to be moved, it does not therefore at the same time cease to be movable-e.g. the cessation of the process of being burned does not involve the cessation of the capacity of being burned, since a thing may be capable of being burned without being in process of being burned-nor, when a thing ceases to be moved, does it therefore at the same time cease to be movable. Again, the destructive agent will have to be destroyed, after what it destroys has been destroyed, and then that which has the capacity of destroying it will have to be destroyed afterwards, (so that there will be a process of change subsequent to the last,) for being destroyed also is a kind of change. If, then, the view which we are criticizing involves these impossible consequences, it is clear that motion is eternal and cannot have existed at one time and not at another: in fact such a view can hardly be described as anything else than fantastic.

And much the same may be said of the view that such is the ordinance of nature and that this must be regarded as a principle, as would seem to be the view of Empedocles when he says that the constitution of the world is of necessity such that Love and Strife alternately predominate and cause motion, while in the intermediate period of time there is a state of rest. Probably also those who like like Anaxagoras, assert a single principle (of motion) would hold this view. But that which is produced or directed by nature can never be anything disorderly: for nature is everywhere the cause of order. Moreover, there is no ratio in the relation of the infinite to the infinite, whereas order always means ratio. But if we say that there is first a state of rest for an infinite time, and then motion is started at some moment, and that the fact that it is this rather than a previous moment is of no importance, and involves no order, then we can no longer say that it is nature's work: for if anything is of a certain character naturally, it either is so invariably and is not sometimes of this and sometimes of another character (e.g. fire, which travels upwards naturally, does not sometimes do so and sometimes not) or there is a ratio in the variation. It would be better, therefore, to say with Empedocles and any one else who may have maintained such a theory as his that the universe is alternately at rest and in motion: for in a system of this kind we

have at once a certain order. But even here the holder of the theory ought not only to assert the fact: he ought to explain the cause of it: i.e. he should not make any mere assumption or lay down any gratuitous axiom, but should employ either inductive or demonstrative reasoning. The Love and Strife postulated by Empedocles are not in themselves causes of the fact in question, nor is it of the essence of either that it should be so, the essential function of the former being to unite, of the latter to separate. If he is to go on to explain this alternate predominance, he should adduce cases where such a state of things exists, as he points to the fact that among mankind we have something that unites men, namely Love, while on the other hand enemies avoid one another: thus from the observed fact that this occurs in certain cases comes the assumption that it occurs also in the universe. Then, again, some argument is needed to explain why the predominance of each of the two forces lasts for an equal period of time. But it is a wrong assumption to suppose universally that we have an adequate first principle in virtue of the fact that something always is so or always happens so. Thus Democritus reduces the causes that explain nature to the fact that things happened in the past in the same way as they happen now: but he does not think fit to seek for a first principle to explain this 'always': so, while his theory is right in so far as it is applied to certain individual cases, he is wrong in making it of universal application. Thus, a triangle always has its angles equal to two right angles, but there is nevertheless an ulterior cause of the eternity of this truth, whereas first principles are eternal and have no ulterior cause. Let this conclude what we have to say in support of our contention that there never was a time when there was not motion, and never will be a time when there will not be motion.

BOOK_8|CH_2

2

-

The arguments that may be advanced against this position are not difficult to dispose of. The chief considerations that might be thought to indicate that motion may exist though at one time it had not existed at all are the following:

First, it may be said that no process of change is eternal: for the nature of all change is such that it proceeds from something to something, so that every process of change must be bounded by the contraries that mark its course, and no motion can go on to infinity.

Secondly, we see that a thing that neither is in motion nor contains any motion within itself can be set in motion; e.g. inanimate things that are (whether the whole or some part is in question) not in motion

but at rest, are at some moment set in motion: whereas, if motion cannot have a becoming before which it had no being, these things ought to be either always or never in motion.

Thirdly, the fact is evident above all in the case of animate beings: for it sometimes happens that there is no motion in us and we are quite still, and that nevertheless we are then at some moment set in motion, that is to say it sometimes happens that we produce a beginning of motion in ourselves spontaneously without anything having set us in motion from without. We see nothing like this in the case of inanimate things, which are always set in motion by something else from without: the animal, on the other hand, we say, moves itself: therefore, if an animal is ever in a state of absolute rest, we have a motionless thing in which motion can be produced from the thing itself, and not from without. Now if this can occur in an animal, why should not the same be true also of the universe as a whole? If it can occur in a small world it could also occur in a great one: and if it can occur in the world, it could also occur in the infinite; that is, if the infinite could as a whole possibly be in motion or at rest.

Of these objections, then, the first-mentioned motion to opposites is not always the same and numerically one a correct statement; in fact, this may be said to be a necessary conclusion, provided that it is possible for the motion of that which is one and the same to be not always one and the same. (I mean that e.g. we may question whether the note given by a single string is one and the same, or is different each time the string is struck, although the string is in the same condition and is moved in the same way.) But still, however this may be, there is nothing to prevent there being a motion that is the same in virtue of being continuous and eternal: we shall have something to say later that will make this point clearer.

As regards the second objection, no absurdity is involved in the fact that something not in motion may be set in motion, that which caused the motion from without being at one time present, and at another absent. Nevertheless, how this can be so remains matter for inquiry; how it comes about, I mean, that the same motive force at one time causes a thing to be in motion, and at another does not do so: for the difficulty raised by our objector really amounts to this-why is it that some things are not always at rest, and the rest always in motion?

The third objection may be thought to present more difficulty than the others, namely, that which alleges that motion arises in things in which it did not exist before, and adduces in proof the case of animate things: thus an animal is first at rest and afterwards walks, not having been set in motion apparently by anything from without. This, however, is false: for we observe that there is

always some part of the animal's organism in motion, and the cause of the motion of this part is not the animal itself, but, it may be, its environment. Moreover, we say that the animal itself originates not all of its motions but its locomotion. So it may well be the case-or rather we may perhaps say that it must necessarily be the case-that many motions are produced in the body by its environment, and some of these set in motion the intellect or the appetite, and this again then sets the whole animal in motion: this is what happens when animals are asleep: though there is then no perceptive motion in them, there is some motion that causes them to wake up again. But we will leave this point also to be elucidated at a later stage in our discussion.

BOOK_8|CH_3

3

-

Our enquiry will resolve itself at the outset into a consideration of the above-mentioned problem-what can be the reason why some things in the world at one time are in motion and at another are at rest again? Now one of three things must be true: either all things are always at rest, or all things are always in motion, or some things are in motion and others at rest: and in this last case again either the things that are in motion are always in motion and the things that are at rest are always at rest, or they are all constituted so as to be capable alike of motion and of rest; or there is yet a third possibility remaining-it may be that some things in the world are always motionless, others always in motion, while others again admit of both conditions. This last is the account of the matter that we must give: for herein lies the solution of all the difficulties raised and the conclusion of the investigation upon which we are engaged.

To maintain that all things are at rest, and to disregard sense-perception in an attempt to show the theory to be reasonable, would be an instance of intellectual weakness: it would call in question a whole system, not a particular detail: moreover, it would be an attack not only on the physicist but on almost all sciences and all received opinions, since motion plays a part in all of them. Further, just as in arguments about mathematics objections that involve first principles do not affect the mathematician-and the other sciences are in similar case-so, too, objections involving the point that we have just raised do not affect the physicist: for it is a fundamental assumption with him that motion is ultimately referable to nature herself.

The assertion that all things are in motion we may fairly regard as equally false, though it is less subversive of physical science: for though in our course on physics it was laid down that rest no less

than motion is ultimately referable to nature herself, nevertheless motion is the characteristic fact of nature: moreover, the view is actually held by some that not merely some things but all things in the world are in motion and always in motion, though we cannot apprehend the fact by sense-perception. Although the supporters of this theory do not state clearly what kind of motion they mean, or whether they mean all kinds, it is no hard matter to reply to them: thus we may point out that there cannot be a continuous process either of increase or of decrease: that which comes between the two has to be included. The theory resembles that about the stone being worn away by the drop of water or split by plants growing out of it: if so much has been extruded or removed by the drop, it does not follow that half the amount has previously been extruded or removed in half the time: the case of the hauled ship is exactly comparable: here we have so many drops setting so much in motion, but a part of them will not set as much in motion in any period of time. The amount removed is, it is true, divisible into a number of parts, but no one of these was set in motion separately: they were all set in motion together. It is evident, then, that from the fact that the decrease is divisible into an infinite number of parts it does not follow that some part must always be passing away: it all passes away at a particular moment. Similarly, too, in the case of any alteration whatever if that which suffers alteration is infinitely divisible it does not follow from this that the same is true of the alteration itself, which often occurs all at once, as in freezing. Again, when any one has fallen ill, there must follow a period of time in which his restoration to health is in the future: the process of change cannot take place in an instant: yet the change cannot be a change to anything else but health. The assertion, therefore, that alteration is continuous is an extravagant calling into question of the obvious: for alteration is a change from one contrary to another. Moreover, we notice that a stone becomes neither harder nor softer. Again, in the matter of locomotion, it would be a strange thing if a stone could be falling or resting on the ground without our being able to perceive the fact. Further, it is a law of nature that earth and all other bodies should remain in their proper places and be moved from them only by violence: from the fact then that some of them are in their proper places it follows that in respect of place also all things cannot be in motion. These and other similar arguments, then, should convince us that it is impossible either that all things are always in motion or that all things are always at rest.

Nor again can it be that some things are always at rest, others always in motion, and nothing sometimes at rest and sometimes in motion. This theory must be pronounced impossible on the same grounds as those previously mentioned: viz. that we see the

above-mentioned changes occurring in the case of the same things. We may further point out that the defender of this position is fighting against the obvious, for on this theory there can be no such thing as increase: nor can there be any such thing as compulsory motion, if it is impossible that a thing can be at rest before being set in motion unnaturally. This theory, then, does away with becoming and perishing. Moreover, motion, it would seem, is generally thought to be a sort of becoming and perishing, for that to which a thing changes comes to be, or occupancy of it comes to be, and that from which a thing changes ceases to be, or there ceases to be occupancy of it. It is clear, therefore, that there are cases of occasional motion and occasional rest.

We have now to take the assertion that all things are sometimes at rest and sometimes in motion and to confront it with the arguments previously advanced. We must take our start as before from the possibilities that we distinguished just above. Either all things are at rest, or all things are in motion, or some things are at rest and others in motion. And if some things are at rest and others in motion, then it must be that either all things are sometimes at rest and sometimes in motion, or some things are always at rest and the remainder always in motion, or some of the things are always at rest and others always in motion while others again are sometimes at rest and sometimes in motion. Now we have said before that it is impossible that all things should be at rest: nevertheless we may now repeat that assertion. We may point out that, even if it is really the case, as certain persons assert, that the existent is infinite and motionless, it certainly does not appear to be so if we follow sense-perception: many things that exist appear to be in motion. Now if there is such a thing as false opinion or opinion at all, there is also motion; and similarly if there is such a thing as imagination, or if it is the case that anything seems to be different at different times: for imagination and opinion are thought to be motions of a kind. But to investigate this question at all-to seek a reasoned justification of a belief with regard to which we are too well off to require reasoned justification-implies bad judgement of what is better and what is worse, what commends itself to belief and what does not, what is ultimate and what is not. It is likewise impossible that all things should be in motion or that some things should be always in motion and the remainder always at rest. We have sufficient ground for rejecting all these theories in the single fact that we see some things that are sometimes in motion and sometimes at rest. It is evident, therefore, that it is no less impossible that some things should be always in motion and the remainder always at rest than that all things should be at rest or that all things should be in motion continuously. It remains, then, to

consider whether all things are so constituted as to be capable both of being in motion and of being at rest, or whether, while some things are so constituted, some are always at rest and some are always in motion: for it is this last view that we have to show to be true.

BOOK_8|CH_4

4

-

Now of things that cause motion or suffer motion, to some the motion is accidental, to others essential: thus it is accidental to what merely belongs to or contains as a part a thing that causes motion or suffers motion, essential to a thing that causes motion or suffers motion not merely by belonging to such a thing or containing it as a part.

Of things to which the motion is essential some derive their motion from themselves, others from something else: and in some cases their motion is natural, in others violent and unnatural. Thus in things that derive their motion from themselves, e.g. all animals, the motion is natural (for when an animal is in motion its motion is derived from itself): and whenever the source of the motion of a thing is in the thing itself we say that the motion of that thing is natural. Therefore the animal as a whole moves itself naturally: but the body of the animal may be in motion unnaturally as well as naturally: it depends upon the kind of motion that it may chance to be suffering and the kind of element of which it is composed. And the motion of things that derive their motion from something else is in some cases natural, in other unnatural: e.g. upward motion of earthy things and downward motion of fire are unnatural. Moreover the parts of animals are often in motion in an unnatural way, their positions and the character of the motion being abnormal. The fact that a thing that is in motion derives its motion from something is most evident in things that are in motion unnaturally, because in such cases it is clear that the motion is derived from something other than the thing itself. Next to things that are in motion unnaturally those whose motion while natural is derived from themselves-e.g. animals-make this fact clear: for here the uncertainty is not as to whether the motion is derived from something but as to how we ought to distinguish in the thing between the movent and the moved. It would seem that in animals, just as in ships and things not naturally organized, that which causes motion is separate from that which suffers motion, and that it is only in this sense that the animal as a whole causes its own motion.

The greatest difficulty, however, is presented by the remaining case of those that we last distinguished. Where things derive their motion from something else we distinguished the cases in which the

motion is unnatural: we are left with those that are to be contrasted with the others by reason of the fact that the motion is natural. It is in these cases that difficulty would be experienced in deciding whence the motion is derived, e.g. in the case of light and heavy things. When these things are in motion to positions the reverse of those they would properly occupy, their motion is violent: when they are in motion to their proper positions—the light thing up and the heavy thing down—their motion is natural; but in this latter case it is no longer evident, as it is when the motion is unnatural, whence their motion is derived. It is impossible to say that their motion is derived from themselves: this is a characteristic of life and peculiar to living things. Further, if it were, it would have been in their power to stop themselves (I mean that if e.g. a thing can cause itself to walk it can also cause itself not to walk), and so, since on this supposition fire itself possesses the power of upward locomotion, it is clear that it should also possess the power of downward locomotion. Moreover if things move themselves, it would be unreasonable to suppose that in only one kind of motion is their motion derived from themselves. Again, how can anything of continuous and naturally connected substance move itself? In so far as a thing is one and continuous not merely in virtue of contact, it is impassive: it is only in so far as a thing is divided that one part of it is by nature active and another passive. Therefore none of the things that we are now considering move themselves (for they are of naturally connected substance), nor does anything else that is continuous: in each case the movent must be separate from the moved, as we see to be the case with inanimate things when an animate thing moves them. It is the fact that these things also always derive their motion from something: what it is would become evident if we were to distinguish the different kinds of cause.

The above-mentioned distinctions can also be made in the case of things that cause motion: some of them are capable of causing motion unnaturally (e.g. the lever is not naturally capable of moving the weight), others naturally (e.g. what is actually hot is naturally capable of moving what is potentially hot): and similarly in the case of all other things of this kind.

In the same way, too, what is potentially of a certain quality or of a certain quantity in a certain place is naturally movable when it contains the corresponding principle in itself and not accidentally (for the same thing may be both of a certain quality and of a certain quantity, but the one is an accidental, not an essential property of the other). So when fire or earth is moved by something the motion is violent when it is unnatural, and natural when it brings to actuality the proper activities that they potentially possess.

But the fact that the term 'potentially' is used in more than one sense is the reason why it is not evident whence such motions as the upward motion of fire and the downward motion of earth are derived. One who is learning a science potentially knows it in a different sense from one who while already possessing the knowledge is not actually exercising it. Wherever we have something capable of acting and something capable of being correspondingly acted on, in the event of any such pair being in contact what is potential becomes at times actual: e.g. the learner becomes from one potential something another potential something: for one who possesses knowledge of a science but is not actually exercising it knows the science potentially in a sense, though not in the same sense as he knew it potentially before he learnt it. And when he is in this condition, if something does not prevent him, he actively exercises his knowledge: otherwise he would be in the contradictory state of not knowing. In regard to natural bodies also the case is similar. Thus what is cold is potentially hot: then a change takes place and it is fire, and it burns, unless something prevents and hinders it. So, too, with heavy and light: light is generated from heavy, e.g. air from water (for water is the first thing that is potentially light), and air is actually light, and will at once realize its proper activity as such unless something prevents it. The activity of lightness consists in the light thing being in a certain situation, namely high up: when it is in the contrary situation, it is being prevented from rising. The case is similar also in regard to quantity and quality. But, be it noted, this is the question we are trying to answer-how can we account for the motion of light things and heavy things to their proper situations? The reason for it is that they have a natural tendency respectively towards a certain position: and this constitutes the essence of lightness and heaviness, the former being determined by an upward, the latter by a downward, tendency. As we have said, a thing may be potentially light or heavy in more senses than one. Thus not only when a thing is water is it in a sense potentially light, but when it has become air it may be still potentially light: for it may be that through some hindrance it does not occupy an upper position, whereas, if what hinders it is removed, it realizes its activity and continues to rise higher. The process whereby what is of a certain quality changes to a condition of active existence is similar: thus the exercise of knowledge follows at once upon the possession of it unless something prevents it. So, too, what is of a certain quantity extends itself over a certain space unless something prevents it. The thing in a sense is and in a sense is not moved by one who moves what is obstructing and preventing its motion (e.g. one who pulls away a pillar from under a roof or one who removes a stone from a wineskin in the water is the accidental

cause of motion): and in the same way the real cause of the motion of a ball rebounding from a wall is not the wall but the thrower. So it is clear that in all these cases the thing does not move itself, but it contains within itself the source of motion-not of moving something or of causing motion, but of suffering it.

If then the motion of all things that are in motion is either natural or unnatural and violent, and all things whose motion is violent and unnatural are moved by something, and something other than themselves, and again all things whose motion is natural are moved by something-both those that are moved by themselves and those that are not moved by themselves (e.g. light things and heavy things, which are moved either by that which brought the thing into existence as such and made it light and heavy, or by that which released what was hindering and preventing it); then all things that are in motion must be moved by something.

BOOK_8|CH_5

5

-

Now this may come about in either of two ways. Either the movent is not itself responsible for the motion, which is to be referred to something else which moves the movent, or the movent is itself responsible for the motion. Further, in the latter case, either the movent immediately precedes the last thing in the series, or there may be one or more intermediate links: e.g. the stick moves the stone and is moved by the hand, which again is moved by the man: in the man, however, we have reached a movent that is not so in virtue of being moved by something else. Now we say that the thing is moved both by the last and by the first movent in the series, but more strictly by the first, since the first movent moves the last, whereas the last does not move the first, and the first will move the thing without the last, but the last will not move it without the first: e.g. the stick will not move anything unless it is itself moved by the man. If then everything that is in motion must be moved by something, and the movent must either itself be moved by something else or not, and in the former case there must be some first movent that is not itself moved by anything else, while in the case of the immediate movent being of this kind there is no need of an intermediate movent that is also moved (for it is impossible that there should be an infinite series of movents, each of which is itself moved by something else, since in an infinite series there is no first term)-if then everything that is in motion is moved by something, and the first movent is moved but not by anything else, it much be moved by itself.

This same argument may also be stated in another way as follows. Every movent moves something and moves it with something, either

with itself or with something else: e.g. a man moves a thing either himself or with a stick, and a thing is knocked down either by the wind itself or by a stone propelled by the wind. But it is impossible for that with which a thing is moved to move it without being moved by that which imparts motion by its own agency: on the other hand, if a thing imparts motion by its own agency, it is not necessary that there should be anything else with which it imparts motion, whereas if there is a different thing with which it imparts motion, there must be something that imparts motion not with something else but with itself, or else there will be an infinite series. If, then, anything is a movent while being itself moved, the series must stop somewhere and not be infinite. Thus, if the stick moves something in virtue of being moved by the hand, the hand moves the stick: and if something else moves with the hand, the hand also is moved by something different from itself. So when motion by means of an instrument is at each stage caused by something different from the instrument, this must always be preceded by something else which imparts motion with itself. Therefore, if this last movent is in motion and there is nothing else that moves it, it must move itself. So this reasoning also shows that when a thing is moved, if it is not moved immediately by something that moves itself, the series brings us at some time or other to a movent of this kind.

And if we consider the matter in yet a third way we shall get this same result as follows. If everything that is in motion is moved by something that is in motion, either this being in motion is an accidental attribute of the movents in question, so that each of them moves something while being itself in motion, but not always because it is itself in motion, or it is not accidental but an essential attribute. Let us consider the former alternative. If then it is an accidental attribute, it is not necessary that that is in motion should be in motion: and if this is so it is clear that there may be a time when nothing that exists is in motion, since the accidental is not necessary but contingent. Now if we assume the existence of a possibility, any conclusion that we thereby reach will not be an impossibility though it may be contrary to fact. But the nonexistence of motion is an impossibility: for we have shown above that there must always be motion.

Moreover, the conclusion to which we have been led is a reasonable one. For there must be three things—the moved, the movent, and the instrument of motion. Now the moved must be in motion, but it need not move anything else: the instrument of motion must both move something else and be itself in motion (for it changes together with the moved, with which it is in contact and continuous, as is clear in the case of things that move other things locally, in which case the two things must up to a certain point be in contact): and the

movent-that is to say, that which causes motion in such a manner that it is not merely the instrument of motion-must be unmoved. Now we have visual experience of the last term in this series, namely that which has the capacity of being in motion, but does not contain a motive principle, and also of that which is in motion but is moved by itself and not by anything else: it is reasonable, therefore, not to say necessary, to suppose the existence of the third term also, that which causes motion but is itself unmoved. So, too, Anaxagoras is right when he says that Mind is impassive and unmixed, since he makes it the principle of motion: for it could cause motion in this sense only by being itself unmoved, and have supreme control only by being unmixed.

We will now take the second alternative. If the movement is not accidentally but necessarily in motion-so that, if it were not in motion, it would not move anything-then the movent, in so far as it is in motion, must be in motion in one of two ways: it is moved either as that which is moved with the same kind of motion, or with a different kind-either that which is heating, I mean, is itself in process of becoming hot, that which is making healthy in process of becoming healthy, and that which is causing locomotion in process of locomotion, or else that which is making healthy is, let us say, in process of locomotion, and that which is causing locomotion in process of, say, increase. But it is evident that this is impossible. For if we adopt the first assumption we have to make it apply within each of the very lowest species into which motion can be divided: e.g. we must say that if some one is teaching some lesson in geometry, he is also in process of being taught that same lesson in geometry, and that if he is throwing he is in process of being thrown in just the same manner. Or if we reject this assumption we must say that one kind of motion is derived from another; e.g. that that which is causing locomotion is in process of increase, that which is causing this increase is in process of being altered by something else, and that which is causing this alteration is in process of suffering some different kind of motion. But the series must stop somewhere, since the kinds of motion are limited; and if we say that the process is reversible, and that that which is causing alteration is in process of locomotion, we do no more than if we had said at the outset that that which is causing locomotion is in process of locomotion, and that one who is teaching is in process of being taught: for it is clear that everything that is moved is moved by the movent that is further back in the series as well as by that which immediately moves it: in fact the earlier movent is that which more strictly moves it. But this is of course impossible: for it involves the consequence that one who is teaching is in process of learning what he is teaching, whereas teaching necessarily implies possessing knowledge, and learning not

possessing it. Still more unreasonable is the consequence involved that, since everything that is moved is moved by something that is itself moved by something else, everything that has a capacity for causing motion has as such a corresponding capacity for being moved: i.e. it will have a capacity for being moved in the sense in which one might say that everything that has a capacity for making healthy, and exercises that capacity, has as such a capacity for being made healthy, and that which has a capacity for building has as such a capacity for being built. It will have the capacity for being thus moved either immediately or through one or more links (as it will if, while everything that has a capacity for causing motion has as such a capacity for being moved by something else, the motion that it has the capacity for suffering is not that with which it affects what is next to it, but a motion of a different kind; e.g. that which has a capacity for making healthy might as such have a capacity for learn. the series, however, could be traced back, as we said before, until at some time or other we arrived at the same kind of motion). Now the first alternative is impossible, and the second is fantastic: it is absurd that that which has a capacity for causing alteration should as such necessarily have a capacity, let us say, for increase. It is not necessary, therefore, that that which is moved should always be moved by something else that is itself moved by something else: so there will be an end to the series. Consequently the first thing that is in motion will derive its motion either from something that is at rest or from itself. But if there were any need to consider which of the two, that which moves itself or that which is moved by something else, is the cause and principle of motion, every one would decide the former: for that which is itself independently a cause is always prior as a cause to that which is so only in virtue of being itself dependent upon something else that makes it so.

We must therefore make a fresh start and consider the question; if a thing moves itself, in what sense and in what manner does it do so? Now everything that is in motion must be infinitely divisible, for it has been shown already in our general course on Physics, that everything that is essentially in motion is continuous. Now it is impossible that that which moves itself should in its entirety move itself: for then, while being specifically one and indivisible, it would as a Whole both undergo and cause the same locomotion or alteration: thus it would at the same time be both teaching and being taught (the same thing), or both restoring to and being restored to the same health. Moreover, we have established the fact that it is the movable that is moved; and this is potentially, not actually, in motion, but the potential is in process to actuality, and motion is an incomplete actuality of the movable. The movent on the other hand is already in activity: e.g. it is that which is hot that produces

heat: in fact, that which produces the form is always something that possesses it. Consequently (if a thing can move itself as a whole), the same thing in respect of the same thing may be at the same time both hot and not hot. So, too, in every other case where the movent must be described by the same name in the same sense as the moved. Therefore when a thing moves itself it is one part of it that is the movent and another part that is moved. But it is not self-moving in the sense that each of the two parts is moved by the other part: the following considerations make this evident. In the first place, if each of the two parts is to move the other, there will be no first movent. If a thing is moved by a series of movents, that which is earlier in the series is more the cause of its being moved than that which comes next, and will be more truly the movent: for we found that there are two kinds of movent, that which is itself moved by something else and that which derives its motion from itself: and that which is further from the thing that is moved is nearer to the principle of motion than that which is intermediate. In the second place, there is no necessity for the movent part to be moved by anything but itself: so it can only be accidentally that the other part moves it in return. I take then the possible case of its not moving it: then there will be a part that is moved and a part that is an unmoved movent. In the third place, there is no necessity for the movent to be moved in return: on the contrary the necessity that there should always be motion makes it necessary that there should be some movent that is either unmoved or moved by itself. In the fourth place we should then have a thing undergoing the same motion that it is causing—that which is producing heat, therefore, being heated. But as a matter of fact that which primarily moves itself cannot contain either a single part that moves itself or a number of parts each of which moves itself. For, if the whole is moved by itself, it must be moved either by some part of itself or as a whole by itself as a whole. If, then, it is moved in virtue of some part of it being moved by that part itself, it is this part that will be the primary self-movent, since, if this part is separated from the whole, the part will still move itself, but the whole will do so no longer. If on the other hand the whole is moved by itself as a whole, it must be accidentally that the parts move themselves: and therefore, their self-motion not being necessary, we may take the case of their not being moved by themselves. Therefore in the whole of the thing we may distinguish that which imparts motion without itself being moved and that which is moved: for only in this way is it possible for a thing to be self-moved. Further, if the whole moves itself we may distinguish in it that which imparts the motion and that which is moved: so while we say that AB is moved by itself, we may also say that it is moved by A. And since that which imparts motion may be

either a thing that is moved by something else or a thing that is unmoved, and that which is moved may be either a thing that imparts motion to something else or a thing that does not, that which moves itself must be composed of something that is unmoved but imparts motion and also of something that is moved but does not necessarily impart motion but may or may not do so. Thus let A be something that imparts motion but is unmoved, B something that is moved by A and moves G, G something that is moved by B but moves nothing (granted that we eventually arrive at G we may take it that there is only one intermediate term, though there may be more). Then the whole ABG moves itself. But if I take away G, AB will move itself, A imparting motion and B being moved, whereas G will not move itself or in fact be moved at all. Nor again will BG move itself apart from A: for B imparts motion only through being moved by something else, not through being moved by any part of itself. So only AB moves itself. That which moves itself, therefore, must comprise something that imparts motion but is unmoved and something that is moved but does not necessarily move anything else: and each of these two things, or at any rate one of them, must be in contact with the other. If, then, that which imparts motion is a continuous substance—that which is moved must of course be so—it is clear that it is not through some part of the whole being of such a nature as to be capable of moving itself that the whole moves itself: it moves itself as a whole, both being moved and imparting motion through containing a part that imparts motion and a part that is moved. It does not impart motion as a whole nor is it moved as a whole: it is A alone that imparts motion and B alone that is moved. It is not true, further, that G is moved by A, which is impossible.

Here a difficulty arises: if something is taken away from A (supposing that that which imparts motion but is unmoved is a continuous substance), or from B the part that is moved, will the remainder of A continue to impart motion or the remainder of B continue to be moved? If so, it will not be AB primarily that is moved by itself, since, when something is taken away from AB, the remainder of AB will still continue to move itself. Perhaps we may state the case thus: there is nothing to prevent each of the two parts, or at any rate one of them, that which is moved, being divisible though actually undivided, so that if it is divided it will not continue in the possession of the same capacity: and so there is nothing to prevent self-motion residing primarily in things that are potentially divisible.

From what has been said, then, it is evident that that which primarily imparts motion is unmoved: for, whether the series is closed at once by that which is in motion but moved by something else deriving its motion directly from the first unmoved, or whether the

motion is derived from what is in motion but moves itself and stops its own motion, on both suppositions we have the result that in all cases of things being in motion that which primarily imparts motion is unmoved.

BOOK_8|CH_6

6

-

Since there must always be motion without intermission, there must necessarily be something, one thing or it may be a plurality, that first imparts motion, and this first movent must be unmoved. Now the question whether each of the things that are unmoved but impart motion is eternal is irrelevant to our present argument: but the following considerations will make it clear that there must necessarily be some such thing, which, while it has the capacity of moving something else, is itself unmoved and exempt from all change, which can affect it neither in an unqualified nor in an accidental sense. Let us suppose, if any one likes, that in the case of certain things it is possible for them at different times to be and not to be, without any process of becoming and perishing (in fact it would seem to be necessary, if a thing that has not parts at one time is and at another time is not, that any such thing should without undergoing any process of change at one time be and at another time not be). And let us further suppose it possible that some principles that are unmoved but capable of imparting motion at one time are and at another time are not. Even so, this cannot be true of all such principles, since there must clearly be something that causes things that move themselves at one time to be and at another not to be. For, since nothing that has not parts can be in motion, that which moves itself must as a whole have magnitude, though nothing that we have said makes this necessarily true of every movent. So the fact that some things become and others perish, and that this is so continuously, cannot be caused by any one of those things that, though they are unmoved, do not always exist: nor again can it be caused by any of those which move certain particular things, while others move other things. The eternity and continuity of the process cannot be caused either by any one of them singly or by the sum of them, because this causal relation must be eternal and necessary, whereas the sum of these movents is infinite and they do not all exist together. It is clear, then, that though there may be countless instances of the perishing of some principles that are unmoved but impart motion, and though many things that move themselves perish and are succeeded by others that come into being, and though one thing that is unmoved moves one thing while another moves another, nevertheless there is something that comprehends them all, and that as something apart from each one

of them, and this it is that is the cause of the fact that some things are and others are not and of the continuous process of change: and this causes the motion of the other movents, while they are the causes of the motion of other things. Motion, then, being eternal, the first movent, if there is but one, will be eternal also: if there are more than one, there will be a plurality of such eternal movents. We ought, however, to suppose that there is one rather than many, and a finite rather than an infinite number. When the consequences of either assumption are the same, we should always assume that things are finite rather than infinite in number, since in things constituted by nature that which is finite and that which is better ought, if possible, to be present rather than the reverse: and here it is sufficient to assume only one movent, the first of unmoved things, which being eternal will be the principle of motion to everything else.

The following argument also makes it evident that the first movent must be something that is one and eternal. We have shown that there must always be motion. That being so, motion must also be continuous, because what is always is continuous, whereas what is merely in succession is not continuous. But further, if motion is continuous, it is one: and it is one only if the movent and the moved that constitute it are each of them one, since in the event of a thing's being moved now by one thing and now by another the whole motion will not be continuous but successive.

Moreover a conviction that there is a first unmoved something may be reached not only from the foregoing arguments, but also by considering again the principles operative in movents. Now it is evident that among existing things there are some that are sometimes in motion and sometimes at rest. This fact has served above to make it clear that it is not true either that all things are in motion or that all things are at rest or that some things are always at rest and the remainder always in motion: on this matter proof is supplied by things that fluctuate between the two and have the capacity of being sometimes in motion and sometimes at rest. The existence of things of this kind is clear to all: but we wish to explain also the nature of each of the other two kinds and show that there are some things that are always unmoved and some things that are always in motion. In the course of our argument directed to this end we established the fact that everything that is in motion is moved by something, and that the movent is either unmoved or in motion, and that, if it is in motion, it is moved either by itself or by something else and so on throughout the series: and so we proceeded to the position that the first principle that directly causes things that are in motion to be moved is that which moves itself, and the first principle of the whole series is the unmoved. Further it is evident from actual observation

that there are things that have the characteristic of moving themselves, e.g. the animal kingdom and the whole class of living things. This being so, then, the view was suggested that perhaps it may be possible for motion to come to be in a thing without having been in existence at all before, because we see this actually occurring in animals: they are unmoved at one time and then again they are in motion, as it seems. We must grasp the fact, therefore, that animals move themselves only with one kind of motion, and that this is not strictly originated by them. The cause of it is not derived from the animal itself: it is connected with other natural motions in animals, which they do not experience through their own instrumentality, e.g. increase, decrease, and respiration: these are experienced by every animal while it is at rest and not in motion in respect of the motion set up by its own agency: here the motion is caused by the atmosphere and by many things that enter into the animal: thus in some cases the cause is nourishment: when it is being digested animals sleep, and when it is being distributed through the system they awake and move themselves, the first principle of this motion being thus originally derived from outside. Therefore animals are not always in continuous motion by their own agency: it is something else that moves them, itself being in motion and changing as it comes into relation with each several thing that moves itself. (Moreover in all these self-moving things the first movent and cause of their self-motion is itself moved by itself, though in an accidental sense: that is to say, the body changes its place, so that that which is in the body changes its place also and is a self-movement through its exercise of leverage.) Hence we may confidently conclude that if a thing belongs to the class of unmoved movements that are also themselves moved accidentally, it is impossible that it should cause continuous motion. So the necessity that there should be motion continuously requires that there should be a first movent that is unmoved even accidentally, if, as we have said, there is to be in the world of things an unceasing and undying motion, and the world is to remain permanently self-contained and within the same limits: for if the first principle is permanent, the universe must also be permanent, since it is continuous with the first principle. (We must distinguish, however, between accidental motion of a thing by itself and such motion by something else, the former being confined to perishable things, whereas the latter belongs also to certain first principles of heavenly bodies, of all those, that is to say, that experience more than one locomotion.)

And further, if there is always something of this nature, a movent that is itself unmoved and eternal, then that which is first moved by it must be eternal. Indeed this is clear also from the consideration that there would otherwise be no becoming and

perishing and no change of any kind in other things, which require something that is in motion to move them: for the motion imparted by the unmoved will always be imparted in the same way and be one and the same, since the unmoved does not itself change in relation to that which is moved by it. But that which is moved by something that, though it is in motion, is moved directly by the unmoved stands in varying relations to the things that it moves, so that the motion that it causes will not be always the same: by reason of the fact that it occupies contrary positions or assumes contrary forms at different times it will produce contrary motions in each several thing that it moves and will cause it to be at one time at rest and at another time in motion.

The foregoing argument, then, has served to clear up the point about which we raised a difficulty at the outset-why is it that instead of all things being either in motion or at rest, or some things being always in motion and the remainder always at rest, there are things that are sometimes in motion and sometimes not? The cause of this is now plain: it is because, while some things are moved by an eternal unmoved movent and are therefore always in motion, other things are moved by a movent that is in motion and changing, so that they too must change. But the unmoved movent, as has been said, since it remains permanently simple and unvarying and in the same state, will cause motion that is one and simple.

BOOK_8|CH_7

7

-

This matter will be made clearer, however, if we start afresh from another point. We must consider whether it is or is not possible that there should be a continuous motion, and, if it is possible, which this motion is, and which is the primary motion: for it is plain that if there must always be motion, and a particular motion is primary and continuous, then it is this motion that is imparted by the first movent, and so it is necessarily one and the same and continuous and primary.

Now of the three kinds of motion that there are-motion in respect of magnitude, motion in respect of affection, and motion in respect of place-it is this last, which we call locomotion, that must be primary. This may be shown as follows. It is impossible that there should be increase without the previous occurrence of alteration: for that which is increased, although in a sense it is increased by what is like itself, is in a sense increased by what is unlike itself: thus it is said that contrary is nourishment to contrary: but growth is effected only by things becoming like to like. There must be alteration, then, in that there is this change from contrary to

contrary. But the fact that a thing is altered requires that there should be something that alters it, something e.g. that makes the potentially hot into the actually hot: so it is plain that the movent does not maintain a uniform relation to it but is at one time nearer to and at another farther from that which is altered: and we cannot have this without locomotion. If, therefore, there must always be motion, there must also always be locomotion as the primary motion, and, if there is a primary as distinguished from a secondary form of locomotion, it must be the primary form. Again, all affections have their origin in condensation and rarefaction: thus heavy and light, soft and hard, hot and cold, are considered to be forms of density and rarity. But condensation and rarefaction are nothing more than combination and separation, processes in accordance with which substances are said to become and perish: and in being combined and separated things must change in respect of place. And further, when a thing is increased or decreased its magnitude changes in respect of place.

Again, there is another point of view from which it will be clearly seen that locomotion is primary. As in the case of other things so too in the case of motion the word 'primary' may be used in several senses. A thing is said to be prior to other things when, if it does not exist, the others will not exist, whereas it can exist without the others: and there is also priority in time and priority in perfection of existence. Let us begin, then, with the first sense. Now there must be motion continuously, and there may be continuously either continuous motion or successive motion, the former, however, in a higher degree than the latter: moreover it is better that it should be continuous rather than successive motion, and we always assume the presence in nature of the better, if it be possible: since, then, continuous motion is possible (this will be proved later: for the present let us take it for granted), and no other motion can be continuous except locomotion, locomotion must be primary. For there is no necessity for the subject of locomotion to be the subject either of increase or of alteration, nor need it become or perish: on the other hand there cannot be any one of these processes without the existence of the continuous motion imparted by the first movent.

Secondly, locomotion must be primary in time: for this is the only motion possible for things. It is true indeed that, in the case of any individual thing that has a becoming, locomotion must be the last of its motions: for after its becoming it first experiences alteration and increase, and locomotion is a motion that belongs to such things only when they are perfected. But there must previously be something else that is in process of locomotion to be the cause even of the becoming of things that become, without itself being in process of

becoming, as e.g. the begotten is preceded by what begot it: otherwise becoming might be thought to be the primary motion on the ground that the thing must first become. But though this is so in the case of any individual thing that becomes, nevertheless before anything becomes, something else must be in motion, not itself becoming but being, and before this there must again be something else. And since becoming cannot be primary-for, if it were, everything that is in motion would be perishable-it is plain that no one of the motions next in order can be prior to locomotion. By the motions next in order I mean increase and then alteration, decrease, and perishing. All these are posterior to becoming: consequently, if not even becoming is prior to locomotion, then no one of the other processes of change is so either.

Thirdly, that which is in process of becoming appears universally as something imperfect and proceeding to a first principle: and so what is posterior in the order of becoming is prior in the order of nature. Now all things that go through the process of becoming acquire locomotion last. It is this that accounts for the fact that some living things, e.g. plants and many kinds of animals, owing to lack of the requisite organ, are entirely without motion, whereas others acquire it in the course of their being perfected. Therefore, if the degree in which things possess locomotion corresponds to the degree in which they have realized their natural development, then this motion must be prior to all others in respect of perfection of existence: and not only for this reason but also because a thing that is in motion loses its essential character less in the process of locomotion than in any other kind of motion: it is the only motion that does not involve a change of being in the sense in which there is a change in quality when a thing is altered and a change in quantity when a thing is increased or decreased. Above all it is plain that this motion, motion in respect of place, is what is in the strictest sense produced by that which moves itself; but it is the self-movment that we declare to be the first principle of things that are moved and impart motion and the primary source to which things that are in motion are to be referred.

It is clear, then, from the foregoing arguments that locomotion is the primary motion. We have now to show which kind of locomotion is primary. The same process of reasoning will also make clear at the same time the truth of the assumption we have made both now and at a previous stage that it is possible that there should be a motion that is continuous and eternal. Now it is clear from the following considerations that no other than locomotion can be continuous. Every other motion and change is from an opposite to an opposite: thus for the processes of becoming and perishing the limits are the existent and the non-existent, for alteration the various pairs of

contrary affections, and for increase and decrease either greatness and smallness or perfection and imperfection of magnitude: and changes to the respective contraries are contrary changes. Now a thing that is undergoing any particular kind of motion, but though previously existent has not always undergone it, must previously have been at rest so far as that motion is concerned. It is clear, then, that for the changing thing the contraries will be states of rest. And we have a similar result in the case of changes that are not motions: for becoming and perishing, whether regarded simply as such without qualification or as affecting something in particular, are opposites: therefore provided it is impossible for a thing to undergo opposite changes at the same time, the change will not be continuous, but a period of time will intervene between the opposite processes. The question whether these contradictory changes are contraries or not makes no difference, provided only it is impossible for them both to be present to the same thing at the same time: the point is of no importance to the argument. Nor does it matter if the thing need not rest in the contradictory state, or if there is no state of rest as a contrary to the process of change: it may be true that the non-existent is not at rest, and that perishing is a process to the non-existent. All that matters is the intervention of a time: it is this that prevents the change from being continuous: so, too, in our previous instances the important thing was not the relation of contrariety but the impossibility of the two processes being present to a thing at the same time. And there is no need to be disturbed by the fact that on this showing there may be more than one contrary to the same thing, that a particular motion will be contrary both to rest and to motion in the contrary direction. We have only to grasp the fact that a particular motion is in a sense the opposite both of a state of rest and of the contrary motion, in the same way as that which is of equal or standard measure is the opposite both of that which surpasses it and of that which it surpasses, and that it is impossible for the opposite motions or changes to be present to a thing at the same time. Furthermore, in the case of becoming and perishing it would seem to be an utterly absurd thing if as soon as anything has become it must necessarily perish and cannot continue to exist for any time: and, if this is true of becoming and perishing, we have fair grounds for inferring the same to be true of the other kinds of change, since it would be in the natural order of things that they should be uniform in this respect.

BOOK_8|CH_8

8

-

Let us now proceed to maintain that it is possible that there should

be an infinite motion that is single and continuous, and that this motion is rotatory motion. The motion of everything that is in process of locomotion is either rotatory or rectilinear or a compound of the two: consequently, if one of the former two is not continuous, that which is composed of them both cannot be continuous either. Now it is plain that if the locomotion of a thing is rectilinear and finite it is not continuous locomotion: for the thing must turn back, and that which turns back in a straight line undergoes two contrary locomotions, since, so far as motion in respect of place is concerned, upward motion is the contrary of downward motion, forward motion of backward motion, and motion to the left of motion to the right, these being the pairs of contraries in the sphere of place. But we have already defined single and continuous motion to be motion of a single thing in a single period of time and operating within a sphere admitting of no further specific differentiation (for we have three things to consider, first that which is in motion, e.g. a man or a god, secondly the 'when' of the motion, that is to say, the time, and thirdly the sphere within which it operates, which may be either place or affection or essential form or magnitude): and contraries are specifically not one and the same but distinct: and within the sphere of place we have the above-mentioned distinctions. Moreover we have an indication that motion from A to B is the contrary of motion from B to A in the fact that, if they occur at the same time, they arrest and stop each other. And the same is true in the case of a circle: the motion from A towards B is the contrary of the motion from A towards G: for even if they are continuous and there is no turning back they arrest each other, because contraries annihilate or obstruct one another. On the other hand lateral motion is not the contrary of upward motion. But what shows most clearly that rectilinear motion cannot be continuous is the fact that turning back necessarily implies coming to a stand, not only when it is a straight line that is traversed, but also in the case of locomotion in a circle (which is not the same thing as rotatory locomotion: for, when a thing merely traverses a circle, it may either proceed on its course without a break or turn back again when it has reached the same point from which it started). We may assure ourselves of the necessity of this coming to a stand not only on the strength of observation, but also on theoretical grounds. We may start as follows: we have three points, starting-point, middle-point, and finishing-point, of which the middle-point in virtue of the relations in which it stands severally to the other two is both a starting-point and a finishing-point, and though numerically one is theoretically two. We have further the distinction between the potential and the actual. So in the straight line in question any one of the points lying between the two extremes is potentially a middle-point: but it is not actually so

unless that which is in motion divides the line by coming to a stand at that point and beginning its motion again: thus the middle-point becomes both a starting-point and a goal, the starting-point of the latter part and the finishing-point of the first part of the motion. This is the case e.g. when A in the course of its locomotion comes to a stand at B and starts again towards G: but when its motion is continuous A cannot either have come to be or have ceased to be at the point B: it can only have been there at the moment of passing, its passage not being contained within any period of time except the whole of which the particular moment is a dividing-point. To maintain that it has come to be and ceased to be there will involve the consequence that A in the course of its locomotion will always be coming to a stand: for it is impossible that A should simultaneously have come to be at B and ceased to be there, so that the two things must have happened at different points of time, and therefore there will be the intervening period of time: consequently A will be in a state of rest at B, and similarly at all other points, since the same reasoning holds good in every case. When to A, that which is in process of locomotion, B, the middle-point, serves both as a finishing-point and as a starting-point for its motion, A must come to a stand at B, because it makes it two just as one might do in thought. However, the point A is the real starting-point at which the moving body has ceased to be, and it is at G that it has really come to be when its course is finished and it comes to a stand. So this is how we must meet the difficulty that then arises, which is as follows. Suppose the line E is equal to the line Z, that A proceeds in continuous locomotion from the extreme point of E to G, and that, at the moment when A is at the point B, D is proceeding in uniform locomotion and with the same velocity as A from the extremity of Z to H: then, says the argument, D will have reached H before A has reached G for that which makes an earlier start and departure must make an earlier arrival: the reason, then, for the late arrival of A is that it has not simultaneously come to be and ceased to be at B: otherwise it will not arrive later: for this to happen it will be necessary that it should come to a stand there. Therefore we must not hold that there was a moment when A came to be at B and that at the same moment D was in motion from the extremity of Z: for the fact of A's having come to be at B will involve the fact of its also ceasing to be there, and the two events will not be simultaneous, whereas the truth is that A is at B at a sectional point of time and does not occupy time there. In this case, therefore, where the motion of a thing is continuous, it is impossible to use this form of expression. On the other hand in the case of a thing that turns back in its course we must do so. For suppose H in the course of its locomotion proceeds to D and then turns back and proceeds downwards

again: then the extreme point D has served as finishing-point and as starting-point for it, one point thus serving as two: therefore H must have come to a stand there: it cannot have come to be at D and departed from D simultaneously, for in that case it would simultaneously be there and not be there at the same moment. And here we cannot apply the argument used to solve the difficulty stated above: we cannot argue that H is at D at a sectional point of time and has not come to be or ceased to be there. For here the goal that is reached is necessarily one that is actually, not potentially, existent. Now the point in the middle is potential: but this one is actual, and regarded from below it is a finishing-point, while regarded from above it is a starting-point, so that it stands in these same two respective relations to the two motions. Therefore that which turns back in traversing a rectilinear course must in so doing come to a stand. Consequently there cannot be a continuous rectilinear motion that is eternal.

The same method should also be adopted in replying to those who ask, in the terms of Zeno's argument, whether we admit that before any distance can be traversed half the distance must be traversed, that these half-distances are infinite in number, and that it is impossible to traverse distances infinite in number-or some on the lines of this same argument put the questions in another form, and would have us grant that in the time during which a motion is in progress it should be possible to reckon a half-motion before the whole for every half-distance that we get, so that we have the result that when the whole distance is traversed we have reckoned an infinite number, which is admittedly impossible. Now when we first discussed the question of motion we put forward a solution of this difficulty turning on the fact that the period of time occupied in traversing the distance contains within itself an infinite number of units: there is no absurdity, we said, in supposing the traversing of infinite distances in infinite time, and the element of infinity is present in the time no less than in the distance. But, although this solution is adequate as a reply to the questioner (the question asked being whether it is possible in a finite time to traverse or reckon an infinite number of units), nevertheless as an account of the fact and explanation of its true nature it is inadequate. For suppose the distance to be left out of account and the question asked to be no longer whether it is possible in a finite time to traverse an infinite number of distances, and suppose that the inquiry is made to refer to the time taken by itself (for the time contains an infinite number of divisions): then this solution will no longer be adequate, and we must apply the truth that we enunciated in our recent discussion, stating it in the following way. In the act of dividing the continuous distance into two halves one point is treated as two,

since we make it a starting-point and a finishing-point: and this same result is also produced by the act of reckoning halves as well as by the act of dividing into halves. But if divisions are made in this way, neither the distance nor the motion will be continuous: for motion if it is to be continuous must relate to what is continuous: and though what is continuous contains an infinite number of halves, they are not actual but potential halves. If the halves are made actual, we shall get not a continuous but an intermittent motion. In the case of reckoning the halves, it is clear that this result follows: for then one point must be reckoned as two: it will be the finishing-point of the one half and the starting-point of the other, if we reckon not the one continuous whole but the two halves. Therefore to the question whether it is possible to pass through an infinite number of units either of time or of distance we must reply that in a sense it is and in a sense it is not. If the units are actual, it is not possible: if they are potential, it is possible. For in the course of a continuous motion the traveller has traversed an infinite number of units in an accidental sense but not in an unqualified sense: for though it is an accidental characteristic of the distance to be an infinite number of half-distances, this is not its real and essential character. It is also plain that unless we hold that the point of time that divides earlier from later always belongs only to the later so far as the thing is concerned, we shall be involved in the consequence that the same thing is at the same moment existent and not existent, and that a thing is not existent at the moment when it has become. It is true that the point is common to both times, the earlier as well as the later, and that, while numerically one and the same, it is theoretically not so, being the finishing-point of the one and the starting-point of the other: but so far as the thing is concerned it belongs to the later stage of what happens to it. Let us suppose a time ABG and a thing D, D being white in the time A and not-white in the time B. Then D is at the moment G white and not-white: for if we were right in saying that it is white during the whole time A, it is true to call it white at any moment of A, and not-white in B, and G is in both A and B. We must not allow, therefore, that it is white in the whole of A, but must say that it is so in all of it except the last moment G. G belongs already to the later period, and if in the whole of A not-white was in process of becoming and white of perishing, at G the process is complete. And so G is the first moment at which it is true to call the thing white or not white respectively. Otherwise a thing may be non-existent at the moment when it has become and existent at the moment when it has perished: or else it must be possible for a thing at the same time to be white and not white and in fact to be existent and non-existent. Further, if anything that exists

after having been previously non-existent must become existent and does not exist when it is becoming, time cannot be divisible into time-atoms. For suppose that D was becoming white in the time A and that at another time B, a time-atom consecutive with the last atom of A, D has already become white and so is white at that moment: then, inasmuch as in the time A it was becoming white and so was not white and at the moment B it is white, there must have been a becoming between A and B and therefore also a time in which the becoming took place. On the other hand, those who deny atoms of time (as we do) are not affected by this argument: according to them D has become and so is white at the last point of the actual time in which it was becoming white: and this point has no other point consecutive with or in succession to it, whereas time-atoms are conceived as successive. Moreover it is clear that if D was becoming white in the whole time A, the time occupied by it in having become white in addition to having been in process of becoming white is no more than all that it occupied in the mere process of becoming white.

These and such-like, then, are the arguments for our conclusion that derive cogency from the fact that they have a special bearing on the point at issue. If we look at the question from the point of view of general theory, the same result would also appear to be indicated by the following arguments. Everything whose motion is continuous must, on arriving at any point in the course of its locomotion, have been previously also in process of locomotion to that point, if it is not forced out of its path by anything: e.g. on arriving at B a thing must also have been in process of locomotion to B, and that not merely when it was near to B, but from the moment of its starting on its course, since there can be, no reason for its being so at any particular stage rather than at an earlier one. So, too, in the case of the other kinds of motion. Now we are to suppose that a thing proceeds in locomotion from A to G and that at the moment of its arrival at G the continuity of its motion is unbroken and will remain so until it has arrived back at A. Then when it is undergoing locomotion from A to G it is at the same time undergoing also its locomotion to A from G: consequently it is simultaneously undergoing two contrary motions, since the two motions that follow the same straight line are contrary to each other. With this consequence there also follows another: we have a thing that is in process of change from a position in which it has not yet been: so, inasmuch as this is impossible, the thing must come to a stand at G. Therefore the motion is not a single motion, since motion that is interrupted by stationariness is not single.

Further, the following argument will serve better to make this point clear universally in respect of every kind of motion. If the motion undergone by that which is in motion is always one of those already

enumerated, and the state of rest that it undergoes is one of those that are the opposites of the motions (for we found that there could be no other besides these), and moreover that which is undergoing but does not always undergo a particular motion (by this I mean one of the various specifically distinct motions, not some particular part of the whole motion) must have been previously undergoing the state of rest that is the opposite of the motion, the state of rest being privation of motion; then, inasmuch as the two motions that follow the same straight line are contrary motions, and it is impossible for a thing to undergo simultaneously two contrary motions, that which is undergoing locomotion from A to G cannot also simultaneously be undergoing locomotion from G to A: and since the latter locomotion is not simultaneous with the former but is still to be undergone, before it is undergone there must occur a state of rest at G: for this, as we found, is the state of rest that is the opposite of the motion from G. The foregoing argument, then, makes it plain that the motion in question is not continuous.

Our next argument has a more special bearing than the foregoing on the point at issue. We will suppose that there has occurred in something simultaneously a perishing of not-white and a becoming of white. Then if the alteration to white and from white is a continuous process and the white does not remain any time, there must have occurred simultaneously a perishing of not-white, a becoming of white, and a becoming of not-white: for the time of the three will be the same.

Again, from the continuity of the time in which the motion takes place we cannot infer continuity in the motion, but only successiveness: in fact, how could contraries, e.g. whiteness and blackness, meet in the same extreme point?

On the other hand, in motion on a circular line we shall find singleness and continuity: for here we are met by no impossible consequence: that which is in motion from A will in virtue of the same direction of energy be simultaneously in motion to A (since it is in motion to the point at which it will finally arrive), and yet will not be undergoing two contrary or opposite motions: for a motion to a point and a motion from that point are not always contraries or opposites: they are contraries only if they are on the same straight line (for then they are contrary to one another in respect of place, as e.g. the two motions along the diameter of the circle, since the ends of this are at the greatest possible distance from one another), and they are opposites only if they are along the same line. Therefore in the case we are now considering there is nothing to prevent the motion being continuous and free from all intermission: for rotatory motion is motion of a thing from its place to its place, whereas rectilinear motion is motion from its place to

another place.

Moreover the progress of rotatory motion is never localized within certain fixed limits, whereas that of rectilinear motion repeatedly is so. Now a motion that is always shifting its ground from moment to moment can be continuous: but a motion that is repeatedly localized within certain fixed limits cannot be so, since then the same thing would have to undergo simultaneously two opposite motions. So, too, there cannot be continuous motion in a semicircle or in any other arc of a circle, since here also the same ground must be traversed repeatedly and two contrary processes of change must occur. The reason is that in these motions the starting-point and the termination do not coincide, whereas in motion over a circle they do coincide, and so this is the only perfect motion.

This differentiation also provides another means of showing that the other kinds of motion cannot be continuous either: for in all of them we find that there is the same ground to be traversed repeatedly; thus in alteration there are the intermediate stages of the process, and in quantitative change there are the intervening degrees of magnitude: and in becoming and perishing the same thing is true. It makes no difference whether we take the intermediate stages of the process to be few or many, or whether we add or subtract one: for in either case we find that there is still the same ground to be traversed repeatedly. Moreover it is plain from what has been said that those physicists who assert that all sensible things are always in motion are wrong: for their motion must be one or other of the motions just mentioned: in fact they mostly conceive it as alteration (things are always in flux and decay, they say), and they go so far as to speak even of becoming and perishing as a process of alteration. On the other hand, our argument has enabled us to assert the fact, applying universally to all motions, that no motion admits of continuity except rotatory motion: consequently neither alteration nor increase admits of continuity. We need now say no more in support of the position that there is no process of change that admits of infinity or continuity except rotatory locomotion.

BOOK_8|CH_9

9

-

It can now be shown plainly that rotation is the primary locomotion. Every locomotion, as we said before, is either rotatory or rectilinear or a compound of the two: and the two former must be prior to the last, since they are the elements of which the latter consists. Moreover rotatory locomotion is prior to rectilinear locomotion, because it is more simple and complete, which may be shown as follows. The straight line traversed in rectilinear motion cannot be

infinite: for there is no such thing as an infinite straight line; and even if there were, it would not be traversed by anything in motion: for the impossible does not happen and it is impossible to traverse an infinite distance. On the other hand rectilinear motion on a finite straight line is if it turns back a composite motion, in fact two motions, while if it does not turn back it is incomplete and perishable: and in the order of nature, of definition, and of time alike the complete is prior to the incomplete and the imperishable to the perishable. Again, a motion that admits of being eternal is prior to one that does not. Now rotatory motion can be eternal: but no other motion, whether locomotion or motion of any other kind, can be so, since in all of them rest must occur and with the occurrence of rest the motion has perished. Moreover the result at which we have arrived, that rotatory motion is single and continuous, and rectilinear motion is not, is a reasonable one. In rectilinear motion we have a definite starting-point, finishing-point, middle-point, which all have their place in it in such a way that there is a point from which that which is in motion can be said to start and a point at which it can be said to finish its course (for when anything is at the limits of its course, whether at the starting-point or at the finishing-point, it must be in a state of rest). On the other hand in circular motion there are no such definite points: for why should any one point on the line be a limit rather than any other? Any one point as much as any other is alike starting-point, middle-point, and finishing-point, so that we can say of certain things both that they are always and that they never are at a starting-point and at a finishing-point (so that a revolving sphere, while it is in motion, is also in a sense at rest, for it continues to occupy the same place). The reason of this is that in this case all these characteristics belong to the centre: that is to say, the centre is alike starting-point, middle-point, and finishing-point of the space traversed; consequently since this point is not a point on the circular line, there is no point at which that which is in process of locomotion can be in a state of rest as having traversed its course, because in its locomotion it is proceeding always about a central point and not to an extreme point: therefore it remains still, and the whole is in a sense always at rest as well as continuously in motion. Our next point gives a convertible result: on the one hand, because rotation is the measure of motions it must be the primary motion (for all things are measured by what is primary): on the other hand, because rotation is the primary motion it is the measure of all other motions. Again, rotatory motion is also the only motion that admits of being regular. In rectilinear locomotion the motion of things in leaving the starting-point is not uniform with their motion in approaching the

finishing-point, since the velocity of a thing always increases proportionately as it removes itself farther from its position of rest: on the other hand rotatory motion is the only motion whose course is naturally such that it has no starting-point or finishing-point in itself but is determined from elsewhere.

As to locomotion being the primary motion, this is a truth that is attested by all who have ever made mention of motion in their theories: they all assign their first principles of motion to things that impart motion of this kind. Thus 'separation' and 'combination' are motions in respect of place, and the motion imparted by 'Love' and 'Strife' takes these forms, the latter 'separating' and the former 'combining'. Anaxagoras, too, says that 'Mind', his first movent, 'separates'. Similarly those who assert no cause of this kind but say that 'void' accounts for motion-they also hold that the motion of natural substance is motion in respect of place: for their motion that is accounted for by 'void' is locomotion, and its sphere of operation may be said to be place. Moreover they are of opinion that the primary substances are not subject to any of the other motions, though the things that are compounds of these substances are so subject: the processes of increase and decrease and alteration, they say, are effects of the 'combination' and 'separation' of atoms. It is the same, too, with those who make out that the becoming or perishing of a thing is accounted for by 'density' or 'rarity': for it is by 'combination' and 'separation' that the place of these things in their systems is determined. Moreover to these we may add those who make Soul the cause of motion: for they say that things that undergo motion have as their first principle 'that which moves itself': and when animals and all living things move themselves, the motion is motion in respect of place. Finally it is to be noted that we say that a thing 'is in motion' in the strict sense of the term only when its motion is motion in respect of place: if a thing is in process of increase or decrease or is undergoing some alteration while remaining at rest in the same place, we say that it is in motion in some particular respect: we do not say that it 'is in motion' without qualification.

Our present position, then, is this: We have argued that there always was motion and always will be motion throughout all time, and we have explained what is the first principle of this eternal motion: we have explained further which is the primary motion and which is the only motion that can be eternal: and we have pronounced the first movent to be unmoved.

We have now to assert that the first movent must be without parts and without magnitude, beginning with the establishment of the premisses on which this conclusion depends.

One of these premisses is that nothing finite can cause motion during an infinite time. We have three things, the movent, the moved, and thirdly that in which the motion takes place, namely the time: and these are either all infinite or all finite or partly-that is to say two of them or one of them-finite and partly infinite. Let A be the movement, B the moved, and G the infinite time. Now let us suppose that D moves E, a part of B. Then the time occupied by this motion cannot be equal to G: for the greater the amount moved, the longer the time occupied. It follows that the time Z is not infinite. Now we see that by continuing to add to D, I shall use up A and by continuing to add to E, I shall use up B: but I shall not use up the time by continually subtracting a corresponding amount from it, because it is infinite. Consequently the duration of the part of G which is occupied by all A in moving the whole of B, will be finite. Therefore a finite thing cannot impart to anything an infinite motion. It is clear, then, that it is impossible for the finite to cause motion during an infinite time.

It has now to be shown that in no case is it possible for an infinite force to reside in a finite magnitude. This can be shown as follows: we take it for granted that the greater force is always that which in less time than another does an equal amount of work when engaged in any activity-in heating, for example, or sweetening or throwing; in fact, in causing any kind of motion. Then that on which the forces act must be affected to some extent by our supposed finite magnitude possessing an infinite force as well as by anything else, in fact to a greater extent than by anything else, since the infinite force is greater than any other. But then there cannot be any time in which its action could take place. Suppose that A is the time occupied by the infinite power in the performance of an act of heating or pushing, and that AB is the time occupied by a finite power in the performance of the same act: then by adding to the latter another finite power and continually increasing the magnitude of the power so added I shall at some time or other reach a point at which the finite power has completed the motive act in the time A: for by continual addition to a finite magnitude I must arrive at a magnitude that exceeds any assigned limit, and in the same way by continual subtraction I must arrive at one that falls short of any assigned limit. So we get the result that the finite force will occupy the same amount of time in performing the motive act as the infinite force. But this is impossible. Therefore nothing finite can possess an infinite force. So it is also impossible for a finite force to reside in an infinite magnitude. It is true that a greater force can

reside in a lesser magnitude: but the superiority of any such greater force can be still greater if the magnitude in which it resides is greater. Now let AB be an infinite magnitude. Then BG possesses a certain force that occupies a certain time, let us say the time Z in moving D. Now if I take a magnitude twice as great as BG, the time occupied by this magnitude in moving D will be half of EZ (assuming this to be the proportion): so we may call this time ZH. That being so, by continually taking a greater magnitude in this way I shall never arrive at the full AB, whereas I shall always be getting a lesser fraction of the time given. Therefore the force must be infinite, since it exceeds any finite force. Moreover the time occupied by the action of any finite force must also be finite: for if a given force moves something in a certain time, a greater force will do so in a lesser time, but still a definite time, in inverse proportion. But a force must always be infinite-just as a number or a magnitude is-if it exceeds all definite limits. This point may also be proved in another way-by taking a finite magnitude in which there resides a force the same in kind as that which resides in the infinite magnitude, so that this force will be a measure of the finite force residing in the infinite magnitude.

It is plain, then, from the foregoing arguments that it is impossible for an infinite force to reside in a finite magnitude or for a finite force to reside in an infinite magnitude. But before proceeding to our conclusion it will be well to discuss a difficulty that arises in connexion with locomotion. If everything that is in motion with the exception of things that move themselves is moved by something else, how is it that some things, e.g. things thrown, continue to be in motion when their movent is no longer in contact with them? If we say that the movent in such cases moves something else at the same time, that the thrower e.g. also moves the air, and that this in being moved is also a movent, then it would be no more possible for this second thing than for the original thing to be in motion when the original movent is not in contact with it or moving it: all the things moved would have to be in motion simultaneously and also to have ceased simultaneously to be in motion when the original movent ceases to move them, even if, like the magnet, it makes that which it has moved capable of being a movent. Therefore, while we must accept this explanation to the extent of saying that the original movent gives the power of being a movent either to air or to water or to something else of the kind, naturally adapted for imparting and undergoing motion, we must say further that this thing does not cease simultaneously to impart motion and to undergo motion: it ceases to be in motion at the moment when its movent ceases to move it, but it still remains a movent, and so it causes something else consecutive with it to be in motion, and of this again the same may be said. The

motion begins to cease when the motive force produced in one member of the consecutive series is at each stage less than that possessed by the preceding member, and it finally ceases when one member no longer causes the next member to be a movent but only causes it to be in motion. The motion of these last two-of the one as movent and of the other as moved-must cease simultaneously, and with this the whole motion ceases. Now the things in which this motion is produced are things that admit of being sometimes in motion and sometimes at rest, and the motion is not continuous but only appears so: for it is motion of things that are either successive or in contact, there being not one movent but a number of movents consecutive with one another: and so motion of this kind takes place in air and water. Some say that it is 'mutual replacement': but we must recognize that the difficulty raised cannot be solved otherwise than in the way we have described. So far as they are affected by 'mutual replacement', all the members of the series are moved and impart motion simultaneously, so that their motions also cease simultaneously: but our present problem concerns the appearance of continuous motion in a single thing, and therefore, since it cannot be moved throughout its motion by the same movent, the question is, what moves it?

Resuming our main argument, we proceed from the positions that there must be continuous motion in the world of things, that this is a single motion, that a single motion must be a motion of a magnitude (for that which is without magnitude cannot be in motion), and that the magnitude must be a single magnitude moved by a single movent (for otherwise there will not be continuous motion but a consecutive series of separate motions), and that if the movement is a single thing, it is either itself in motion or itself unmoved: if, then, it is in motion, it will have to be subject to the same conditions as that which it moves, that is to say it will itself be in process of change and in being so will also have to be moved by something: so we have a series that must come to an end, and a point will be reached at which motion is imparted by something that is unmoved. Thus we have a movent that has no need to change along with that which it moves but will be able to cause motion always (for the causing of motion under these conditions involves no effort): and this motion alone is regular, or at least it is so in a higher degree than any other, since the movent is never subject to any change. So, too, in order that the motion may continue to be of the same character, the moved must not be subject to change in respect of its relation to the movent. Moreover the movent must occupy either the centre or the circumference, since these are the first principles from which a sphere is derived. But the things nearest the movent are those whose motion is quickest, and in this case it is the motion of the circumference that is the quickest: therefore the movent occupies

the circumference.

There is a further difficulty in supposing it to be possible for anything that is in motion to cause motion continuously and not merely in the way in which it is caused by something repeatedly pushing (in which case the continuity amounts to no more than successiveness). Such a movent must either itself continue to push or pull or perform both these actions, or else the action must be taken up by something else and be passed on from one movent to another (the process that we described before as occurring in the case of things thrown, since the air or the water, being divisible, is a movent only in virtue of the fact that different parts of the air are moved one after another): and in either case the motion cannot be a single motion, but only a consecutive series of motions. The only continuous motion, then, is that which is caused by the unmoved movent: and this motion is continuous because the movent remains always invariable, so that its relation to that which it moves remains also invariable and continuous.

Now that these points are settled, it is clear that the first unmoved movent cannot have any magnitude. For if it has magnitude, this must be either a finite or an infinite magnitude. Now we have already proved in our course on Physics that there cannot be an infinite magnitude: and we have now proved that it is impossible for a finite magnitude to have an infinite force, and also that it is impossible for a thing to be moved by a finite magnitude during an infinite time. But the first movent causes a motion that is eternal and does cause it during an infinite time. It is clear, therefore, that the first movent is indivisible and is without parts and without magnitude.

-
-

THE END

Electronically Enhanced Text Copyright 1991 - 1995 World Library, Inc.

GREEK PHILOSOPHERS (tm) Ver. 4.3
On the Nature of Things Lucretius

50 BC

ON THE NATURE OF THINGS

by Titus Lucretius Carus

Translated by William Ellery Leonard

Electronically Enhanced Text (c) Copyright 1991, World Library, Inc.

BOOK_1

BOOK I

BOOK_1|PROEM
PROEM

-

Mother of Rome, delight of Gods and men,
Dear Venus that beneath the gliding stars
Makest to teem the many-voyaged main
And fruitful lands- for all of living things
Through thee alone are evermore conceived,
Through thee are risen to visit the great sun-
Before thee, Goddess, and thy coming on,
Flee stormy wind and massy cloud away,

For thee the daedal Earth bears scented flowers,
For thee waters of the unvexed deep
Smile, and the hollows of the serene sky
Glow with diffused radiance for thee!
For soon as comes the springtime face of day,
And procreant gales blow from the West unbarred,
First fowls of air, smit to the heart by thee,
Foretoken thy approach, O thou Divine,
And leap the wild herds round the happy fields
Or swim the bounding torrents. Thus amain,
Seized with the spell, all creatures follow thee
Whithersoever thou walkest forth to lead,
And thence through seas and mountains and swift streams,
Through leafy homes of birds and greening plains,
Kindling the lure of love in every breast,
Thou bringest the eternal generations forth,
Kind after kind. And since 'tis thou alone
Guidest the Cosmos, and without thee naught
Is risen to reach the shining shores of light,
Nor aught of joyful or of lovely born,
Thee do I crave co-partner in that verse
Which I presume on Nature to compose
For Memmius mine, whom thou hast willed to be
Peerless in every grace at every hour-
Wherefore indeed, Divine one, give my words
Immortal charm. Lull to a timely rest
O'er sea and land the savage works of war,
For thou alone hast power with public peace
To aid mortality; since he who rules
The savage works of battle, puissant Mars,
How often to thy bosom flings his strength
O'er-mastered by the eternal wound of love-
And there, with eyes and full throat backward thrown,
Gazing, my Goddess, open-mouthed at thee,
Pastures on love his greedy sight, his breath
Hanging upon thy lips. Him thus reclined
Fill with thy holy body, round, above!
Pour from those lips soft syllables to win
Peace for the Romans, glorious Lady, peace!
For in a season troublous to the state
Neither may I attend this task of mine
With thought untroubled, nor mid such events
The illustrious scion of the Memmian house
Neglect the civic cause.

Whilst human kind

Throughout the lands lay miserably crushed
Before all eyes beneath Religion- who
Would show her head along the region skies,
Glowing on mortals with her hideous face-
A Greek it was who first opposing dared
Raise mortal eyes that terror to withstand,
Whom nor the fame of Gods nor lightning's stroke
Nor threatening thunder of the ominous sky
Abashed; but rather chafed to angry zest
His dauntless heart to be the first to rend
The crossbars at the gates of Nature old.
And thus his will and hardy wisdom won;
And forward thus he fared afar, beyond
The flaming ramparts of the world, until
He wandered the unmeasurable All.
Whence he to us, a conqueror, reports
What things can rise to being, what cannot,
And by what law to each its scope prescribed,
Its boundary stone that clings so deep in Time.
Wherefore Religion now is under foot,
And us his victory now exalts to heaven.

I know how hard it is in Latian verse
To tell the dark discoveries of the Greeks,
Chiefly because our pauper-speech must find
Strange terms to fit the strangeness of the thing;
Yet worth of thine and the expected joy
Of thy sweet friendship do persuade me on
To bear all toil and wake the clear nights through,
Seeking with what of words and what of song
I may at last most gloriously uncloud
For thee the light beyond, wherewith to view
The core of being at the centre hid.
And for the rest, summon to judgments true,
Unbusied ears and singleness of mind
Withdrawn from cares; lest these my gifts, arranged
For thee with eager service, thou disdain
Before thou comprehendest: since for thee
I prove the supreme law of Gods and sky,
And the primordial germs of things unfold,
Whence Nature all creates, and multiplies
And fosters all, and whither she resolves
Each in the end when each is overthrown.
This ultimate stock we have devised to name
Procreant atoms, matter, seeds of things,
Or primal bodies, as primal to the world.

-
I fear perhaps thou deemest that we fare
An impious road to realms of thought profane;
But 'tis that same religion oftener far
Hath bred the foul impieties of men:
As once at Aulis, the elected chiefs,
Foremost of heroes, Danaan counsellors,
Defiled Diana's altar, virgin queen,
With Agamemnon's daughter, foully slain.
She felt the chaplet round her maiden locks
And fillets, fluttering down on either cheek,
And at the altar marked her grieving sire,
The priests beside him who concealed the knife,
And all the folk in tears at sight of her.
With a dumb terror and a sinking knee
She dropped; nor might avail her now that first
'Twas she who gave the king a father's name.
They raised her up, they bore the trembling girl
On to the altar- hither led not now
With solemn rites and hymeneal choir,
But sinless woman, sinfully foredone,
A parent felled her on her bridal day,
Making his child a sacrificial beast
To give the ships auspicious winds for Troy:
Such are the crimes to which Religion leads.

-
And there shall come the time when even thou,
Forced by the soothsayer's terror-tales, shalt seek
To break from us. Ah, many a dream even now
Can they concoct to rout thy plans of life,
And trouble all thy fortunes with base fears.
I own with reason: for, if men but knew
Some fixed end to ills, they would be strong
By some device unconquered to withstand
Religions and the menacings of seers.
But now nor skill nor instrument is theirs,
Since men must dread eternal pains in death.
For what the soul may be they do not know,
Whether 'tis born, or enter in at birth,
And whether, snatched by death, it die with us,
Or visit the shadows and the vasty caves
Of Orcus, or by some divine decree
Enter the brute herds, as our Ennius sang,
Who first from lovely Helicon brought down
A laurel wreath of bright perennial leaves,

Renowned forever among the Italian clans.
Yet Ennius too in everlasting verse
Proclaims those vaults of Acheron to be,
Though thence, he said, nor souls nor bodies fare,
But only phantom figures, strangely wan,
And tells how once from out those regions rose
Old Homer's ghost to him and shed salt tears
And with his words unfolded Nature's source.
Then be it ours with steady mind to clasp
The purport of the skies- the law behind
The wandering courses of the sun and moon;
To scan the powers that speed all life below;
But most to see with reasonable eyes
Of what the mind, of what the soul is made,
And what it is so terrible that breaks
On us asleep, or waking in disease,
Until we seem to mark and hear at hand
Dead men whose bones earth bosomed long ago.

BOOK_1|SUBSTANCE_IS_ETERNAL
SUBSTANCE IS ETERNAL

-

This terror, then, this darkness of the mind,
Not sunrise with its flaring spokes of light,
Nor glittering arrows of morning can disperse,
But only Nature's aspect and her law,
Which, teaching us, hath this exordium:
Nothing from nothing ever yet was born.
Fear holds dominion over mortality
Only because, seeing in land and sky
So much the cause whereof no wise they know,
Men think Divinities are working there.
Meantime, when once we know from nothing still
Nothing can be create, we shall divine
More clearly what we seek: those elements
From which alone all things created are,
And how accomplished by no tool of Gods.
Suppose all sprang from all things: any kind
Might take its origin from any thing,
No fixed seed required. Men from the sea
Might rise, and from the land the scaly breed,
And, fowl full fledged come bursting from the sky;
The horned cattle, the herds and all the wild
Would haunt with varying offspring tilth and waste;
Nor would the same fruits keep their olden trees,

But each might grow from any stock or limb
By chance and change. Indeed, and were there not
For each its procreant atoms, could things have
Each its unalterable mother old?
But, since produced from fixed seeds are all,
Each birth goes forth upon the shores of light
From its own stuff, from its own primal bodies.
And all from all cannot become, because
In each resides a secret power its own.
Again, why see we lavished o'er the lands
At spring the rose, at summer heat the corn,
The vines that mellow when the autumn lures,
If not because the fixed seeds of things
At their own season must together stream,
And new creations only be revealed
When the due times arrive and pregnant earth
Safely may give unto the shores of light
Her tender progenies? But if from naught
Were their becoming, they would spring abroad
Suddenly, unforeseen, in alien months,
With no primordial germs, to be preserved
From procreant unions at an adverse hour.
Nor on the mingling of the living seeds
Would space be needed for the growth of things
Were life an increment of nothing: then
The tiny babe forthwith would walk a man,
And from the turf would leap a branching tree-
Wonders unheard of; for, by Nature, each
Slowly increases from its lawful seed,
And through that increase shall conserve its kind.
Whence take the proof that things enlarge and feed
From out their proper matter. Thus it comes
That earth, without her seasons of fixed rains,
Could bear no produce such as makes us glad,
And whatsoever lives, if shut from food,
Prolongs its kind and guards its life no more.
Thus easier 'tis to hold that many things
Have primal bodies in common (as we see
The single letters common to many words)
Than aught exists without its origins.
Moreover, why should Nature not prepare
Men of a bulk to ford the seas afoot,
Or rend the mighty mountains with their hands,
Or conquer Time with length of days, if not
Because for all begotten things abides

The changeless stuff, and what from that may spring
Is fixed forevermore? Lastly we see
How far the tilled surpass the fields untilled
And to the labour of our hands return
Their more abounding crops; there are indeed
Within the earth primordial germs of things,
Which, as the ploughshare turns the fruitful clods
And kneads the mould, we quicken into birth.
Else would ye mark, without all toil of ours,
Spontaneous generations, fairer forms.
Confess then, naught from nothing can become,
Since all must have their seeds, wherefrom to grow,
Wherefrom to reach the gentle fields of air.

Hence too it comes that Nature all dissolves
Into their primal bodies again, and naught
Perishes ever to annihilation.
For, were aught mortal in its every part,
Before our eyes it might be snatched away
Unto destruction; since no force were needed
To sunder its members and undo its bands.
Whereas, of truth, because all things exist,
With seed imperishable, Nature allows
Destruction nor collapse of aught, until
Some outward force may shatter by a blow,
Or inward craft, entering its hollow cells,
Dissolve it down. And more than this, if Time,
That wastes with eld the works along the world,
Destroy entire, consuming matter all,
Whence then may Venus back to light of life
Restore the generations kind by kind?
Or how, when thus restored, may daedal Earth
Foster and plenish with her ancient food,
Which, kind by kind, she offers unto each?
Whence may the water-springs, beneath the sea,
Or inland rivers, far and wide away,
Keep the unfathomable ocean full?
And out of what does Ether feed the stars?
For lapsed years and infinite age must else
Have eat all shapes of mortal stock away:
But be it the Long Ago contained those germs,
By which this sum of things recruited lives,
Those same infallibly can never die,
Nor nothing to nothing evermore return.
And, too, the selfsame power might end alike
All things, were they not still together held

By matter eternal, shackled through its parts,
Now more, now less. A touch might be enough
To cause destruction. For the slightest force
Would loose the weft of things wherein no part
Were of imperishable stock. But now
Because the fastenings of primordial parts
Are put together diversely and stuff
Is everlasting, things abide the same
Unhurt and sure, until some power comes on
Strong to destroy the warp and woof of each:
Nothing returns to naught; but all return
At their collapse to primal forms of stuff.
Lo, the rains perish which Ether-father throws
Down to the bosom of Earth-mother; but then
Upsprings the shining grain, and boughs are green
Amid the trees, and trees themselves wax big
And lade themselves with fruits; and hence in turn
The race of man and all the wild are fed;
Hence joyful cities thrive with boys and girls;
And leafy woodlands echo with new birds;
Hence cattle, fat and drowsy, lay their bulk
Along the joyous pastures whilst the drops
Of white ooze trickle from distended bags;
Hence the young scamper on their weakling joints
Along the tender herbs, fresh hearts afrisk
With warm new milk. Thus naught of what so seems
Perishes utterly, since Nature ever
Upbuilds one thing from other, suffering naught
To come to birth but through some other's death.

-
And now, since I have taught that things cannot
Be born from nothing, nor the same, when born,
To nothing be recalled, doubt not my words,
Because our eyes no primal germs perceive;
For mark those bodies which, though known to be
In this our world, are yet invisible:
The winds infuriate lash our face and frame,
Unseen, and swamp huge ships and rend the clouds,
Or, eddying wildly down, bestrew the plains
With mighty trees, or scour the mountain tops
With forest-crackling blasts. Thus on they rave
With uproar shrill and ominous moan. The winds,
'Tis clear, are sightless bodies sweeping through
The sea, the lands, the clouds along the sky,
Vexing and whirling and seizing all amain;

And forth they flow and pile destruction round,
Even as the water's soft and supple bulk
Becoming a river of abounding floods,
Which a wide downpour from the lofty hills
Swells with big showers, dashes headlong down
Fragments of woodland and whole branching trees;
Nor can the solid bridges bide the shock
As on the waters whelm: the turbulent stream,
Strong with a hundred rains, beats round the piers,
Crashes with havoc, and rolls beneath its waves
Down-toppled masonry and ponderous stone,
Hurling away whatever would oppose.
Even so must move the blasts of all the winds,
Which, when they spread, like to a mighty flood,
Hither or thither, drive things on before
And hurl to ground with still renewed assault,
Or sometimes in their circling vortex seize
And bear in cones of whirlwind down the world:
The winds are sightless bodies and naught else-
Since both in works and ways they rival well
The mighty rivers, the visible in form.
Then too we know the varied smells of things
Yet never to our nostrils see them come;
With eyes we view not burning heats, nor cold,
Nor are we wont men's voices to behold.
Yet these must be corporeal at the base,
Since thus they smite the senses: naught there is
Save body, having property of touch.
And raiment, hung by surf-beat shore, grows moist,
The same, spread out before the sun, will dry;
Yet no one saw how sank the moisture in,
Nor how by heat off-driven. Thus we know,
That moisture is dispersed about in bits
Too small for eyes to see. Another case:
A ring upon the finger thins away
Along the under side, with years and suns;
The drippings from the eaves will scoop the stone;
The hooked ploughshare, though of iron, wastes
Amid the fields insidiously. We view
The rock-paved highways worn by many feet;
And at the gates the brazen statues show
Their right hands leaner from the frequent touch
Of wayfarers innumerable who greet.
We see how wearing-down hath minished these,
But just what motes depart at any time,

The envious nature of vision bars our sight.
Lastly whatever days and nature add
Little by little, constraining things to grow
In due proportion, no gaze however keen
Of these our eyes hath watched and known. No more
Can we observe what's lost at any time,
When things wax old with eld and foul decay,
Or when salt seas eat under beetling crags.
Thus Nature ever by unseen bodies works.

BOOK_1|THE_VOID
THE VOID

-
But yet creation's neither crammed nor blocked
About by body: there's in things a void-
Which to have known will serve thee many a turn,
Nor will not leave thee wandering in doubt,
Forever searching in the sum of all,
And losing faith in these pronouncements mine.
There's place intangible, a void and room.
For were it not, things could in nowise move;
Since body's property to block and check
Would work on all and at an times the same.
Thus naught could evermore push forth and go,
Since naught elsewhere would yield a starting place.
But now through oceans, lands, and heights of heaven
By divers causes and in divers modes,
Before our eyes we mark how much may move,
Which, finding not a void, would fail deprived
Of stir and motion; nay, would then have been
Nowise begot at all, since matter, then,
Had staid at rest, its parts together crammed.
Then too, however solid objects seem,
They yet are formed of matter mixed with void:
In rocks and caves the watery moisture seeps,
And beady drops stand out like plenteous tears;
And food finds way through every frame that lives;
The trees increase and yield the season's fruit
Because their food throughout the whole is poured,
Even from the deepest roots, through trunks and boughs;
And voices pass the solid walls and fly
Reverberant through shut doorways of a house;
And stiffening frost seeps inward to our bones.
Which but for voids for bodies to go through
'Tis clear could happen in nowise at all.

Again, why see we among objects some
Of heavier weight, but of no bulkier size:
Indeed, if in a ball of wool there be
As much of body as in lump of lead,
The two should weigh alike, since body tends
To load things downward, while the void abides,
By contrary nature, the imponderable.
Therefore, an object just as large but lighter
Declares infallibly its more of void;
Even as the heavier more of matter shows,
And how much less of vacant room inside.
That which we're seeking with sagacious quest
Exists, infallibly, commixed with things-
The void, the invisible inane.

Right here

I am compelled a question to expound,
Forestalling something certain folk suppose,
Lest it avail to lead thee off from truth:
Waters (they say) before the shining breed
Of the swift scaly creatures somehow give,
And straightway open sudden liquid paths,
Because the fishes leave behind them room
To which at once the yielding billows stream.
Thus things among themselves can yet be moved,
And change their place, however full the Sum-
Received opinion, wholly false forsooth.
For where can scaly creatures forward dart,
Save where the waters give them room? Again,
Where can the billows yield a way, so long
As ever the fish are powerless to go?
Thus either all bodies of motion are deprived,
Or things contain admixture of a void
Where each thing gets its start in moving on.

Lastly, where after impact two broad bodies
Suddenly spring apart, the air must crowd
The whole new void between those bodies formed;
But air, however it stream with hastening gusts,
Can yet not fill the gap at once- for first
It makes for one place, ere diffused through all.
And then, if haply any think this comes,
When bodies spring apart, because the air
Somehow condenses, wander they from truth:
For then a void is formed, where none before;
And, too, a void is filled which was before.
Nor can air be condensed in such a wise;

Nor, granting it could, without a void, I hold,
It still could not contract upon itself
And draw its parts together into one.
Wherefore, despite demur and counter-speech,
Confess thou must there is a void in things.

-
And still I might by many an argument
Here scrape together credence for my words.
But for the keen eye these mere footprints serve,
Whereby thou mayest know the rest thyself.
As dogs full oft with noses on the ground,
Find out the silent lairs, though hid in brush,
Of beasts, the mountain-rangers, when but once
They scent the certain footsteps of the way,
Thus thou thyself in themes like these alone
Can hunt from thought to thought, and keenly wind
Along even onward to the secret places
And drag out truth. But, if thou loiter loth
Or veer, however little, from the point,
This I can promise, Memmius, for a fact:
Such copious drafts my singing tongue shall pour
From the large well-springs of my plenished breast
That much I dread slow age will steal and coil
Along our members, and unloose the gates
Of life within us, ere for thee my verse
Hath put within thine ears the stores of proofs
At hand for one soever question broached.

BOOK_1|ATOMS_AND_THE_VOID
NOTHING EXISTS per se EXCEPT ATOMS
AND THE VOID

-
But, now again to weave the tale begun,
All nature, then, as self-sustained, consists
Of twain of things: of bodies and of void
In which they're set, and where they're moved around.
For common instinct of our race declares
That body of itself exists: unless
This primal faith, deep-founded, fail us not,
Naught will there be whereunto to appeal
On things occult when seeking aught to prove
By reasonings of mind. Again, without
That place and room, which we do call the inane,
Nowhere could bodies then be set, nor go
Hither or thither at all- as shown before.

Besides, there's naught of which thou canst declare
It lives disjoined from body, shut from void-
A kind of third in nature. For whatever
Exists must be a somewhat; and the same,
If tangible, however light and slight,
Will yet increase the count of body's sum,
With its own augmentation big or small;
But, if intangible and powerless ever
To keep a thing from passing through itself
On any side, 'twill be naught else but that
Which we do call the empty, the inane.
Again, whate'er exists, as of itself,
Must either act or suffer action on it.
Or else be that wherein things move and be:
Naught, saving body, acts, is acted on;
Naught but the inane can furnish room. And thus,
Beside the inane and bodies, is no third
Nature amid the number of all things-
Remainder none to fall at any time
Under our senses, nor be seized and seen
By any man through reasonings of mind.
Name o'er creation with what names thou wilt,
Thou'lt find but properties of those first twain,
Or see but accidents those twain produce.

-
A property is that which not at all
Can be disjoined and severed from a thing
Without a fatal dissolution: such,
Weight to the rocks, heat to the fire, and flow
To the wide waters, touch to corporal things,
Intangibility to the viewless void.
But state of slavery, pauperhood, and wealth,
Freedom, and war, and concord, and all else
Which come and go whilst Nature stands the same,
We're wont, and rightly, to call accidents.
Even time exists not of itself; but sense
Reads out of things what happened long ago,
What presses now, and what shall follow after:
No man, we must admit, feels time itself,
Disjoined from motion and repose of things.
Thus, when they say there "is" the ravishment
Of Princess Helen, "is" the siege and sack
Of Trojan Town, look out, they force us not
To admit these acts existent by themselves,
Merely because those races of mankind

(Of whom these acts were accidents) long since
Irrevocable age has borne away:
For all past actions may be said to be
But accidents, in one way, of mankind,-
In other, of some region of the world.
Add, too, had been no matter, and no room
Wherein all things go on, the fire of love
Upblown by that fair form, the glowing coal
Under the Phrygian Alexander's breast,
Had ne'er enkindled that renowned strife
Of savage war, nor had the wooden horse
Involved in flames old Pergama, by a birth
At midnight of a brood of the Hellenes.
And thus thou canst remark that every act
At bottom exists not of itself, nor is
As body is, nor has like name with void;
But rather of sort more fitly to be called
An accident of body, and of place
Wherein all things go on.

BOOK_1|CHARACTER_OF_THE_ATOMS
CHARACTER OF THE ATOMS

-
Bodies, again,
Are partly primal germs of things, and partly
Unions deriving from the primal germs.
And those which are the primal germs of things
No power can quench; for in the end they conquer
By their own solidness; though hard it be
To think that aught in things has solid frame;
For lightnings pass, no less than voice and shout,
Through hedging walls of houses, and the iron
White-dazzles in the fire, and rocks will burn
With exhalations fierce and burst asunder.
Totters the rigid gold dissolved in heat;
The ice of bronze melts conquered in the flame;
Warmth and the piercing cold through silver seep,
Since, with the cups held rightly in the hand,
We oft feel both, as from above is poured
The dew of waters between their shining sides:
So true it is no solid form is found.
But yet because true reason and nature of things
Constrain us, come, whilst in few verses now
I disentangle how there still exist
Bodies of solid, everlasting frame-

The seeds of things, the primal germs we teach,
Whence all creation around us came to be.
First since we know a twofold nature exists,
Of things, both twain and utterly unlike-
Body, and place in which an things go on-
Then each must be both for and through itself,
And all unmixed: where'er be empty space,
There body's not; and so where body bides,
There not at an exists the void inane.
Thus primal bodies are solid, without a void.
But since there's void in all begotten things,
All solid matter must be round the same;
Nor, by true reason canst thou prove aught hides
And holds a void within its body, unless
Thou grant what holds it be a solid. Know,
That which can hold a void of things within
Can be naught else than matter in union knit.
Thus matter, consisting of a solid frame,
Hath power to be eternal, though all else,
Though all creation, be dissolved away.
Again, were naught of empty and inane,
The world were then a solid; as, without
Some certain bodies to fill the places held,
The world that is were but a vacant void.
And so, infallibly, alternate-wise
Body and void are still distinguished,
Since nature knows no wholly full nor void.
There are, then, certain bodies, possessed of power
To vary forever the empty and the full;
And these can nor be sundered from without
By beats and blows, nor from within be torn
By penetration, nor be overthrown
By any assault soever through the world-
For without void, naught can be crushed, it seems,
Nor broken, nor severed by a cut in twain,
Nor can it take the damp, or seeping cold
Or piercing fire, those old destroyers three;
But the more void within a thing, the more
Entirely it totters at their sure assault.
Thus if first bodies be, as I have taught,
Solid, without a void, they must be then
Eternal; and, if matter ne'er had been
Eternal, long ere now had all things gone
Back into nothing utterly, and all
We see around from nothing had been born-

But since I taught above that naught can be
From naught created, nor the once begotten
To naught be summoned back, these primal germs
Must have an immortality of frame.
And into these must each thing be resolved,
When comes its supreme hour, that thus there be
At hand the stuff for plenishing the world.

-
So primal germs have solid singleness
Nor otherwise could they have been conserved
Through aeons and infinity of time
For the replenishment of wasted worlds.

-
Once more, if Nature had given a scope for things
To be forever broken more and more,
By now the bodies of matter would have been
So far reduced by breakings in old days
That from them nothing could, at season fixed,
Be born, and arrive its prime and of life.
For, lo, each thing is quicker marred than made;
And so what'er the long infinitude
Of days and all fore-passed time would now
By this have broken and ruined and dissolved,
That same could ne'er in all remaining time
Be builded up for plenishing the world.
But mark: infallibly a fixed bound
Remaineth stablished 'gainst their breaking down;
Since we behold each thing soever renewed,
And unto all, their seasons, after their kind,
Wherein they arrive the flower of their age.

-
Again, if bounds have not been set against
The breaking down of this corporeal world,
Yet must all bodies of whatever things
Have still endured from everlasting time
Unto this present, as not yet assailed
By shocks of peril. But because the same
Are, to thy thinking, of a nature frail,
It ill accords that thus they could remain
(As thus they do) through everlasting time,
Vexed through the ages (as indeed they are)
By the innumerable blows of chance.

-
So in our programme of creation, mark
How 'tis that, though the bodies of all stuff

The ways whereby some things are fashioned soft-
Air, water, earth, and fiery exhalations-
And by what force they function and go on:
The fact is founded in the void of things.
But if the primal germs themselves be soft,
Reason cannot be brought to bear to show
The ways whereby may be created these
Great crags of basalt and the during iron;
For their whole nature will profoundly lack
The first foundations of a solid frame.
But powerful in old simplicity,
Abide the solid, the primeval germs;
And by their combinations more condensed,
All objects can be tightly knit and bound
And made to show unconquerable strength.
Again, since all things kind by kind obtain
Fixed bounds of growing and conserving life;
Since Nature hath inviolably decreed
What each can do, what each can never do;
Since naught is changed, but all things so abide
That ever the variegated birds reveal
The spots or stripes peculiar to their kind,
Spring after spring: thus surely all that is
Must be composed of matter immutable.
For if the primal germs in any wise
Were open to conquest and to change, 'twould be
Uncertain also what could come to birth
And what could not, and by what law to each
Its scope prescribed, its boundary stone that clings
So deep in Time. Nor could the generations
Kind after kind so often reproduce
The nature, habits, motions, ways of life,
Of their progenitors.

And then again,
Since there is ever an extreme bounding point

-
Of that first body which our senses now
Cannot perceive: That bounding point indeed
Exists without all parts, a minimum
Of nature, nor was e'er a thing apart,
As of itself,- nor shall hereafter be,
Since 'tis itself still parcel of another,
A first and single part, whence other parts
And others similar in order lie
In a packed phalanx, filling to the full

The nature of first body: being thus
Not self-existent, they must cleave to that
From which in nowise they can sundered be.
So primal germs have solid singleness,
Which tightly packed and closely joined cohere
By virtue of their minim particles-
No compound by mere union of the same;
But strong in their eternal singleness,
Nature, reserving them as seeds for things,
Permitteth naught of rupture or decrease.

-
Moreover, were there not a minimum,
The smallest bodies would have infinites,
Since then a half-of-half could still be halved,
With limitless division less and less.
Then what the difference 'twixt the sum and least?
None: for however infinite the sum,
Yet even the smallest would consist the same
Of infinite parts. But since true reason here
Protests, denying that the mind can think it,
Convinced thou must confess such things there are
As have no parts, the minimums of nature.
And since these are, likewise confess thou must
That primal bodies are solid and eterne.
Again, if Nature, creatress of all things,
Were wont to force all things to be resolved
Unto least parts, then would she not avail
To reproduce from out them anything;
Because whate'er is not endowed with parts
Cannot possess those properties required
Of generative stuff- divers connections,
Weights, blows, encounters, motions, whereby things
Forevermore have being and go on.

BOOK_1|CONFUTATION
CONFUTATION OF OTHER PHILOSOPHERS

-
And on such grounds it is that those who held
The stuff of things is fire, and out of fire
Alone the cosmic sum is formed, are seen
Mightily from true reason to have lapsed.
Of whom, chief leader to do battle, comes
That Heraclitus, famous for dark speech
Among the silly, not the serious Greeks
Who search for truth. For dolts are ever prone

That to bewonder and adore which hides
Beneath distorted words, holding that true
Which sweetly tickles in their stupid ears,
Or which is rouged in finely finished phrase.
For how, I ask, can things so varied be,
If formed of fire, single and pure? No whit
'Twould help for fire to be condensed or thinned,
If all the parts of fire did still preserve
But fire's own nature, seen before in gross.
The heat were keener with the parts compressed,
Milder, again when severed or dispersed-
And more than this thou canst conceive of naught
That from such causes could become; much less
Might earth's variety of things be born
From any fires soever, dense or rare.
This too: if they suppose a void in things,
Then fires can be condensed and still left rare;
But since they see such opposites of thought
Rising against them, and are loath to leave
An unmixed void in things, they fear the steep
And lose the road of truth. Nor do they see,
That, if from things we take away the void,
All things are then condensed, and out of all
One body made, which has no power to dart
Swiftly from out itself not anything-
As throws the fire its light and warmth around,
Giving thee proof its parts are not compact.
But if perhaps they think, in other wise,
Fires through their combinations can be quenched
And change their substance, very well: behold,
If fire shall spare to do so in no part,
Then heat will perish utterly and all,
And out of nothing would the world be formed.
For change in anything from out its bounds
Means instant death of that which was before;
And thus a somewhat must persist unharmed
Amid the world, lest all return to naught,
And, born from naught, abundance thrive anew.
Now since indeed there are those surest bodies
Which keep their nature evermore the same,
Upon whose going out and coming in
And changed order things their nature change,
And all corporeal substances transformed,
'Tis thine to know those primal bodies, then,
Are not of fire. For 'twere of no avail

Should some depart and go away, and some
Be added new, and some be changed in order,
If still all kept their nature of old heat:
For whatsoever they created then
Would still in any case be only fire.
The truth, I fancy, this: bodies there are
Whose clashings, motions, order, posture, shapes
Produce the fire and which, by order changed,
Do change the nature of the thing produced,
And are thereafter nothing like to fire
Nor whatso else has power to send its bodies
With impact touching on the senses' touch.

-
Again, to say that all things are but fire
And no true thing in number of all things
Exists but fire, as this same fellow says,
Seems crazed folly. For the man himself
Against the senses by the senses fights,
And hews at that through which is all belief,
Through which indeed unto himself is known
The thing he calls the fire. For, though he thinks
The senses truly can perceive the fire,
He thinks they cannot as regards all else,
Which still are palpably as clear to sense-
To me a thought inept and crazy too.
For whither shall we make appeal? for what
More certain than our senses can there be
Whereby to mark asunder error and truth?
Besides, why rather do away with all,
And wish to allow heat only, then deny
The fire and still allow all else to be?-
Alike the madness either way it seems.
Thus whosoe'er have held the stuff of things
To be but fire, and out of fire the sum,
And whosoever have constituted air
As first beginning of begotten things,
And all whoever have held that of itself
Water alone contrives things, or that earth
Createth all and changes things anew
To divers natures, mightily they seem
A long way to have wandered from the truth.

-
Add, too, whoever make the primal stuff
Twofold, by joining air to fire, and earth
To water; add who deem that things can grow

Out of the four- fire, earth, and breath, and rain;
As first Empedocles of Acragas,
Whom that three-cornered isle of all the lands
Bore on her coasts, around which flows and flows
In mighty bend and bay the Ionic seas,
Splashing the brine from off their gray-green waves.
Here, billowing onward through the narrow straits,
Swift ocean cuts her boundaries from the shores
Of the Italic mainland. Here the waste
Charybdis; and here Aetna rumbles threats
To gather anew such furies of its flames
As with its force anew to vomit fires,
Belched from its throat, and skyward bear anew
Its lightnings' flash. And though for much she seem
The mighty and the wondrous isle to men,
Most rich in all good things, and fortified
With generous strength of heroes, she hath ne'er
Possessed within her aught of more renown,
Nor aught more holy, wonderful, and dear
Than this true man. Nay, ever so far and pure
The lofty music of his breast divine
Lifts up its voice and tells of glories found,
That scarce he seems of human stock create.

Yet he and those forementioned (known to be
So far beneath him, less than he in all),
Though, as discoverers of much goodly truth,
They gave, as 'twere from out of the heart's own shrine,
Responses holier and soundlier based
Than ever the Pythia pronounced for men
From out the tripod and the Delphian laurel,
Have still in matter of first-elements
Made ruin of themselves, and, great men, great
Indeed and heavy there for them the fall:
First, because, banishing the void from things,
They yet assign them motion, and allow
Things soft and loosely textured to exist,
As air, dew, fire, earth, animals, and grains,
Without admixture of void amid their frame.
Next, because, thinking there can be no end
In cutting bodies down to less and less
Nor pause established to their breaking up,
They hold there is no minimum in things;
Albeit we see the boundary point of aught
Is that which to our senses seems its least,

Whereby thou mayst conjecture, that, because
The things thou canst not mark have boundary points,
They surely have their minimums. Then, too,
Since these philosophers ascribe to things
Soft primal germs, which we behold to be
Of birth and body mortal, thus, throughout,
The sum of things must be returned to naught,
And, born from naught, abundance thrive anew-
Thou seest how far each doctrine stands from truth.
And, next, these bodies are among themselves
In many ways poisons and foes to each,
Wherefore their congress will destroy them quite
Or drive asunder as we see in storms
Rains, winds, and lightnings all asunder fly.

Thus too, if all things are create of four,
And all again dissolved into the four,
How can the four be called the primal germs
Of things, more than all things themselves be thought,
By retroversion, primal germs of them?
For ever alternately are both begot,
With interchange of nature and aspect
From immemorial time. But if perchance
Thou think'st the frame of fire and earth, the air,
The dew of water can in such wise meet
As not by mingling to resign their nature,
From them for thee no world can be create-
No thing of breath, no stock or stalk of tree:
In the wild congress of this varied heap
Each thing its proper nature will display,
And air will palpably be seen mixed up
With earth together, unquenched heat with water.
But primal germs in bringing things to birth
Must have a latent, unseen quality,
Lest some outstanding alien element
Confuse and minish in the thing create
Its proper being.

But these men begin
From heaven, and from its fires; and first they feign
That fire will turn into the winds of air,
Next, that from air the rain begotten is,
And earth created out of rain, and then
That all, reversely, are returned from earth-
The moisture first, then air thereafter heat-
And that these same ne'er cease in interchange,
To go their ways from heaven to earth, from earth

Unto the stars of the ethereal world-
Which in no wise at all the germs can do.
Since an immutable somewhat still must be,
Lest all things utterly be sped to naught;
For change in anything from out its bounds
Means instant death of that which was before.
Wherefore, since those things, mentioned heretofore,
Suffer a changed state, they must derive
From others ever unconvertible,
Lest an things utterly return to naught.
Then why not rather presuppose there be
Bodies with such a nature furnished forth
That, if perchance they have created fire,
Can still (by virtue of a few withdrawn,
Or added few, and motion and order changed)
Fashion the winds of air, and thus all things
Forevermore be interchanged with all?
"But facts in proof are manifest;" thou sayest,
"That all things grow into the winds of air
And forth from earth are nourished, and unless
The season favour at propitious hour
With rains enough to set the trees a-reel
Under the soak of bulking thunderheads,
And sun, for its share, foster and give heat,
No grains, nor trees, nor breathing things can grow."
True- and unless hard food and moisture soft
Recruited man, his frame would waste away,
And life dissolve from out his thews and bones;
For out of doubt recruited and fed are we
By certain things, as other things by others.
Because in many ways the many germs
Common to many things are mixed in things,
No wonder 'tis that therefore divers things
By divers things are nourished. And, again,
Often it matters vastly with what others,
In what positions the primordial germs
Are bound together, and what motions, too,
They give and get among themselves; for these
Same germs do put together sky, sea, lands,
Rivers, and sun, grains, trees, and breathing things,
But yet commixed they are in divers modes
With divers things, forever as they move.
Nay, thou beholdest in our verses here
Elements many, common to many worlds,
Albeit thou must confess each verse, each word

From one another differs both in sense
And ring of sound- so much the elements
Can bring about by change of order alone.
But those which are the primal germs of things
Have power to work more combinations still,
Whence divers things can be produced in turn.

Now let us also take for scrutiny
The homeomeria of Anaxagoras,
So called by Greeks, for which our pauper-speech
Yieldeth no name in the Italian tongue,
Although the thing itself is not o'erhard
For explanation. First, then, when he speaks
Of this homeomeria of things, he thinks
Bones to be sprung from littlest bones minute,
And from minute and littlest flesh all flesh,
And blood created out of drops of blood,
Conceiving gold compact of grains of gold,
And earth concreted out of bits of earth,
Fire made of fires, and water out of waters,
Feigning the like with all the rest of stuff.
Yet he concedes not an void in things,
Nor any limit to cutting bodies down.
Wherefore to me he seems on both accounts
To err no less than those we named before.
Add too: these germs he feigns are far too frail-
If they be germs primordial furnished forth
With but same nature as the things themselves,
And travail and perish equally with those,
And no rein curbs them from annihilation.
For which will last against the grip and crush
Under the teeth of death? the fire? the moist?
Or else the air? which then? the blood? the bones?
No one, methinks, when every thing will be
At bottom as mortal as whate'er we mark
To perish by force before our gazing eyes.
But my appeal is to the proofs above
That things cannot fall back to naught, nor yet
From naught increase. And now again, since food
Augments and nourishes the human frame,
'Tis thine to know our veins and blood and bones
And thews are formed of particles unlike
To them in kind; or if they say all foods
Are of mixed substance having in themselves
Small bodies of thews, and bones, and also veins

And particles of blood, then every food,
Solid or liquid, must itself be thought
As made and mixed of things unlike in kind-
Of bones, of thews, of ichor and of blood.
Again, if all the bodies which upgrow
From earth, are first within the earth, then earth
Must be compound of alien substances earth.
Which spring and bloom abroad from out the earth.
Transfer the argument, and thou may'st use
The selfsame words: if flame and smoke and ash
Still lurk unseen within the wood, the wood
Must be compound of alien substances
Which spring from out the wood.

Right here remains

A certain slender means to skulk from truth,
Which Anaxagoras takes unto himself,
Who holds that all things lurk commixed with all
While that one only comes to view, of which
The bodies exceed in number all the rest,
And lie more close to hand and at the fore-
A notion banished from true reason far.
For then 'twere meet that kernels of the grains
Should oft, when crunched between the might of stones,
Give forth a sign of blood, or of aught else
Which in our human frame is fed; and that
Rock rubbed on rock should yield a gory ooze.
Likewise the herbs ought oft to give forth drops
Of sweet milk, flavoured like the uddered sheep's;
Indeed we ought to find, when crumbling up
The earthy clods, there herbs, and grains, and leaves,
All sorts dispersed minutely in the soil;
Lastly we ought to find in cloven wood
Ashes and smoke and bits of fire there hid.
But since fact teaches this is not the case,
'Tis thine to know things are not mixed with things
Thuswise; but seeds, common to many things,
Commixed in many ways, must lurk in things.
"But often it happens on skiey hills" thou sayest,
"That neighbouring tops of lofty trees are rubbed
One against other, smote by the blustering south,
Till all ablaze with bursting flower of flame."
Good sooth- yet fire is not ingraft in wood,
But many are the seeds of heat, and when
Rubbing together they together flow,
They start the conflagrations in the forests.

Whereas if flame, already fashioned, lay
Stored up within the forests, then the fires
Could not for any time be kept unseen,
But would be laying all the wildwood waste
And burning all the boscaige. Now dost see
(Even as we said a little space above)
How mightily it matters with what others,
In what positions these same primal germs
Are bound together? And what motions, too,
They give and get among themselves? how, hence,
The same, if altered 'mongst themselves, can body
Both igneous and ligneous objects forth-
Precisely as these words themselves are made
By somewhat altering their elements,
Although we mark with name indeed distinct
The igneous from the ligneous. Once again,
If thou suppose whatever thou beholdest,
Among all visible objects, cannot be,
Unless thou feign bodies of matter endowed
With a like nature,- by thy vain device
For thee will perish all the germs of things:
'Twill come to pass they'll laugh aloud, like men,
Shaken asunder by a spasm of mirth,
Or moisten with salty tear-drops cheeks and chins.

BOOK_1|INFINITY_OF_THE_UNIVERSE
THE INFINITY OF THE UNIVERSE

-

Now learn of what remains! More keenly hear!
And for myself, my mind is not deceived
How dark it is: But the large hope of praise
Hath strook with pointed thyrsus through my heart;
On the same hour hath strook into my breast
Sweet love of the Muses, wherewith now instinct,
I wander afield, thriving in sturdy thought,
Through unpathed haunts of the Pierides,
Trodden by step of none before. I joy
To come on undefiled fountains there,
To drain them deep; I joy to pluck new flowers,
To seek for this my head a signal crown
From regions where the Muses never yet
Have garlanded the temples of a man:
First, since I teach concerning mighty things,
And go right on to loose from round the mind
The tightened coils of dread religion;

Next, since, concerning themes so dark, I frame
Songs so pellucid, touching all throughout
Even with the Muses' charm- which, as 'twould seem,
Is not without a reasonable ground:
But as physicians, when they seek to give
Young boys the nauseous wormwood, first do touch
The brim around the cup with the sweet juice
And yellow of the boney, in order that
The thoughtless age of boyhood be cajoled
As far as the lips, and meanwhile swallow down
The wormwood's bitter draught, and, though befooled
Be yet not merely duped, but rather thus
Grow strong again with recreated health:
So now I too (since this my doctrine seems
In general somewhat woeful unto those
Who've had it not in hand, and since the crowd
Starts back from it in horror) have desired
To expound our doctrine unto thee in song
Soft-speaking and Pierian, and, as 'twere,
To touch it with sweet honey of the Muse-
If by such method haply I might hold
The mind of thee upon these lines of ours,
Till thou see through the nature of all things,
And how exists the interwoven frame.

-
But since I've taught that bodies of matter, made
Completely solid, hither and thither fly
Forevermore unconquered through all time,
Now come, and whether to the sum of them
There be a limit or be none, for thee
Let us unfold; likewise what has been found
To be the wide inane, or room, or space
Wherein all things soever do go on,
Let us examine if it finite be
All and entire, or reach unmeasured round
And downward an illimitable profound.

-
Thus, then, the All that is is limited
In no one region of its onward paths,
For then 't must have forever its beyond.
And a beyond 'tis seen can never be
For aught, unless still further on there be
A somewhat somewhere that may bound the same-
So that the thing be seen still on to where
The nature of sensation of that thing

Can follow it no longer. Now because
Confess we must there's naught beside the sum,
There's no beyond, and so it lacks all end.
It matters nothing where thou post thyself,
In whatsoever regions of the same;
Even any place a man has set him down
Still leaves about him the unbounded all
Outward in all directions; or, supposing
moment the all of space finite to be,
If some one farthest traveller runs forth
Unto the extreme coasts and throws ahead
A flying spear, is't then thy wish to think
It goes, hurled off amain, to where 'twas sent
And shoots afar, or that some object there
Can thwart and stop it? For the one or other
Thou must admit; and take. Either of which
Shuts off escape for thee, and does compel
That thou concede the all spreads everywhere,
Owning no confines. Since whether there be
Aught that may block and check it so it comes
Not where 'twas sent, nor lodges in its goal,
Or whether borne along, in either view
'Thas started not from any end. And so
I'll follow on, and whereso'er thou set
The extreme coasts, I'll query, "what becomes
Thereafter of thy spear?" 'Twill come to pass
That nowhere can a world's-end be, and that
The chance for further flight prolongs forever
The flight itself. Besides, were all the space
Of the totality and sum shut in
With fixed coasts, and bounded everywhere,
Then would the abundance of world's matter flow
Together by solid weight from everywhere
Still downward to the bottom of the world,
Nor aught could happen under cope of sky,
Nor could there be a sky at all or sun-
Indeed, where matter all one heap would lie,
By having settled during infinite time.
But in reality, repose is given
Unto no bodies 'mongst the elements,
Because there is no bottom whereunto
They might, as 'twere, together flow, and where
They might take up their undisturbed abodes.
In endless motion everything goes on
Forevermore; out of all regions, even

Out of the pit below, from forth the vast,
Are hurtled bodies evermore supplied.
The nature of room, the space of the abyss
Is such that even the flashing thunderbolts
Can neither speed upon their courses through,
Gliding across eternal tracts of time,
Nor, further, bring to pass, as on they run,
That they may bate their journeying one whit:
Such huge abundance spreads for things around-
Room off to every quarter, without end.
Lastly, before our very eyes is seen
Thing to bound thing: air hedges hill from hill,
And mountain walls hedge air; land ends the sea,
And sea in turn all lands; but for the All
Truly is nothing which outside may bound.
That, too, the sum of things itself may not
Have power to fix a measure of its own,
Great Nature guards, she who compels the void
To bound all body, as body all the void,
Thus rendering by these alternates the whole
An infinite; or else the one or other,
Being unbounded by the other, spreads,
Even by its single nature, ne'ertheless
Immeasurably forth....
Nor sea, nor earth, nor shining vaults of sky,
Nor breed of mortals, nor holy limbs of gods
Could keep their place least portion of an hour:
For, driven apart from out its meetings fit,
The stock of stuff, dissolved, would be borne
Along the illimitable inane afar,
Or rather, in fact, would never have once combined
And given a birth to aught, since, scattered wide,
It could not be united. For of truth
Neither by counsel did the primal germs
'Stablish themselves, as by keen act of mind,
Each in its proper place; nor did they make,
Forsooth, a compact how each germ should move;
But since, being many and changed in many modes
Along the All, they're driven abroad and vexed
By blow on blow, even from all time of old,
They thus at last, after attempting all
The kinds of motion and conjoining, come
Into those great arrangements out of which
This sum of things established is create,
By which, moreover, through the mighty years,

It is preserved, when once it has been thrown
Into the proper motions, bringing to pass
That ever the streams refresh the greedy main
With river-waves abounding, and that earth,
Lapped in warm exhalations of the sun,
Renews her broods, and that the lusty race
Of breathing creatures bears and blooms, and that
The gliding fires of ether are alive-
What still the primal germs nowise could do,
Unless from out the infinite of space
Could come supply of matter, whence in season
They're wont whatever losses to repair.
For as the nature of breathing creatures wastes,
Losing its body, when deprived of food:
So all things have to be dissolved as soon
As matter, diverted by what means soever
From off its course, shall fail to be on hand.
Nor can the blows from outward still conserve,
On every side, whatever sum of a world
Has been united in a whole. They can
Indeed, by frequent beating, check a part,
Till others arriving may fulfil the sum;
But meanwhile often are they forced to spring
Rebounding back, and, as they spring, to yield,
Unto those elements whence a world derives,
Room and a time for flight, permitting them
To be from off the massy union borne
Free and afar. Wherefore, again, again:
Needs must there come a many for supply;
And also, that the blows themselves shall be
Unfailing ever, must there ever be
An infinite force of matter all sides round.

-
And in these problems, shrink, my Memmius, far
From yielding faith to that notorious talk:
That all things inward to the centre press;
And thus the nature of the world stands firm
With never blows from outward, nor can be
Nowhere disparted- since all height and depth
Have always inward to the centre pressed
(If thou art ready to believe that aught
Itself can rest upon itself); or that
The ponderous bodies which be under earth
Do all press upwards and do come to rest
Upon the earth, in some ways upside down,

Like to those images of things we see
At present through the waters. They contend,
With like procedure, that all breathing things
Head downward roam about, and yet cannot
Tumble from earth to realms of sky below,
No more than these our bodies wing away
Spontaneously to vaults of sky above;
That, when those creatures look upon the sun,
We view the constellations of the night;
And that with us the seasons of the sky
They thus alternately divide, and thus
Do pass the night coequal to our days,
But a vain error has given these dreams to fools,
What they've embraced with reasoning perverse
For centre none can be where world is still
Boundless, nor yet, if now a centre were,
Could aught take there a fixed position more
Than for some other cause 'tmight be dislodged.
For all of room and space we call the void
Must both through centre and non-centre yield
Alike to weights where'er their motions tend.
Nor is there any place, where, when they've come,
Bodies can be at standstill in the void,
Deprived of force of weight; nor yet may void
Furnish support to any,- nay, it must,
True to its bent of nature, still give way.
Thus in such manner not all can things
Be held in union, as if overcome
By craving for a centre.

But besides,
Seeing they feign that not all bodies press
To centre inward, rather only those
Of earth and water (liquid of the sea,
And the big billows from the mountain slopes,
And whatsoever are encased, as 'twere,
In earthen body), contrariwise, they teach
How the thin air, and with it the hot fire,
Is borne asunder from the centre, and how,
For this all ether quivers with bright stars,
And the sun's flame along the blue is fed
(Because the heat, from out the centre flying,
All gathers there), and how, again, the boughs
Upon the tree-tops could not sprout their leaves,
Unless, little by little, from out the earth
For each were nutriment...

-
Lest, after the manner of the winged flames,
The ramparts of the world should flee away,
Dissolved amain throughout the mighty void,
And lest all else should likewise follow after,
Aye, lest the thundering vaults of heaven should burst
And splinter upward, and the earth forthwith
Withdraw from under our feet, and all its bulk,
Among its mingled wrecks and those of heaven,
With slipping asunder of the primal seeds,
Should pass, along the immeasurable inane,
Away forever, and, that instant, naught
Of wrack and remnant would be left, beside
The desolate space, and germs invisible.
For on whatever side thou deemest first
The primal bodies lacking, lo, that side
Will be for things the very door of death:
Wherethrough the throng of matter all will dash,
Out and abroad.

 These points, if thou wilt ponder,
Then, with but paltry trouble led along...

-
For one thing after other will grow clear,
Nor shall the blind night rob thee of the road,
To hinder thy gaze on Nature's Farthest-forth.
Thus things for things shall kindle torches new.

BOOK_2

BOOK II

BOOK_2|PROEM

PROEM

-
'Tis sweet, when, down the mighty main, the winds
Roll up its waste of waters, from the land
To watch another's labouring anguish far,
Not that we joyously delight that man
Should thus be smitten, but because 'tis sweet
To mark what evils we ourselves be spared;
'Tis sweet, again, to view the mighty strife

Of armies embattled yonder o'er the plains,
Ourselves no sharers in the peril; but naught
There is more goodly than to hold the high
Serene plateaus, well fortified by the wise,
Whence thou may'st look below on other men
And see them ev'rywhere wand'ring, all dispersed
In their lone seeking for the road of life;
Rivals in genius, or emulous in rank,
Pressing through days and nights with hugest toil
For summits of power and mastery of the world.
O wretched minds of men! O blinded hearts!
In how great perils, in what darks of life
Are spent the human years, however brief!-
O not to see that Nature for herself
Barks after nothing, save that pain keep off,
Disjoined from the body, and that mind enjoy
Delightful feeling, far from care and fear!
Therefore we see that our corporeal life
Needs little, altogether, and only such
As takes the pain away, and can besides
Strew underneath some number of delights.
More grateful 'tis at times (for Nature craves
No artifice nor luxury), if forsooth
There be no golden images of boys
Along the halls, with right hands holding out
The lamps ablaze, the lights for evening feasts,
And if the house doth glitter not with gold
Nor gleam with silver, and to the lyre resound
No fretted and gilded ceilings overhead,
Yet still to lounge with friends in the soft grass
Beside a river of water, underneath
A big tree's boughs, and merrily to refresh
Our frames, with no vast outlay- most of all
If the weather is laughing and the times of the year
Besprinkle the green of the grass around with flowers.
Nor yet the quicker will hot fevers go,
If on a pictured tapestry thou toss,
Or purple robe, than if 'tis thine to lie
Upon the poor man's bedding. Wherefore, since
Treasure, nor rank, nor glory of a reign
Avail us naught for this our body, thus
Reckon them likewise nothing for the mind:
Save then perchance, when thou beholdest forth
Thy legions swarming round the Field of Mars,
Rousing a mimic warfare- either side

Strengthened with large auxiliaries and horse,
Alike equipped with arms, alike inspired;
Or save when also thou beholdest forth
Thy fleets to swarm, deploying down the sea:
For then, by such bright circumstance abashed,
Religion pales and flees thy mind; O then
The fears of death leave heart so free of care.
But if we note how all this pomp at last
Is but a drollery and a mocking sport,
And of a truth man's dread, with cares at heels,
Dreads not these sounds of arms, these savage swords
But among kings and lords of all the world
Mingles undaunted, nor is overawed
By gleam of gold nor by the splendour bright
Of purple robe, canst thou then doubt that this
Is aught, but power of thinking?- when, besides
The whole of life but labours in the dark.
For just as children tremble and fear all
In the viewless dark, so even we at times
Dread in the light so many things that be
No whit more fearsome than what children feign,
Shuddering, will be upon them in the dark.
This terror then, this darkness of the mind,
Not sunrise with its flaring spokes of light,
Nor glittering arrows of morning can disperse,
But only Nature's aspect and her law.

BOOK_2|ATOMIC_MOTIONS
ATOMIC MOTIONS

-

Now come: I will untangle for thy steps
Now by what motions the begetting bodies
Of the world-stuff beget the varied world,
And then forever resolve it when begot,
And by what force they are constrained to this,
And what the speed appointed unto them
Wherewith to travel down the vast inane:
Do thou remember to yield thee to my words.
For truly matter coheres not, crowds not tight,
Since we behold each thing to wane away,
And we observe how all flows on and off,
As 'twere, with age-old time, and from our eyes
How eld withdraws each object at the end,
Albeit the sum is seen to bide the same,
Unharm'd, because these motes that leave each thing

Diminish what they part from, but endow
With increase those to which in turn they come,
Constraining these to wither in old age,
And those to flower at the prime (and yet
Biding not long among them). Thus the sum
Forever is replenished, and we live
As mortals by eternal give and take.
The nations wax, the nations wane away;
In a brief space the generations pass,
And like to runners hand the lamp of life
One unto other.

But if thou believe
That the primordial germs of things can stop,
And in their stopping give new motions birth,
Afar thou wanderest from the road of truth.
For since they wander through the void inane,
All the primordial germs of things must needs
Be borne along, either by weight their own,
Or haply by another's blow without.
For, when, in their incessancy so oft
They meet and clash, it comes to pass amain
They leap asunder, face to face: not strange-
Being most hard, and solid in their weights,
And naught opposing motion, from behind.
And that more clearly thou perceive how all
These mites of matter are darted round about,
Recall to mind how nowhere in the sum
Of All exists a bottom,- nowhere is
A realm of rest for primal bodies; since
(As amply shown and proved by reason sure)
Space has no bound nor measure, and extends
Unmetered forth in all directions round.
Since this stands certain, thus 'tis out of doubt
No rest is rendered to the primal bodies
Along the unfathomable inane; but rather,
Inveterately plied by motions mixed,
Some, at their jamming, bound aback and leave
Huge gaps between, and some from off the blow
Are hurried about with spaces small between.
And all which, brought together with slight gaps,
In more condensed union bound aback,
Linked by their own all intertangled shapes,-
These form the irrefragable roots of rocks
And the brute bulks of iron, and what else
Is of their kind...

The rest leap far asunder, far recoil,
Leaving huge gaps between: and these supply
For us thin air and splendour-lights of the sun.
And many besides wander the mighty void-
Cast back from unions of existing things,
Nowhere accepted in the universe,
And nowise linked in motions to the rest.
And of this fact (as I record it here)
An image, a type goes on before our eyes
Present each moment; for behold whenever
The sun's light and the rays, let in, pour down
Across dark halls of houses: thou wilt see
The many mites in many a manner mixed
Amid a void in the very light of the rays,
And battling on, as in eternal strife,
And in battalions contending without halt,
In meetings, partings, harried up and down.
From this thou mayest conjecture of what sort
The ceaseless tossing of primordial seeds
Amid the mightier void- at least so far
As small affair can for a vaster serve,
And by example put thee on the spoor
Of knowledge. For this reason too 'tis fit
Thou turn thy mind the more unto these bodies
Which here are witnessed tumbling in the light:
Namely, because such tumblings are a sign
That motions also of the primal stuff
Secret and viewless lurk beneath, behind.
For thou wilt mark here many a speck, impelled
By viewless blows, to change its little course,
And beaten backwards to return again,
Hither and thither in all directions round.
Lo, all their shifting movement is of old,
From the primeval atoms; for the same
Primordial seeds of things first move of self,
And then those bodies built of unions small
And nearest, as it were, unto the powers
Of the primeval atoms, are stirred up
By impulse of those atoms' unseen blows,
And these thereafter goad the next in size;
Thus motion ascends from the primevals on,
And stage by stage emerges to our sense,
Until those objects also move which we
Can mark in sunbeams, though it not appears
What blows do urge them.

Herein wonder not
How 'tis that, while the seeds of things are all
Moving forever, the sum yet seems to stand
Supremely still, except in cases where
A thing shows motion of its frame as whole.
For far beneath the ken of senses lies
The nature of those ultimates of the world;
And so, since those themselves thou canst not see,
Their motion also must they veil from men-
For mark, indeed, how things we can see, oft
Yet hide their motions, when afar from us
Along the distant landscape. Often thus,
Upon a hillside will the woolly flocks
Be cropping their goodly food and creeping about
Whither the summons of the grass, begemmed
With the fresh dew, is calling, and the lambs
Well filled, are frisking, locking horns in sport:
Yet all for us seem blurred and blent afar-
A glint of white at rest on a green hill.
Again, when mighty legions, marching round,
Fill all the quarters of the plains below,
Rousing a mimic warfare, there the sheen
Shoots up the sky, and all the fields about
Glitter with brass, and from beneath, a sound
Goes forth from feet of stalwart soldiery,
And mountain walls, smote by the shouting, send
The voices onward to the stars of heaven,
And hither and thither darts the cavalry,
And of a sudden down the midmost fields
Charges with onset stout enough to rock
The solid earth: and yet some post there is
Up the high mountains, viewed from which they seem
To stand- a gleam at rest along the plains.

Now what the speed to matter's atoms given
Thou mayest in few, my Memmius, learn from this:
When first the dawn is sprinkling with new light
The lands, and all the breed of birds abroad
Flit round the trackless forests, with liquid notes
Filling the regions along the mellow air,
We see 'tis forthwith manifest to man
How suddenly the risen sun is wont
At such an hour to overspread and clothe
The whole with its own splendour; but the sun's
Warm exhalations and this serene light

Travel not down an empty void; and thus
They are compelled more slowly to advance,
Whilst, as it were, they cleave the waves of air;
Nor one by one travel these particles
Of the warm exhalations, but are all
Entangled and enmassed, whereby at once
Each is restrained by each, and from without
Checked, till compelled more slowly to advance.
But the primordial atoms with their old
Simple solidity, when forth they travel
Along the empty void, all undelayed
By aught outside them there, and they, each one
Being one unit from nature of its parts,
Are borne to that one place on which they strive
Still to lay hold, must then, beyond a doubt,
Outstrip in speed, and be more swiftly borne
Than light of sun, and over regions rush,
Of space much vaster, in the self-same time
The sun's effulgence widens round the sky.

-
Nor to pursue the atoms one by one,
To see the law whereby each thing goes on.
But some men, ignorant of matter, think,
Opposing this, that not without the gods,
In such adjustment to our human ways,
Can Nature change the seasons of the years,
And bring to birth the grains and all of else
To which divine Delight, the guide of life,
Persuades mortality and leads it on,
That, through her artful blandishments of love,
It propagate the generations still,
Lest humankind should perish. When they feign
That gods have stablished all things but for man,
They seem in all ways mightily to lapse
From reason's truth: for ev'n if ne'er I knew
What seeds primordial are, yet would I dare
This to affirm, ev'n from deep judgment based
Upon the ways and conduct of the skies-
This to maintain by many a fact besides-
That in no wise the nature of the world
For us was builded by a power divine-
So great the faults it stands encumbered with:
The which, my Memmius, later on, for thee
We will clear up. Now as to what remains
Concerning motions we'll unfold our thought.

Now is the place, meseems, in these affairs
To prove for thee this too: nothing corporeal
Of its own force can e'er be upward borne,
Or upward go- nor let the bodies of flames
Deceive thee here: for they engendered are
With urge to upwards, taking thus increase,
Whereby grow upwards shining grains and trees,
Though all the weight within them downward bears.
Nor, when the fires will leap from under round
The roofs of houses, and swift flame laps up
Timber and beam, 'tis then to be supposed
They act of own accord, no force beneath
To urge them up. 'Tis thus that blood, discharged
From out our bodies, spurts its jets aloft
And spatters gore. And hast thou never marked
With what a force the water will disgorge
Timber and beam? The deeper, straight and down,
We push them in, and, many though we be,
The more we press with main and toil, the more
The water vomits up and flings them back,
That, more than half their length, they there emerge,
Rebounding. Yet we never doubt, meseems,
That all the weight within them downward bears
Through empty void. Well, in like manner, flames
Ought also to be able, when pressed out,
Through winds of air to rise aloft, even though
The weight within them strive to draw them down.
Hast thou not seen, sweeping so far and high,
The meteors, midnight flambeaus of the sky,
How after them they draw long trails of flame
Wherever Nature gives a thoroughfare?
How stars and constellations drop to earth,
Seest not? Nay, too, the sun from peak of heaven
Sheds round to every quarter its large heat,
And sows the new-ploughed intervalles with light:
Thus also sun's heat downward tends to earth.
Athwart the rain thou seest the lightning fly;
Now here, now there, bursting from out the clouds,
The fires dash zig-zag- and that flaming power
Falls likewise down to earth.

In these affairs

We wish thee also well aware of this:
The atoms, as their own weight bears them down
Plumb through the void, at scarce determined times,
In scarce determined places, from their course

Decline a little- call it, so to speak,
Mere changed trend. For were it not their wont
Thuswise to swerve, down would they fall, each one,
Like drops of rain, through the unbottomed void;
And then collisions ne'er could be nor blows
Among the primal elements; and thus
Nature would never have created aught.

-
But, if perchance be any that believe
The heavier bodies, as more swiftly borne
Plumb down the void, are able from above
To strike the lighter, thus engendering blows
Able to cause those procreant motions, far
From highways of true reason they retire.
For whatsoever through the waters fall,
Or through thin air, must their descent,
Each after its weight- on this account, because
Both bulk of water and the subtle air
By no means can retard each thing alike,
But give more quick before the heavier weight;
But contrariwise the empty void cannot,
On any side, at any time, to aught
Oppose resistance, but will ever yield,
True to its bent of nature. Wherefore all,
With equal speed, though equal not in weight,
Must rush, borne downward through the still inane.
Thus ne'er at all have heavier from above
Been swift to strike the lighter, gendering strokes
Which cause those divers motions, by whose means
Nature transacts her work. And so I say,
The atoms must a little swerve at times-
But only the least, lest we should seem to feign
Motions oblique, and fact refute us there.
For this we see forthwith is manifest:
Whatever the weight, it can't obliquely go,
Down on its headlong journey from above,
At least so far as thou canst mark; but who
Is there can mark by sense that naught can swerve
At all aside from off its road's straight line?

-
Again, if ev'r all motions are co-linked,
And from the old ever arise the new
In fixed order, and primordial seeds
Produce not by their swerving some new start
Of motion to sunder the covenants of fate,

That cause succeed not cause from everlasting,
Whence this free will for creatures o'er the lands,
Whence is it wrested from the fates,- this will
Whereby we step right forward where desire
Leads each man on, whereby the same we swerve
In motions, not as at some fixed time,
Nor at some fixed line of space, but where
The mind itself has urged? For out of doubt
In these affairs 'tis each man's will itself
That gives the start, and hence throughout our limbs
Incipient motions are diffused. Again,
Dost thou not see, when, at a point of time,
The bars are opened, how the eager strength
Of horses cannot forward break as soon
As pants their mind to do? For it behooves
That all the stock of matter, through the frame,
Be roused, in order that, through every joint,
Aroused, it press and follow mind's desire;
So thus thou seest initial motion's gendered
From out the heart, aye, verily, proceeds
First from the spirit's will, whence at the last
'Tis given forth through joints and body entire.
Quite otherwise it is, when forth we move,
Impelled by a blow of another's mighty powers
And mighty urge; for then 'tis clear enough
All matter of our total body goes,
Hurried along, against our own desire-
Until the will has pulled upon the reins
And checked it back, throughout our members all;
At whose arbitrament indeed sometimes
The stock of matter's forced to change its path,
Throughout our members and throughout our joints,
And, after being forward cast, to be
Reined up, whereat it settles back again.
So seest thou not, how, though external force
Drive men before, and often make them move,
Onward against desire, and headlong snatched,
Yet is there something in these breasts of ours
Strong to combat, strong to withstand the same?-
Wherefore no less within the primal seeds
Thou must admit, besides all blows and weight,
Some other cause of motion, whence derives
This power in us inborn, of some free act.-
Since naught from nothing can become, we see.
For weight prevents all things should come to pass

Through blows, as 'twere, by some external force;
But that man's mind itself in all it does
Hath not a fixed necessity within,
Nor is not, like a conquered thing, compelled
To bear and suffer,- this state comes to man
From that slight swerovement of the elements
In no fixed line of space, in no fixed time.
Nor ever was the stock of stuff more crammed,
Nor ever, again, sundered by bigger gaps:
For naught gives increase and naught takes away;
On which account, just as they move to-day,
The elemental bodies moved of old
And shall the same hereafter evermore.
And what was wont to be begot of old
Shall be begotten under selfsame terms
And grow and thrive in power, so far as given
To each by Nature's changeless, old decrees.
The sum of things there is no power can change,
For naught exists outside, to which can flee
Out of the world matter of any kind,
Nor forth from which a fresh supply can spring,
Break in upon the founded world, and change
Whole nature of things, and turn their motions about.

BOOK_2|ATOMIC_FORMS
ATOMIC FORMS AND THEIR
COMBINATIONS

-
Now come, and next hereafter apprehend
What sorts, how vastly different in form,
How varied in multitudinous shapes they are-
These old beginnings of the universe;
Not in the sense that only few are furnished
With one like form, but rather not at all
In general have they likeness each with each,
No marvel: since the stock of them's so great
That there's no end (as I have taught) nor sum,
They must indeed not one and all be marked
By equal outline and by shape the same.

-
Moreover, humankind, and the mute flocks
Of scaly creatures swimming in the streams,
And joyous herds around, and all the wild,
And all the breeds of birds- both those that teem
In gladsome regions of the water-haunts,

About the river-banks and springs and pools,
And those that throng, flitting from tree to tree,
Through trackless woods- Go, take which one thou wilt,
In any kind: thou wilt discover still
Each from the other still unlike in shape.
Nor in no other wise could offspring know
Mother, nor mother offspring- which we see
They yet can do, distinguished one from other,
No less than human beings, by clear signs.
Thus oft before fair temples of the gods,
Beside the incense-burning altars slain,
Drops down the yearling calf, from out its breast
Breathing warm streams of blood; the orphaned mother,
Ranging meanwhile green woodland pastures round,
Knows well the footprints, pressed by cloven hoofs,
With eyes regarding every spot about,
For sight somewhere of youngling gone from her;
And, stopping short, filleth the leafy lanes
With her complaints; and oft she seeks again
Within the stall, pierced by her yearning still.
Nor tender willows, nor dew-quicken'd grass,
Nor the loved streams that glide along low banks,
Can lure her mind and turn the sudden pain;
Nor other shapes of calves that graze thereby
Distract her mind or lighten pain the least-
So keen her search for something known and hers.
Moreover, tender kids with bleating throats
Do know their horned dams, and butting lambs
The flocks of sheep, and thus they patter on,
Unfailingly each to its proper teat,
As Nature intends. Lastly, with any grain,
Thou'lt see that no one kernel in one kind
Is so far like another, that there still
Is not in shapes some difference running through.
By a like law we see how earth is pied
With shells and conchs, where, with soft waves, the sea
Beats on the thirsty sands of curving shores.
Wherefore again, again, since seeds of things
Exist by nature, nor were wrought with hands
After a fixed pattern of one other,
They needs must flitter to and fro with shapes
In types dissimilar to one another.

-
Easy enough by thought of mind to solve
Why fires of lightning more can penetrate

Than these of ours from pitch-pine born on earth.
For thou canst say lightning's celestial fire,
So subtle, is formed of figures finer far,
And passes thus through holes which this our fire,
Born from the wood, created from the pine,
Cannot. Again, light passes through the horn
On the lantern's side, while rain is dashed away.
And why?- unless those bodies of light should be
Finer than those of water's genial showers.
We see how quickly through a colander
The wines will flow; how, on the other hand,
The sluggish olive-oil delays: no doubt,
Because 'tis wrought of elements more large,
Or else more crook'd and intertangled. Thus
It comes that the primordials cannot be
So suddenly sundered one from other, and seep,
One through each several hole of anything.

-
And note, besides, that liquor of honey or milk
Yields in the mouth agreeable taste to tongue,
Whilst nauseous wormwood, pungent centaury,
With their foul flavour set the lips awry;
Thus simple 'tis to see that whatsoever
Can touch the senses pleasingly are made
Of smooth and rounded elements, whilst those
Which seem the bitter and the sharp, are held
Entwined by elements more crook'd, and so
Are wont to tear their ways into our senses,
And rend our body as they enter in.
In short all good to sense, all bad to touch,
Being up-built of figures so unlike,
Are mutually at strife- lest thou suppose
That the shrill rasping of a squeaking saw
Consists of elements as smooth as song
Which, waked by nimble fingers, on the strings
The sweet musicians fashion; or suppose
That same-shaped atoms through men's nostrils pierce
When foul cadavers burn, as when the stage
Is with Cilician saffron sprinkled fresh,
And the altar near exhales Panchaean scent;
Or hold as of like seed the goodly hues
Of things which feast our eyes, as those which sting
Against the smarting pupil and draw tears,
Or show, with gruesome aspect, grim and vile.
For never a shape which charms our sense was made

Without some elemental smoothness; whilst
Whate'er is harsh and irksome has been framed
Still with some roughness in its elements.
Some, too, there are which justly are supposed
To be nor smooth nor altogether hooked,
With bended barbs, but slightly angled-out,
To tickle rather than to wound the sense-
And of which sort is the salt tartar of wine
And flavours of the gummed elecampane.
Again, that glowing fire and icy rime
Are fanged with teeth unlike whereby to sting
Our body's sense, the touch of each gives proof.
For touch- by sacred majesties of gods!-
Touch is indeed the body's only sense-
Be't that something in-from-outward works,
Be't that something in the body born
Wounds, or delighteth as it passes out
Along the procreant paths of Aphrodite;
Or be't the seeds by some collision whirl
Disordered in the body and confound
By tumult and confusion all the sense-
As thou mayst find, if haply with the hand
Thyself thou strike thy body's any part.
On which account, the elemental forms
Must differ widely, as enabled thus
To cause diverse sensations.

And, again,

What seems to us the hardened and condensed
Must be of atoms among themselves more hooked,
Be held compacted deep within, as 'twere
By branch-like atoms- of which sort the chief
Are diamond stones, despisers of all blows,
And stalwart flint and strength of solid iron,
And brazen bars, which, budging hard in locks,
Do grate and scream. But what are liquid, formed
Of fluid body, they indeed must be
Of elements more smooth and round- because
Their globules severally will not cohere:
To suck the poppy-seeds from palm of hand
Is quite as easy as drinking water down,
And they, once struck, roll like unto the same.
But that thou seest among the things that flow
Some bitter, as the brine of ocean is,
Is not the least a marvel...
For since 'tis fluid, smooth its atoms are

And round, with painful rough ones mixed therein;
Yet need not these be held together hooked:
In fact, though rough, they're globular besides,
Able at once to roll, and rasp the sense.
And that the more thou mayst believe me here,
That with smooth elements are mixed the rough
(Whence Neptune's salt astringent body comes),
There is a means to separate the twain,
And thereupon dividedly to see
How the sweet water, after filtering through
So often underground, flows freshened forth
Into some hollow; for it leaves above
The primal germs of nauseating brine,
Since cling the rough more readily in earth.
Lastly, whatso thou markest to disperse
Upon the instant- smoke, and cloud, and flame-
Must not (even though not all of smooth and round)
Be yet co-linked with atoms intertwined,
That thus they can, without together cleaving,
So pierce our body and so bore the rocks.
Whatever we see...
Given to senses, that thou must perceive
They're not from linked but pointed elements.

The which now having taught, I will go on
To bind thereto a fact to this allied
And drawing from this its proof: these primal germs
Vary, yet only with finite tale of shapes.
For were these shapes quite infinite, some seeds
Would have a body of infinite increase.
For in one seed, in one small frame of any,
The shapes can't vary from one another much.
Assume, we'll say, that of three minim parts
Consist the primal bodies, or add a few:
When, now, by placing all these parts of one
At top and bottom, changing lefts and rights,
Thou hast with every kind of shift found out
What the aspect of shape of its whole body
Each new arrangement gives, for what remains,
If thou percase wouldst vary its old shapes,
New parts must then be added; 'twill follow next,
If thou percase wouldst vary still its shapes,
That by like logic each arrangement still
Requires its increment of other parts.
Ergo, an augmentation of its frame

Follows upon each novelty of forms.
Wherefore, it cannot be thou'lt undertake
That seeds have infinite differences in form,
Lest thus thou forcest some indeed to be
Of an immeasurable immensity-
Which I have taught above cannot be proved.

-
And now for thee barbaric robes, and gleam
Of Meliboean purple, touched with dye
Of the Thessalian shell...
The peacock's golden generations, stained
With spotted gaities, would lie o'erthrown
By some new colour of new things more bright;
The odour of myrrh and savours of honey despised;
The swan's old lyric, and Apollo's hymns,
Once modulated on the many chords,
Would likewise sink o'er mastered and be mute:
For, lo, a somewhat, finer than the rest,
Would be arising evermore. So, too,
Into some baser part might all retire,
Even as we said to better might they come:
For, lo, a somewhat, loathlier than the rest
To nostrils, ears, and eyes, and taste of tongue,
Would then, by reasoning reversed, be there.
Since 'tis not so, but unto things are given
Their fixed limitations which do bound
Their sum on either side, 't must be confessed
That matter, too, by finite tale of shapes
Does differ. Again, from earth's midsummer heats
Unto the icy hoar-frosts of the year
The forward path is fixed, and by like law
O'ertravelled backwards at the dawn of spring.
For each degree of heat, and each of cold,
And the half-warm, all filling up the sum
In due progression, lie, my Memmius, there
Betwixt the two extremes: the things create
Must differ, therefore, by a finite change,
Since at each end marked off they ever are
By fixed point- on one side plagued by flames
And on the other by congealing frosts.

-
The which now having taught, I will go on
To bind thereto a fact to this allied
And drawing from this its proof: those primal germs
Which have been fashioned all of one like shape

Are infinite in tale; for, since the forms
Themselves are finite in divergences,
Then those which are alike will have to be
Infinite, else the sum of stuff remains
A finite- what I've proved is not the fact,
Showing in verse how corpuscles of stuff,
From everlasting and to-day the same,
Uphold the sum of things, all sides around
By old succession of unending blows.
For though thou view'st some beasts to be more rare,
And mark'st in them a less prolific stock,
Yet in another region, in lands remote,
That kind abounding may make up the count;
Even as we mark among the four-foot kind
Snake-handed elephants, whose thousands wall
With ivory ramparts India about,
That her interiors cannot entered be-
So big her count of brutes of which we see
Such few examples. Or suppose, besides,
We feign some thing, one of its kind and sole
With body born, to which is nothing like
In all the lands: yet now unless shall be
An infinite count of matter out of which
Thus to conceive and bring it forth to life,
It cannot be created and- what's more-
It cannot take its food and get increase.
Yea, if through all the world in finite tale
Be tossed the procreant bodies of one thing,
Whence, then, and where in what mode, by what power,
Shall they to meeting come together there,
In such vast ocean of matter and tumult strange?-
No means they have of joining into one.
But, just as, after mighty shipwrecks piled,
The mighty main is wont to scatter wide
The rowers' banks, the ribs, the yards, the prow,
The masts and swimming oars, so that afar
Along all shores of lands are seen afloat
The carven fragments of the rended poop,
Giving a lesson to mortality
To shun the ambush of the faithless main,
The violence and the guile, and trust it not
At any hour, however much may smile
The crafty enticements of the placid deep:
Exactly thus, if once thou holdest true
That certain seeds are finite in their tale,

Whence, also, rivers, fronds, and gladsome pastures
Can she supply for mountain-roaming beasts.
Wherefore great mother of gods, and mother of beasts,
And parent of man hath she alone been named.
Her hymned the old and learned bards of Greece

-
Seated in chariot o'er the realms of air
To drive her team of lions, teaching thus
That the great earth hangs poised and cannot lie
Resting on other earth. Unto her car
They've yoked the wild beasts, since a progeny,
However savage, must be tamed and chid
By care of parents. They have girt about
With turret-crown the summit of her head,
Since, fortified in her goodly strongholds high,
'Tis she sustains the cities; now, adorned
With that same token, to-day is carried forth,
With solemn awe through many a mighty land,
The image of that mother, the divine.
Her the wide nations, after antique rite,
Do name Idaean Mother, giving her
Escort of Phrygian bands, since first, they say,
From out those regions 'twas that grain began
Through all the world. To her do they assign
The Galli, the emasculate, since thus
They wish to show that men who violate
The majesty of the mother and have proved
Ingrate to parents are to be adjudged
Unfit to give unto the shores of light
A living progeny. The Galli come:
And hollow cymbals, tight-skinned tambourines
Resound around to bangings of their hands;
The fierce horns threaten with a raucous bray;
The tubed pipe excites their maddened minds
In Phrygian measures; they bear before them knives,
Wild emblems of their frenzy, which have power
The rabble's ingrate heads and impious hearts
To panic with terror of the goddess' might.
And so, when through the mighty cities borne,
She blesses man with salutations mute,
They strew the highway of her journeyings
With coin of brass and silver, gifting her
With alms and largesse, and shower her and shade
With flowers of roses falling like the snow
Upon the Mother and her companion-bands.

Here is an armed troop, the which by Greeks
Are called the Phrygian Curetes. Since
Haply among themselves they use to play
In games of arms and leap in measure round
With bloody mirth and by their nodding shake
The terrorizing crests upon their heads,
This is the armed troop that represents
The arm'd Dictaeon Curetes, who, in Crete,
As runs the story, whilom did out-drown
That infant cry of Zeus, what time their band,
Young boys, in a swift dance around the boy,
To measured step beat with the brass on brass,
That Saturn might not get him for his jaws,
And give its mother an eternal wound
Along her heart. And it is on this account
That armed they escort the mighty Mother,
Or else because they signify by this
That she, the goddess, teaches men to be
Eager with armed valour to defend
Their motherland, and ready to stand forth,
The guard and glory of their parents' years.
A tale, however beautifully wrought,
That's wide of reason by a long remove:
For all the gods must of themselves enjoy
Immortal aeons and supreme repose,
Withdrawn from our affairs, detached, afar:
Immune from peril and immune from pain,
Themselves abounding in riches of their own,
Needing not us, they are not touched by wrath
They are not taken by service or by gift.
Truly is earth insensate for all time;
But, by obtaining germs of many things,
In many a way she brings the many forth
Into the light of sun. And here, whoso
Decides to call the ocean Neptune, or
The grain-crop Ceres, and prefers to abuse
The name of Bacchus rather than pronounce
The liquor's proper designation, him
Let us permit to go on calling earth
Mother of Gods, if only he will spare
To taint his soul with foul religion.

-
So, too, the woolly flocks, and horned kine,
And brood of battle-eager horses, grazing
Often together along one grassy plain,

Under the cope of one blue sky, and slaking
From out one stream of water each its thirst,
All live their lives with face and form unlike,
Keeping the parents' nature, parents' habits,
Which, kind by kind, through ages they repeat.
So great in any sort of herb thou wilt,
So great again in any river of earth
Are the distinct diversities of matter.
Hence, further, every creature- any one
From out them all- compounded is the same
Of bones, blood, veins, heat, moisture, flesh, and thews-
All differing vastly in their forms, and built
Of elements dissimilar in shape.
Again, all things by fire consumed ablaze,
Within their frame lay up, if naught besides,
At least those atoms whence derives their power
To throw forth fire and send out light from under,
To shoot the sparks and scatter embers wide.
If, with like reasoning of mind, all else
Thou traverse through, thou wilt discover thus
That in their frame the seeds of many things
They hide, and divers shapes of seeds contain.
Further, thou markest much, to which are given
Along together colour and flavour and smell,
Among which, chief, are most burnt offerings.

-
Thus must they be of divers shapes composed.
A smell of scorching enters in our frame
Where the bright colour from the dye goes not;
And colour in one way, flavour in quite another
Works inward to our senses- so mayst see
They differ too in elemental shapes.
Thus unlike forms into one mass combine,
And things exist by intermixed seed.

-
But still 't must not be thought that in all ways
All things can be conjoined; for then wouldest view
Portents begot about thee every side:
Hulks of mankind half brute astarting up,
At times big branches sprouting from man's trunk,
Limbs of a sea-beast to a land-beast knit,
And Nature along the all-producing earth
Feeding those dire Chimaeras breathing flame
From hideous jaws- Of which 'tis simple fact
That none have been begot; because we see

All are from fixed seed and fixed dam
Engendered and so function as to keep
Throughout their growth their own ancestral type.
This happens surely by a fixed law:
For from all food-stuff, when once eaten down,
Go sundered atoms, suited to each creature,
Throughout their bodies, and, conjoining there,
Produce the proper motions; but we see
How, contrariwise, Nature upon the ground
Throws off those foreign to their frame; and many
With viewless bodies from their bodies fly,
By blows impelled- those impotent to join
To any part, or, when inside, to accord
And to take on the vital motions there.
But think not, haply, living forms alone
Are bound by these laws: they distinguished all.

-
For just as all things of creation are,
In their whole nature, each to each unlike,
So must their atoms be in shape unlike-
Not since few only are fashioned of like form,
But since they all, as general rule, are not
The same as all. Nay, here in these our verses,
Elements many, common to many words,
Thou seest, though yet 'tis needful to confess
The words and verses differ, each from each,
Compounded out of different elements-
Not since few only, as common letters, run
Through all the words, or no two words are made,
One and the other, from all like elements,
But since they all, as general rule, are not
The same as all. Thus, too, in other things,
Whilst many germs common to many things
There are, yet they, combined among themselves,
Can form new who to others quite unlike.
Thus fairly one may say that humankind,
The grains, the gladsome trees, are all made up
Of different atoms. Further, since the seeds
Are different, difference must there also be
In intervening spaces, thoroughfares,
Connections, weights, blows, clashings, motions, all
Which not alone distinguish living forms,
But sunder earth's whole ocean from the lands,
And hold all heaven from the lands away.

BOOK_2|ABSENCE_OF_2ND_QUALITIES
ABSENCE OF SECONDARY QUALITIES

-

Now come, this wisdom by my sweet toil sought
Look thou perceive, lest haply thou shouldst guess
That the white objects shining to thine eyes
Are gendered of white atoms, or the black
Of a black seed; or yet believe that aught
That's steeped in any hue should take its dye
From bits of matter tinct with hue the same.
For matter's bodies own no hue the least-
Or like to objects or, again, unlike.
But, if perchance it seem to thee that mind
Itself can dart no influence of its own
Into these bodies, wide thou wand'rest off.
For since the blind-born, who have ne'er surveyed
The light of sun, yet recognise by touch
Things that from birth had ne'er a hue for them,
'Tis thine to know that bodies can be brought
No less unto the ken of our minds too,
Though yet those bodies with no dye be smeared.
Again, ourselves whatever in the dark
We touch, the same we do not find to be
Tinctured with any colour.

Now that here

I win the argument, I next will teach

-

Now, every colour changes, none except,
And every...
Which the primordials ought nowise to do.
Since an immutable somewhat must remain,
Lest all things utterly be brought to naught.
For change of anything from out its bounds
Means instant death of that which was before.
Wherefore be mindful not to stain with colour
The seeds of things, lest things return for thee
All utterly to naught.

But now, if seeds

Receive no property of colour, and yet
Be still endowed with variable forms
From which all kinds of colours they beget
And vary (by reason that ever it matters much
With, what seeds, and in what positions joined,
And what the motions that they give and get),
Forthwith most easily thou mayst devise

Why what was black of hue an hour ago
Can of a sudden like the marble gleam,-
As ocean, when the high winds have upheaved
Its level plains, is changed to hoary waves
Of marble whiteness: for, thou mayst declare,
That, when the thing we often see as black
Is in its matter then commixed anew,
Some atoms rearranged, and some withdrawn,
And added some, 'tis seen forthwith to turn
Glowing and white. But if of azure seeds
Consist the level waters of the deep,
They could in nowise whiten: for however
Thou shakest azure seeds, the same can never
Pass into marble hue. But, if the seeds-
Which thus produce the ocean's one pure sheen-
Be now with one hue, now another dyed,
As oft from alien forms and divers shapes
A cube's produced all uniform in shape,
'Twould be but natural, even as in the cube
We see the forms to be dissimilar,
That thus we'd see in brightness of the deep
(Or in whatever one pure sheen thou wilt)
Colours diverse and all dissimilar.
Besides, the unlike shapes don't thwart the least
The whole in being externally a cube;
But differing hues of things do block and keep
The whole from being of one resultant hue.
Then, too, the reason which entices us
At times to attribute colours to the seeds
Falls quite to pieces, since white things are not
Create from white things, nor are black from black,
But evermore they are create from things
Of divers colours. Verily, the white
Will rise more readily, is sooner born
Out of no colour, than of black or aught
Which stands in hostile opposition thus.

Besides, since colours cannot be, sans light,
And the primordials come not forth to light,
'Tis thine to know they are not clothed with colour-
Truly, what kind of colour could there be
In the viewless dark? Nay, in the light itself
A colour changes, gleaming variedly,
When smote by vertical or slanting ray.
Thus in the sunlight shows the down of doves

That circles, garlanding, the nape and throat:
Now it is ruddy with a bright gold-bronze,
Now, by a strange sensation it becomes
Green-emerald blended with the coral-red.
The peacock's tail, filled with the copious light,
Changes its colours likewise, when it turns.
Wherefore, since by some blow of light begot,
Without such blow these colours can't become.

-
And since the pupil of the eye receives
Within itself one kind of blow, when said
To feel a white hue, then another kind,
When feeling a black or any other hue,
And since it matters nothing with what hue
The things thou touchest be perchance endowed,
But rather with what sort of shape equipped,
'Tis thine to know the atoms need not colour,
But render forth sensations, as of touch,
That vary with their varied forms.

Besides,

Since special shapes have not a special colour,
And all formations of the primal germs
Can be of any sheen thou wilt, why, then,
Are not those objects which are of them made
Suffused, each kind with colours of every kind?
For then 'twere meet that ravens, as they fly,
Should dartle from white pinions a white sheen,
Or swans turn black from seed of black, or be
Of any single varied dye thou wilt.

-
Again, the more an object's rent to bits,
The more thou see its colour fade away
Little by little till 'tis quite extinct;
As happens when the gaudy linen's picked
Shred after shred away: the purple there,
Phoenician red, most brilliant of all dyes,
Is lost asunder, ravelled thread by thread;
Hence canst perceive the fragments die away
From out their colour, long ere they depart
Back to the old primordials of things.
And, last, since thou concedest not all bodies
Send out a voice or smell, it happens thus
That not to all thou givest sounds and smells.
So, too, since we behold not all with eyes,
'Tis thine to know some things there are as much

Orphaned of colour, as others without smell,
And reft of sound; and those the mind alert
No less can apprehend than it can mark
The things that lack some other qualities.

But think not haply that the primal bodies
Remain despoiled alone of colour: so,
Are they from warmth dissevered and from cold
And from hot exhalations; and they move,
Both sterile of sound and dry of juice; and throw
Not any odour from their proper bodies.
Just as, when undertaking to prepare
A liquid balm of myrrh and marjoram,
And flower of nard, which to our nostrils breathes
Odour of nectar, first of all behooves
Thou seek, as far as find thou may and can,
The inodorous olive-oil (which never sends
One whiff of scent to nostrils), that it may
The least debauch and ruin with sharp tang
The odorous essence with its body mixed
And in it seethed. And on the same account
The primal germs of things must not be thought
To furnish colour in begetting things,
Nor sound, since pow'rless they to send forth aught
From out themselves, nor any flavour, too,
Nor cold, nor exhalation hot or warm.

The rest; yet since these things are mortal all-
The pliant mortal, with a body soft;
The brittle mortal, with a crumbling frame;
The hollow with a porous-all must be
Disjoined from the primal elements,
If still we wish under the world to lay
Immortal ground-works, whereupon may rest
The sum of weal and safety, lest for thee
All things return to nothing utterly.

Now, too: whate'er we see possessing sense
Must yet confessedly be stablished all
From elements insensate. And those signs,
So clear to all and witnessed out of hand,
Do not refute this dictum nor oppose;
But rather themselves do lead us by the hand,
Compelling belief that living things are born
Of elements insensate, as I say.
Sooth, we may see from out the stinking dung

Live worms spring up, when, after soaking rains,
The drenched earth rots; and all things change the same:
Lo, change the rivers, the fronds, the gladsome pastures
Into the cattle, the cattle their nature change
Into our bodies, and from our body, oft
Grow strong the powers and bodies of wild beasts
And mighty-winged birds. Thus Nature changes
All foods to living frames, and procreates
From them the senses of live creatures all,
In manner about as she uncoils in flames
Dry logs of wood and turns them all to fire.
And seest not, therefore, how it matters much
After what order are set the primal germs,
And with what other germs they all are mixed,
And what the motions that they give and get?

-
But now, what is't that strikes thy sceptic mind,
Constraining thee to sundry arguments
Against belief that from insensate germs
The sensible is gendered?- Verily,
'Tis this: that liquids, earth, and wood, though mixed,
Are yet unable to gender vital sense.
And, therefore, 'twill be well in these affairs
This to remember: that I have not said
Senses are born, under conditions all,
From all things absolutely which create
Objects that feel; but much it matters here
Firstly, how small the seeds which thus compose
The feeling thing, then, with what shapes endowed,
And lastly what they in positions be,
In motions, in arrangements. Of which facts
Naught we perceive in logs of wood and clods;
And yet even these, when sodden by the rains,
Give birth to wormy grubs, because the bodies
Of matter, from their old arrangements stirred
By the new factor, then combine anew
In such a way as genders living things.

-
Next, they who deem that feeling objects can
From feeling objects be create, and these,
In turn, from others that are wont to feel

-
When soft they make them; for all sense is linked
With flesh, and thews, and veins- and such, we see,
Are fashioned soft and of a mortal frame.

Yet be't that these can last forever on:
They'll have the sense that's proper to a part,
Or else be judged to have a sense the same
As that within live creatures as a whole.
But of themselves those parts can never feel,
For all the sense in every member back
To something else refers- a severed hand,
Or any other member of our frame,
Itself alone cannot support sensation.
It thus remains they must resemble, then,
Live creatures as a whole, to have the power
Of feeling sensation concordant in each part
With the vital sense; and so they're bound to feel
The things we feel exactly as do we.
If such the case, how, then, can they be named
The primal germs of things, and how avoid
The highways of destruction?- since they be
Mere living things and living things be all
One and the same with mortal. Grant they could,
Yet by their meetings and their unions all,
Naught would result, indeed, besides a throng
And hurly-burly all of living things-
Precisely as men, and cattle, and wild beasts,
By mere conglomeration each with each
Can still beget not anything of new.
But if by chance they lose, inside a body,
Their own sense and another sense take on,
What, then, avails it to assign them that
Which is withdrawn thereafter? And besides,
To touch on proof that we pronounced before,
Just as we see the eggs of feathered fowls
To change to living chicks, and swarming worms
To bubble forth when from the soaking rains
The earth is sodden, sure, sensations all
Can out of non-sensations be begot.

-
But if one say that sense can so far rise
From non-sense by mutation, or because
Brought forth as by a certain sort of birth,
'Twill serve to render plain to him and prove
There is no birth, unless there be before
Some formed union of the elements,
Nor any change, unless they be unite.

-
In first place, senses can't in body be

Before its living nature's been begot,-
Since all its stuff, in faith, is held dispersed
About through rivers, air, and earth, and all
That is from earth created, nor has met
In combination, and, in proper mode,
Conjoined into those vital motions which
Kindle the all-perceiving senses- they
That keep and guard each living thing soever.

-
Again, a blow beyond its nature's strength
Shatters forthwith each living thing soe'er,
And on it goes confounding all the sense
Of body and mind. For of the primal germs
Are loosed their old arrangements, and, throughout,
The vital motions blocked,- until the stuff,
Shaken profoundly through the frame entire,
Undoes the vital knots of soul from body
And throws that soul, to outward wide-dispersed,
Through all the pores. For what may we surmise
A blow inflicted can achieve besides
Shaking asunder and loosening all apart?
It happens also, when less sharp the blow,
The vital motions which are left are wont
Oft to win out- win out, and stop and still
The uncouth tumults gendered by the blow,
And call each part to its own courses back,
And shake away the motion of death which now
Begins its own dominion in the body,
And kindle anew the senses almost gone.
For by what other means could they the more
Collect their powers of thought and turn again
From very doorways of destruction
Back unto life, rather than pass whereto
They be already well-nigh sped and so
Pass quite away?

Again, since pain is there
Where bodies of matter, by some force stirred up,
Through vitals and through joints, within their seats
Quiver and quake inside, but soft delight,
When they remove unto their place again:
'Tis thine to know the primal germs can be
Assaulted by no pain, nor from themselves
Take no delight; because indeed they are
Not made of any bodies of first things,
Under whose strange new motions they might ache

Or pluck the fruit of any dear new sweet.
And so they must be furnished with no sense.

-

Once more, if thus, that every living thing
May have sensation, needful 'tis to assign
Sense also to its elements, what then
Of those fixed elements from which mankind
Hath been, by their peculiar virtue, formed?
Of verity, they'll laugh aloud, like men,
Shaken asunder by a spasm of mirth,
Or sprinkle with dewy tear-drops cheeks and chins,
And have the cunning hardihood to say
Much on the composition of the world,
And in their turn inquire what elements
They have themselves,- since, thus the same in kind
As a whole mortal creature, even they
Must also be from other elements,
And then those others from others evermore-
So that thou darest nowhere make a stop.
Oho, I'll follow thee until thou grant
The seed (which here thou say'st speaks, laughs, and thinks)
Is yet derived out of other seeds
Which in their turn are doing just the same.
But if we see what raving nonsense this,
And that a man may laugh, though not, forsooth,
Compounded out of laughing elements,
And think and utter reason with learn'd speech,
Though not himself compounded, for a fact,
Of sapient seeds and eloquent, why, then,
Cannot those things which we perceive to have
Their own sensation be composed as well
Of intermixed seeds quite void of sense?

BOOK_2|INFINITE_WORLDDS
INFINITE WORLDS

-

Once more, we all from seed celestial spring,
To all is that same father, from whom earth,
The fostering mother, as she takes the drops
Of liquid moisture, pregnant bears her broods-
The shining grains, and gladsome shrubs and trees,
And bears the human race and of the wild
The generations all, the while she yields
The foods wherewith all feed their frames and lead
The genial life and propagate their kind;

Wherefore she owneth that maternal name,
By old desert. What was before from earth,
The same in earth sinks back, and what was sent
From shores of ether, that, returning home,
The vaults of sky receive. Nor thus doth death
So far annihilate things that she destroys
The bodies of matter; but she dissipates
Their combinations, and conjoins anew
One element with others; and contrives
That all things vary forms and change their colours
And get sensations and straight give them o'er.
And thus may'st know it matters with what others
And in what structure the primordial germs
Are held together, and what motions they
Among themselves do give and get; nor think
That aught we see hither and thither afloat
Upon the crest of things, and now a birth
And straightway now a ruin, inheres at rest
Deep in the eternal atoms of the world.

Why, even in these our very verses here
It matters much with what and in what order
Each element is set: the same denote
Sky, and the ocean, lands, and streams, and sun;
The same, the grains, and trees, and living things.
And if not all alike, at least the most-
But what distinctions by positions wrought!
And thus no less in things themselves, when once
Around are changed the intervals between,
The paths of matter, its connections, weights,
Blows, clashings, motions, order, structure, shapes,
The things themselves must likewise changed be.

Now to true reason give thy mind for us.
Since here strange truth is putting forth its might
To hit thee in thine ears, a new aspect
Of things to show its front. Yet naught there is
So easy that it standeth not at first
More hard to credit than it after is;
And naught so'er that's great to such degree,
Nor wonderful so far, but all mankind
Little by little abandon their surprise.
Look upward yonder at the bright clear sky
And what it holds- the stars that wander o'er,
The moon, the radiance of the splendour-sun:
Yet all, if now they first for mortals were,

Such congregations of matter elsewhere,
Like this our world which vasty ether holds
In huge embrace.

Besides, when matter abundant
Is ready there, when space on hand, nor object
Nor any cause retards, no marvel 'tis
That things are carried on and made complete,
Perforce. And now, if store of seeds there is
So great that not whole life-times of the living
Can count the tale...

And if their force and nature abide the same,
Able to throw the seeds of things together
Into their places, even as here are thrown
The seeds together in this world of ours,
'Tmust be confessed in other realms there are
Still other worlds, still other breeds of men,
And other generations of the wild.

Hence too it happens in the sum there is
No one thing single of its kind in birth,
And single and sole in growth, but rather it is
One member of some generated race,
Among full many others of like kind.
First, cast thy mind abroad upon the living:
Thou'lt find the race of mountain-ranging wild
Even thus to be, and thus the scions of men
To be begot, and lastly the mute flocks
Of scaled fish, and winged frames of birds.
Wherefore confess we must on grounds the same
That earth, sun, moon, and ocean, and all else,
Exist not sole and single- rather in number
Exceeding number. Since that deeply set
Old boundary stone of life remains for them
No less, and theirs a body of mortal birth
No less, than every kind which hereon earth
Is so abundant in its members found.

Which well perceived if thou hold in mind,
Then Nature, delivered from every haughty lord,
And forthwith free, is seen to do all things
Herself and through herself of own accord,
Rid of all gods. For- by their holy hearts
Which pass in long tranquillity of peace
Untroubled ages and a serene life!-
Who hath the power (I ask), who hath the power
To rule the sum of the immeasurable,
To hold with steady hand the giant reins

Of the unfathomed deep? Who hath the power
At once to rule a multitude of skies,
At once to heat with fires ethereal all
The fruitful lands of multitudes of worlds,
To be at all times in all places near,
To stablish darkness by his clouds, to shake
The serene spaces of the sky with sound,
And hurl his lightnings, - ha, and whelm how oft
In ruins his own temples, and to rave,
Retiring to the wildernesses, there
At practice with that thunderbolt of his,
Which yet how often shoots the guilty by,
And slays the honourable blameless ones!

-
Ere since the birth-time of the world, ere since
The risen first-born day of sea, earth, sun,
Have many germs been added from outside,
Have many seeds been added round about,
Which the great All, the while it flung them on,
Brought hither, that from them the sea and lands
Could grow more big, and that the house of heaven
Might get more room and raise its lofty roofs
Far over earth, and air arise around.
For bodies all, from out all regions, are
Divided by blows, each to its proper thing,
And all retire to their own proper kinds:
The moist to moist retires; earth gets increase
From earthy body; and fires, as on a forge,
Beat out new fire; and ether forges ether;
Till Nature, author and ender of the world,
Hath led all things to extreme bound of growth:
As haps when that which hath been poured inside
The vital veins of life is now no more
Than that which ebbs within them and runs off.
This is the point where life for each thing ends;
This is the point where Nature with her powers
Curbs all increase. For whatsoever thou seest
Grow big with glad increase, and step by step
Climb upward to ripe age, these to themselves
Take in more bodies than they send from selves,
Whilst still the food is easily infused
Through all the veins, and whilst the things are not
So far expanded that they cast away
Such numerous atoms as to cause a waste
Greater than nutriment whereby they wax.

For 't must be granted, truly, that from things
Many a body ebbeth and runs off;
But yet still more must come, until the things
Have touched development's top pinnacle;
Then old age breaks their powers and ripe strength
And falls away into a worsen part.
For ever the ampler and more wide a thing,
As soon as ever its augmentation ends,
It scatters abroad forthwith to all sides round
More bodies, sending them from out itself.
Nor easily now is food disseminate
Through all its veins; nor is that food enough
To equal with a new supply on hand
Those plenteous exhalations it gives off.
Thus, fairly, all things perish, when with ebbing
They're made less dense and when from blows without
They are laid low; since food at last will fail
Extremest eld, and bodies from outside
Cease not with thumping to undo a thing
And overmaster by infesting blows.

Thus, too, the ramparts of the mighty world
On all sides round shall taken be by storm,
And tumble to wrack and shivered fragments down.
For food it is must keep things whole, renewing;
'Tis food must prop and give support to all,-
But to no purpose, since nor veins suffice
To hold enough, nor nature ministers
As much as needful. And even now 'tis thus:
Its age is broken and the earth, outworn
With many parturations, scarce creates
The little lives- she who created erst
All generations and gave forth at birth
Enormous bodies of wild beasts of old.
For never, I fancy, did a golden cord
From off the firmament above let down
The mortal generations to the fields;
Nor sea, nor breakers pounding on the rocks
Created them; but earth it was who bore-
The same today who feeds them from herself.
Besides, herself of own accord, she first
The shining grains and vineyards of all joy
Created for mortality; herself
Gave the sweet fruitage and the pastures glad,
Which now to-day yet scarcely wax in size,
Even when aided by our toiling arms.

We break the ox, and wear away the strength
Of sturdy farm-hands; iron tools to-day
Barely avail for tilling of the fields,
So niggardly they grudge our harvestings,
So much increase our labour. Now to-day
The aged ploughman, shaking of his head,
Sighs o'er and o'er that labours of his hands
Have fallen out in vain, and, as he thinks
How present times are not as times of old,
Often he praises the fortunes of his sire,
And crackles, prating, how the ancient race,
Fulfilled with piety, supported life
With simple comfort in a narrow plot,
Since, man for man, the measure of each field
Was smaller far i' the old days. And, again,
The gloomy planter of the withered vine
Rails at the season's change and wearies heaven,
Nor grasps that all of things by sure degrees
Are wasting away and going to the tomb,
Outworn by venerable length of life.

BOOK_3

BOOK III

BOOK_3|PROEM

PROEM

-

O thou who first uplifted in such dark
So clear a torch aloft, who first shed light
Upon the profitable ends of man,
O thee I follow, glory of the Greeks,
And set my footsteps squarely planted now
Even in the impress and the marks of thine-
Less like one eager to dispute the palm,
More as one craving out of very love
That I may copy thee!- for how should swallow
Contend with swans or what compare could be
In a race between young kids with tumbling legs
And the strong might of the horse? Our father thou,
And finder-out of truth, and thou to us

Suppliest a father's precepts; and from out
Those scriven leaves of thine, renowned soul
(Like bees that sip of all in flowery wolds),
We feed upon thy golden sayings all-
Golden, and ever worthiest endless life.
For soon as ever thy planning thought that sprang
From god-like mind begins its loud proclaim
Of nature's courses, terrors of the brain
Asunder flee, the ramparts of the world
Dispart away, and through the void entire
I see the movements of the universe.
Rises to vision the majesty of gods,
And their abodes of everlasting calm
Which neither wind may shake nor rain-cloud splash,
Nor snow, congealed by sharp frosts, may harm
With its white downfall: ever, unclouded sky
O'er roofs, and laughs with far-diffused light.
And nature gives to them their all, nor aught
May ever pluck their peace of mind away.
But nowhere to my vision rise no more
The vaults of Acheron, though the broad earth
Bars me no more from gazing down o'er all
Which under our feet is going on below
Along the void. O, here in these affairs
Some new divine delight and trembling awe
Takes hold through me, that thus by power of thine
Nature, so plain and manifest at last,
Hath been on every side laid bare to man!

-
And since I've taught already of what sort
The seeds of all things are, and how, distinct
In divers forms, they flit of own accord,
Stirred with a motion everlasting on,
And in what mode things be from them create,
Now, after such matters, should my verse, meseems,
Make clear the nature of the mind and soul,
And drive that dread of Acheron without,
Headlong, which so confounds our human life
Unto its deeps, pouring o'er all that is
The black of death, nor leaves not anything
To prosper- a liquid and unsullied joy.
For as to what men sometimes will affirm:
That more than Tartarus (the realm of death)
They fear diseases and a life of shame,
And know the substance of the soul is blood,

Or rather wind (if haply thus their whim),
And so need naught of this our science, then
Thou well may'st note from what's to follow now
That more for glory do they braggart forth
Than for belief. For mark these very same:
Exiles from country, fugitives afar
From sight of men, with charges foul attaint,
Abased with every wretchedness, they yet
Live, and where'er the wretches come, they yet
Make the ancestral sacrifices there,
Butcher the black sheep, and to gods below
Offer the honours, and in bitter case
Turn much more keenly to religion.
Wherefore, it's surer testing of a man
In doubtful perils- mark him as he is
Amid adversities; for then alone
Are the true voices conjured from his breast,
The mask off-stripped, reality behind.
And greed, again, and the blind lust of honours
Which force poor wretches past the bounds of law,
And, oft allies and ministers of crime,
To push through nights and days of the hugest toil
To rise untrammelled to the peaks of power-
These wounds of life in no mean part are kept
Festering and open by this fright of death.
For ever we see fierce Want and foul Disgrace
Dislodged afar from secure life and sweet,
Like huddling Shapes before the doors of death.
And whilst, from these, men wish to scape afar,
Driven by false terror, and afar remove,
With civic blood a fortune they amass,
They double their riches, greedy, heapers-up
Of corpse on corpse they have a cruel laugh
For the sad burial of a brother-born,
And hatred and fear of tables of their kin.
Likewise, through this same terror, envy oft
Makes them to peak because before their eyes
That man is lordly, that man gazed upon
Who walks begirt with honour glorious,
Whilst they in filth and darkness roll around;
Some perish away for statues and a name,
And oft to that degree, from fright of death,
Will hate of living and beholding light
Take hold on humankind that they inflict
Their own destruction with a gloomy heart-

Forgetful that this fear is font of cares,
 This fear the plague upon their sense of shame,
 And this that breaks the ties of comradry
 And oversets all reverence and faith,
 Mid direst slaughter. For long ere to-day
 Often were traitors to country and dear parents
 Through quest to shun the realms of Acheron.
 For just as children tremble and fear all
 In the viewless dark, so even we at times
 Dread in the light so many things that be
 No whit more fearsome than what children feign,
 Shuddering, will be upon them in the dark.
 This terror, then, this darkness of the mind,
 Not sunrise with its flaring spokes of light,
 Nor glittering arrows of morning sun disperse,
 But only Nature's aspect and her law.

BOOK_3|NATURE_AND_MIND
 NATURE AND COMPOSITION
 OF THE MIND

-

First, then, I say, the mind which oft we call
 The intellect, wherein is seated life's
 Counsel and regimen, is part no less
 Of man than hand and foot and eyes are parts
 Of one whole breathing creature. But some hold
 That sense of mind is in no fixed part seated,
 But is of body some one vital state,-
 Named "harmony" by Greeks, because thereby
 We live with sense, though intellect be not
 In any part: as oft the body is said
 To have good health (when health, however, 's not
 One part of him who has it), so they place
 The sense of mind in no fixed part of man.
 Mightily, diversly, meseems they err.
 Often the body palpable and seen
 Sickens, while yet in some invisible part
 We feel a pleasure; oft the other way,
 A miserable in mind feels pleasure still
 Throughout his body- quite the same as when
 A foot may pain without a pain in head.
 Besides, when these our limbs are given o'er
 To gentle sleep and lies the burdened frame
 At random void of sense, a something else
 Is yet within us, which upon that time

Bestirs itself in many a wise, receiving
All motions of joy and phantom cares of heart.
Now, for to see that in man's members dwells
Also the soul, and body ne'er is wont
To feel sensation by a "harmony"
Take this in chief: the fact that life remains
Oft in our limbs, when much of body's gone;
Yet that same life, when particles of heat,
Though few, have scattered been, and through the mouth
Air has been given forth abroad, forthwith
Forever deserts the veins, and leaves the bones.
Thus mayst thou know that not all particles
Perform like parts, nor in like manner all
Are props of weal and safety: rather those-
The seeds of wind and exhalations warm-
Take care that in our members life remains.
Therefore a vital heat and wind there is
Within the very body, which at death
Deserts our frames. And so, since nature of mind
And even of soul is found to be, as 'twere,
A part of man, give over "harmony"-
Name to musicians brought from Helicon,-
Unless themselves they filched it otherwise,
To serve for what was lacking name till then.
Whate'er it be, they're welcome to it- thou,
Hearken my other maxims.

Mind and soul,

I say, are held conjoined one with other,
And form one single nature of themselves;
But chief and regnant through the frame entire
Is still that counsel which we call the mind,
And that cleaves seated in the midmost breast.
Here leap dismay and terror; round these haunts
Be blandishments of joys; and therefore here
The intellect, the mind. The rest of soul,
Throughout the body scattered, but obeys-
Moved by the nod and motion of the mind.
This, for itself, sole through itself, hath thought;
This for itself hath mirth, even when the thing
That moves it, moves nor soul nor body at all.
And as, when head or eye in us is smit
By assailing pain, we are not tortured then
Through all the body, so the mind alone
Is sometimes smitten, or livens with a joy,
Whilst yet the soul's remainder through the limbs

And through the frame is stirred by nothing new.
But when the mind is moved by shock more fierce,
We mark the whole soul suffering all at once
Along man's members: sweats and pallors spread
Over the body, and the tongue is broken,
And fails the voice away, and ring the ears,
Mists blind the eyeballs, and the joints collapse,-
Aye, men drop dead from terror of the mind.
Hence, whoso will can readily remark
That soul conjoined is with mind, and, when
'Tis strook by influence of the mind, forthwith
In turn it hits and drives the body too.

And this same argument establisheth
That nature of mind and soul corporeal is:
For when 'tis seen to drive the members on,
To snatch from sleep the body, and to change
The countenance, and the whole state of man
To rule and turn,- what yet could never be
Sans contact, and sans body contact fails-
Must we not grant that mind and soul consist
Of a corporeal nature?- And besides
Thou markst that likewise with this body of ours
Suffers the mind and with our body feels.
If the dire speed of spear that cleaves the bones
And bares the inner thews hits not the life,
Yet follows a fainting and a foul collapse,
And, on the ground, dazed tumult in the mind,
And whiles a wavering will to rise afoot.
So nature of mind must be corporeal, since
From stroke and spear corporeal 'tis in throes.

Now, of what body, what components formed
Is this same mind I will go on to tell.
First, I aver, 'tis superfine, composed
Of tiniest particles- that such the fact
Thou canst perceive, if thou attend, from this:
Nothing is seen to happen with such speed
As what the mind proposes and begins;
Therefore the same bestirs itself more swiftly
Than aught whose nature's palpable to eyes.
But what's so agile must of seeds consist
Most round, most tiny, that they may be moved,
When hit by impulse slight. So water moves,
In waves along, at impulse just the least-
Being create of little shapes that roll;

But, contrariwise, the quality of honey
More stable is, its liquids more inert,
More tardy its flow; for all its stock of matter
Cleaves more together, since, indeed, 'tis made
Of atoms not so smooth, so fine, and round.
For the light breeze that hovers yet can blow
High heaps of poppy-seed away for thee
Downward from off the top; but, contrariwise,
A pile of stones or spiny ears of wheat
It can't at all. Thus, in so far as bodies
Are small and smooth, is their mobility;
But, contrariwise, the heavier and more rough,
The more immovable they prove. Now, then,
Since nature of mind is movable so much,
Consist it must of seeds exceeding small
And smooth and round. Which fact once known to thee,
Good friend, will serve thee opportune in else.
This also shows the nature of the same,
How nice its texture, in how small a space
'Twould go, if once compacted as a pellet:
When death's unvexed repose gets hold on man
And mind and soul retire, thou markest there
From the whole body nothing ta'en in form,
Nothing in weight. Death grants ye everything,
But vital sense and exhalation hot.
Thus soul entire must be of smallest seeds,
Twined through the veins, the vitals, and the thews,
Seeing that, when 'tis from whole body gone,
The outward figuration of the limbs
Is unimpaired and weight fails not a whit.
Just so, when vanished the bouquet of wine,
Or when an unguent's perfume delicate
Into the winds away departs, or when
From any body savour's gone, yet still
The thing itself seems minished naught to eyes,
Thereby, nor aught abstracted from its weight-
No marvel, because seeds many and minute
Produce the savours and the redolence
In the whole body of the things. And so,
Again, again, nature of mind and soul
'Tis thine to know created is of seeds
The tiniest ever, since at flying-forth
It beareth nothing of the weight away.
Yet fancy not its nature simple so.
For an impalpable aura, mixed with heat,

Deserts the dying, and heat draws off the air;
And heat there's none, unless commixed with air:
For, since the nature of all heat is rare,
Athrough it many seeds of air must move.
Thus nature of mind is triple; yet those all
Suffice not for creating sense- since mind
Accepteth not that aught of these can cause
Sense-bearing motions, and much less the thoughts
A man revolves in mind. So unto these
Must added be a somewhat, and a fourth;
That somewhat's altogether void of name;
Than which existeth naught more mobile, naught
More an impalpable, of elements
More small and smooth and round. That first transmits
Sense-bearing motions through the frame, for that
Is roused the first, composed of little shapes;
Thence heat and viewless force of wind take up
The motions, and thence air, and thence all things
Are put in motion; the blood is strook, and then
The vitals all begin to feel, and last
To bones and marrow the sensation comes-
Pleasure or torment. Nor will pain for naught
Enter so far, nor a sharp ill seep through,
But all things be perturbed to that degree
That room for life will fail, and parts of soul
Will scatter through the body's every pore.
Yet as a rule, almost upon the skin
These motion all are stopped, and this is why
We have the power to retain our life.

Now in my eagerness to tell thee how
They are commixed, through what unions fit
They function so, my country's pauper-speech
Constrains me sadly. As I can, however,
I'll touch some points and pass. In such a wise
Course these primordials 'mongst one another
With intermotions that no one can be
From other sundered, nor its agency
Perform, if once divided by a space;
Like many powers in one body they work.
As in the flesh of any creature still
Is odour and savour and a certain warmth,
And yet from an of these one bulk of body
Is made complete, so, viewless force of wind
And warmth and air, commingled, do create

One nature, by that mobile energy
Assisted which from out itself to them
Imparts initial motion, whereby first
Sense-bearing motion along the vitals springs.
For lurks this essence far and deep and under,
Nor in our body is aught more shut from view,
And 'tis the very soul of all the soul.
And as within our members and whole frame
The energy of mind and power of soul
Is mixed and latent, since create it is
Of bodies small and few, so lurks this fourth,
This essence void of name, composed of small,
And seems the very soul of all the soul,
And holds dominion o'er the body all.
And by like reason wind and air and heat
Must function so, commingled through the frame,
And now the one subside and now another
In interchange of dominance, that thus
From all of them one nature be produced,
Lest heat and wind apart, and air apart,
Make sense to perish, by disseverment.
There is indeed in mind that heat it gets
When seething in rage, and flashes from the eyes
More swiftly fire; there is, again, that wind,
Much, and so cold, companion of all dread,
Which rouses the shudder in the shaken frame;
There is no less that state of air composed,
Making the tranquil breast, the serene face.
But more of hot have they whose restive hearts,
Whose minds of passion quickly seethe in rage-
Of which kind chief are fierce abounding lions,
Who often with roaring burst the breast o'erwrought,
Unable to hold the surging wrath within;
But the cold mind of stags has more of wind,
And speedier through their inwards rouses up
The icy currents which make their members quake.
But more the oxen live by tranquil air,
Nor e'er doth smoky torch of wrath applied,
O'erspreading with shadows of a darkling murk,
Rouse them too far; nor will they stiffen stark,
Pierced through by icy javelins of fear;
But have their place half-way between the two-
Stags and fierce lions. Thus the race of men:
Though training make them equally refined,
It leaves those pristine vestiges behind

Of each mind's nature. Nor may we suppose
Evil can e'er be rooted up so far
That one man's not more given to fits of wrath,
Another's not more quickly touched by fear,
A third not more long-suffering than he should.
And needs must differ in many things besides
The varied natures and resulting habits
Of humankind- of which not now can I
Expound the hidden causes, nor find names
Enough for all the divers shapes of those
Primordials whence this variation springs.
But this meseems I'm able to declare:
Those vestiges of natures left behind
Which reason cannot quite expel from us
Are still so slight that naught prevents a man
From living a life even worthy of the gods.

-
So then this soul is kept by all the body,
Itself the body's guard, and source of weal;
For they with common roots cleave each to each,
Nor can be torn asunder without death.
Not easy 'tis from lumps of frankincense
To tear their fragrance forth, without its nature
Perishing likewise: so, not easy 'tis
From all the body nature of mind and soul
To draw away, without the whole dissolved.
With seeds so intertwined even from birth,
They're dowered conjointly with a partner-life;
No energy of body or mind, apart,
Each of itself without the other's power,
Can have sensation; but our sense, enkindled
Along the vitals, to flame is blown by both
With mutual motions. Besides the body alone
Is nor begot nor grows, nor after death
Seen to endure. For not as water at times
Gives off the alien heat, nor is thereby
Itself destroyed, but unimpaired remains-
Not thus, I say, can the deserted frame
Bear the dissevering of its joined soul,
But, rent and ruined, moulders all away.
Thus the joint contact of the body and soul
Learns from their earliest age the vital motions,
Even when still buried in the mother's womb;
So no dissevering can hap to them,
Without their bane and ill. And thence mayst see

That, as conjoined is their source of weal,
Conjoined also must their nature be.

-
If one, moreover, denies that body feel,
And holds that soul, through all the body mixed,
Takes on this motion which we title "sense"
He battles in vain indubitable facts:
For who'll explain what body's feeling is,
Except by what the public fact itself
Has given and taught us? "But when soul is parted,
Body's without all sense." True!- loses what
Was even in its life-time not its own;
And much beside it loses, when soul's driven
Forth from that life-time. Or, to say that eyes
Themselves can see no thing, but through the same
The mind looks forth, as out of opened doors,
Is- a hard saying; since the feel in eyes
Says the reverse. For this itself draws on
And forces into the pupils of our eyes
Our consciousness. And note the case when often
We lack the power to see refulgent things,
Because our eyes are hampered by their light-
With a mere doorway this would happen not;
For, since it is our very selves that see,
No open portals undertake the toil.
Besides, if eyes of ours but act as doors,
Methinks that, were our sight removed, the mind
Ought then still better to behold a thing-
When even the door-posts have been cleared away.

-
Herein in these affairs nowise take up
What honoured sage, Democritus, lays down-
That proposition, that primordials
Of body and mind, each super-posed on each,
Vary alternately and interweave
The fabric of our members. For not only
Are the soul-elements smaller far than those
Which this our body and inward parts compose,
But also are they in their number less,
And scattered sparsely through our frame. And thus
This canst thou guarantee: soul's primal germs
Maintain between them intervals as large
At least as are the smallest bodies, which,
When thrown against us, in our body rouse
Sense-bearing motions. Hence it comes that we

Sometimes don't feel alighting on our frames
The clinging dust, or chalk that settles soft;
Nor mists of night, nor spider's gossamer
We feel against us, when, upon our road,
Its net entangles us, nor on our head
The dropping of its withered garmentings;
Nor bird-feathers, nor vegetable down,
Flying about, so light they barely fall;
Nor feel the steps of every crawling thing,
Nor each of all those footprints on our skin
Of midges and the like. To that degree
Must many primal germs be stirred in us
Ere once the seeds of soul that through our frame
Are intermingled 'gin to feel that those
Primordials of the body have been strook,
And ere, in pounding with such gaps between,
They clash, combine and leap apart in turn.
But mind is more the keeper of the gates,
Hath more dominion over life than soul.
For without intellect and mind there's not
One part of soul can rest within our frame
Least part of time; companioning, it goes
With mind into the winds away, and leaves
The icy members in the cold of death.
But he whose mind and intellect abide
Himself abides in life. However much
The trunk be mangled, with the limbs lopped off,
The soul withdrawn and taken from the limbs,
Still lives the trunk and draws the vital air.
Even when deprived of all but all the soul,
Yet will it linger on and cleave to life,-
Just as the power of vision still is strong,
If but the pupil shall abide unharmed,
Even when the eye around it's sorely rent-
Provided only thou destroyest not
Wholly the ball, but, cutting round the pupil,
Leavest that pupil by itself behind-
For more would ruin sight. But if that centre,
That tiny part of eye, be eaten through,
Forthwith the vision fails and darkness comes,
Though in all else the unblemished ball be clear.
'Tis by like compact that the soul and mind
Are each to other bound forevermore.

THE SOUL IS MORTAL

-
Now come: that thou mayst able be to know
That minds and the light souls of all that live
Have mortal birth and death, I will go on
Verses to build meet for thy rule of life,
Sought after long, discovered with sweet toil.
But under one name I'd have thee yoke them both;
And when, for instance, I shall speak of soul,
Teaching the same to be but mortal, think
Thereby I'm speaking also of the mind-
Since both are one, a substance interjoined.

-
First, then, since I have taught how soul exists
A subtle fabric, of particles minute,
Made up from atoms smaller much than those
Of water's liquid damp, or fog, or smoke,
So in mobility it far excels,
More prone to move, though strook by lighter cause
Even moved by images of smoke or fog-
As where we view, when in our sleeps we're lulled,
The altars exhaling steam and smoke aloft-
For, beyond doubt, these apparitions come
To us from outward. Now, then, since thou seest,
Their liquids depart, their waters flow away,
When jars are shivered, and since fog and smoke
Depart into the winds away, believe
The soul no less is shed abroad and dies
More quickly far, more quickly is dissolved
Back to its primal bodies, when withdrawn
From out man's members it has gone away.
For, sure, if body (container of the same
Like as a jar), when shivered from some cause,
And rarefied by loss of blood from veins,
Cannot for longer hold the soul, how then
Thinkst thou it can be held by any air-
A stuff much rarer than our bodies be?

-
Besides we feel that mind to being comes
Along with body, with body grows and ages.
For just as children totter round about
With frames infirm and tender, so there follows
A weakling wisdom in their minds; and then,
Where years have ripened into robust powers,
Counsel is also greater, more increased

The power of mind; thereafter, where already
The body's shattered by master-powers of eld,
And fallen the frame with its enfeebled powers,
Thought hobbles, tongue wanders, and the mind gives way;
All fails, all's lacking at the selfsame time.
Therefore it suits that even the soul's dissolved,
Like smoke, into the lofty winds of air;
Since we behold the same to being come
Along with body and grow, and, as I've taught,
Crumble and crack, therewith outworn by eld.

-
Then, too, we see, that, just as body takes
Monstrous diseases and the dreadful pain,
So mind its bitter cares, the grief, the fear;
Wherefore it tallies that the mind no less
Partaker is of death; for pain and disease
Are both artificers of death,- as well
We've learned by the passing of many a man ere now.
Nay, too, in diseases of body, often the mind
Wanders afield; for 'tis beside itself,
And crazed it speaks, or many a time it sinks,
With eyelids closing and a drooping nod,
In heavy drowse, on to eternal sleep;
From whence nor hears it any voices more,
Nor able is to know the faces here
Of those about him standing with wet cheeks
Who vainly call him back to light and life.
Wherefore mind too, confess we must, dissolves,
Seeing, indeed, contagions of disease
Enter into the same. Again, O why,
When the strong wine has entered into man,
And its diffused fire gone round the veins,
Why follows then a heaviness of limbs,
A tangle of the legs as round he reels,
A stuttering tongue, an intellect besoaked,
Eyes all aswim, and hiccups, shouts, and brawls
And whatso else is of that ilk?- Why this?-
If not that violent and impetuous wine
Is wont to confound the soul within the body?
But whatso can confounded be and balked,
Gives proof, that if a hardier cause got in,
'Twould hap that it would perish then, bereaved
Of any life thereafter. And, moreover,
Often will some one in a sudden fit,
As if by stroke of lightning, tumble down

Before our eyes, and sputter foam, and grunt,
Blither, and twist about with sinews taut,
Gasp up in starts, and weary out his limbs
With tossing round. No marvel, since distract
Through frame by violence of disease.

-
Confounds, he foams, as if to vomit soul,
As on the salt sea boil the billows round
Under the master might of winds. And now
A groan's forced out, because his limbs are griped
But, in the main, because the seeds of voice
Are driven forth and carried in a mass
Outwards by mouth, where they are wont to go,
And have a builded highway. He becomes
Mere fool, since energy of mind and soul
Confounded is, and, as I've shown, to-riven,
Asunder thrown, and torn to pieces all
By the same venom. But, again, where cause
Of that disease has faced about, and back
Retreats sharp poison of corrupted frame
Into its shadowy lairs, the man at first
Arises reeling, and gradually comes back
To all his senses and recovers soul.
Thus, since within the body itself of man
The mind and soul are by such great diseases
Shaken, so miserably in labour distraught,
Why, then, believe that in the open air,
Without a body, they can pass their life,
Immortal, battling with the master winds?
And, since we mark the mind itself is cured,
Like the sick body, and restored can be
By medicine, this is forewarning to
That mortal lives the mind. For proper it is
That whosoe'er begins and undertakes
To alter the mind, or meditates to change
Any another nature soever, should add
New parts, or readjust the order given,
Or from the sum remove at least a bit.
But what's immortal willeth for itself
Its parts be nor increased, nor rearranged,
Nor any bit soever flow away:
For change of anything from out its bounds
Means instant death of that which was before.
Ergo, the mind, whether in sickness fallen,
Or by the medicine restored, gives signs,

As I have taught, of its mortality.
So surely will a fact of truth make head
'Gainst errors' theories all, and so shut off
All refuge from the adversary, and rout
Error by two-edged confutation.

-
And since the mind is of a man one part,
Which in one fixed place remains, like ears,
And eyes, and every sense which pilots life;
And just as hand, or eye, or nose, apart,
Severed from us, can neither feel nor be,
But in the least of time is left to rot,
Thus mind alone can never be, without
The body and the man himself, which seems,
As 'twere the vessel of the same- or aught
Whate'er thou'lt feign as yet more closely joined:
Since body cleaves to mind by surest bonds.

-
Again, the body's and the mind's live powers
Only in union prosper and enjoy;
For neither can nature of mind, alone of itself
Sans body, give the vital motions forth;
Nor, then, can body, wanting soul, endure
And use the senses. Verily, as the eye,
Alone, up-rended from its roots, apart
From all the body, can peer about at naught,
So soul and mind it seems are nothing able,
When by themselves. No marvel, because, commixed
Through veins and inwards, and through bones and thews,
Their elements primordial are confined
By all the body, and own no power free
To bound around through interspaces big,
Thus, shut within these confines, they take on
Motions of sense, which, after death, thrown out
Beyond the body to the winds of air,
Take on they cannot- and on this account,
Because no more in such a way confined.
For air will be a body, be alive,
If in that air the soul can keep itself,
And in that air enclose those motions all
Which in the thews and in the body itself
A while ago 'twas making. So for this,
Again, again, I say confess we must,
That, when the body's wrappings are unwound,
And when the vital breath is forced without,

The soul, the senses of the mind dissolve,-
Since for the twain the cause and ground of life
Is in the fact of their conjoined estate.

Once more, since body's unable to sustain
Division from the soul, without decay
And obscene stench, how canst thou doubt but that
The soul, uprisen from the body's deeps,
Has filtered away, wide-drifted like a smoke,
Or that the changed body crumbling fell
With ruin so entire, because, indeed,
Its deep foundations have been moved from place,
The soul out-filtering even through the frame,
And through the body's every winding way
And orifice? And so by many means
Thou'rt free to learn that nature of the soul
Hath passed in fragments out along the frame,
And that 'twas shivered in the very body
Ere ever it slipped abroad and swam away
Into the winds of air. For never a man
Dying appears to feel the soul go forth
As one sure whole from all his body at once,
Nor first come up the throat and into mouth;
But feels it failing in a certain spot,
Even as he knows the senses too dissolve
Each in its own location in the frame.
But were this mind of ours immortal mind,
Dying 'twould scarce bewail a dissolution,
But rather the going, the leaving of its coat,
Like to a snake. Wherefore, when once the body
Hath passed away, admit we must that soul,
Shivered in all that body, perished too.
Nay, even when moving in the bounds of life,
Often the soul, now tottering from some cause,
Craves to go out, and from the frame entire
Loosened to be; the countenance becomes
Flaccid, as if the supreme hour were there;
And flabbily collapse the members all
Against the bloodless trunk- the kind of case
We see when we remark in common phrase,
"That man's quite gone," or "fainted dead away";
And where there's now a bustle of alarm,
And all are eager to get some hold upon
The man's last link of life. For then the mind
And all the power of soul are shook so sore,

And these so totter along with all the frame,
That any cause a little stronger might
Dissolve them altogether.- Why, then, doubt
That soul, when once without the body thrust,
There in the open, an enfeebled thing,
Its wrappings stripped away, cannot endure
Not only through no everlasting age,
But even, indeed, through not the least of time?

-
Then, too, why never is the intellect,
The counselling mind, begotten in the head,
The feet, the hands, instead of cleaving still
To one sole seat, to one fixed haunt, the breast,
If not that fixed places be assigned
For each thing's birth, where each, when 'tis create,
Is able to endure, and that our frames
Have such complex adjustments that no shift
In order of our members may appear?
To that degree effect succeeds to cause,
Nor is the flame once wont to be create
In flowing streams, nor cold begot in fire.

Besides, if nature of soul immortal be,
And able to feel, when from our frame disjoined,
The same, I fancy, must be thought to be
Endowed with senses five,- nor is there way
But this whereby to image to ourselves
How under-souls may roam in Acheron.
Thus painters and the elder race of bards
Have pictured souls with senses so endowed.
But neither eyes, nor nose, nor hand, alone
Apart from body can exist for soul,
Nor tongue nor ears apart. And hence indeed
Alone by self they can nor feel nor be.

-
And since we mark the vital sense to be
In the whole body, all one living thing,
If of a sudden a force with rapid stroke
Should slice it down the middle and cleave in twain,
Beyond a doubt likewise the soul itself,
Divided, dissevered, asunder will be flung
Along with body. But what severed is
And into sundry parts divides, indeed
Admits it owns no everlasting nature.
We hear how chariots of war, areek
With hurly slaughter, lop with flashing scythes

The limbs away so suddenly that there,
Fallen from the trunk, they quiver on the earth,
The while the mind and powers of the man
Can feel no pain, for swiftness of his hurt,
And sheer abandon in the zest of battle:
With the remainder of his frame he seeks
Anew the battle and the slaughter, nor marks
How the swift wheels and scythes of ravin have dragged
Off with the horses his left arm and shield;
Nor other how his right has dropped away,
Mounting again and on. A third attempts
With leg dismembered to arise and stand,
Whilst, on the ground hard by, the dying foot
Twitches its spreading toes. And even the head,
When from the warm and living trunk lopped off,
Keeps on the ground the vital countenance
And open eyes, until 't has rendered up
All remnants of the soul. Nay, once again:
If, when a serpent's darting forth its tongue,
And lashing its tail, thou gettest chance to hew
With axe its length of trunk to many parts,
Thou'lt see each severed fragment writhing round
With its fresh wound, and spattering up the sod,
And there the fore-part seeking with the jaws
After the hinder, with bite to stop the pain.
So shall we say that these be souls entire
In all those fractions?- but from that 'twould follow
One creature'd have in body many souls.
Therefore, the soul, which was indeed but one,
Has been divided with the body too:
Each is but mortal, since alike is each
Hewn into many parts. Again, how often
We view our fellow going by degrees,
And losing limb by limb the vital sense;
First nails and fingers of the feet turn blue,
Next die the feet and legs, then o'er the rest
Slow crawl the certain footsteps of cold death.
And since this nature of the soul is torn,
Nor mounts away, as at one time, entire,
We needs must hold it mortal. But perchance
If thou supposest that the soul itself
Can inward draw along the frame, and bring
Its parts together to one place, and so
From all the members draw the sense away,
Why, then, that place in which such stock of soul

Collected is, should greater seem in sense.
But since such place is nowhere, for a fact,
As said before, 'tis rent and scattered forth,
And so goes under. Or again, if now
I please to grant the false, and say that soul
Can thus be lumped within the frames of those
Who leave the sunshine, dying bit by bit,
Still must the soul as mortal be confessed;
Nor aught it matters whether to wrack it go,
Dispersed in the winds, or, gathered in a mass
From all its parts, sink down to brutish death,
Since more and more in every region sense
Fails the whole man, and less and less of life
In every region lingers.

And besides,
If soul immortal is, and winds its way
Into the body at the birth of man,
Why can we not remember something, then,
Of life-time spent before? why keep we not
Some footprints of the things we did of, old?
But if so changed hath been the power of mind,
That every recollection of things done
Is fallen away, at no o'erlong remove
Is that, I trow, from what we mean by death.
Wherefore 'tis sure that what hath been before
Hath died, and what now is is now create.

Moreover, if after the body hath been built
Our mind's live powers are wont to be put in,
Just at the moment that we come to birth,
And cross the sills of life, 'twould scarcely fit
For them to live as if they seemed to grow
Along with limbs and frame, even in the blood,
But rather as in a cavern all alone.
(Yet all the body duly throngs with sense.)
But public fact declares against all this:
For soul is so entwined through the veins,
The flesh, the thews, the bones, that even the teeth
Share in sensation, as proven by dull ache,
By twinge from icy water, or grating crunch
Upon a stone that got in mouth with bread.
Wherefore, again, again, souls must be thought
Nor void of birth, nor free from law of death;
Nor, if, from outward, in they wound their way,
Could they be thought as able so to cleave
To these our frames, nor, since so interwove,

Appears it that they're able to go forth
Unhurt and whole and loose themselves unscathed
From all the thews, articulations, bones.
But, if perchance thou thinkest that the soul,
From outward winding in its way, is wont
To seep and soak along these members ours,
Then all the more 'twill perish, being thus
With body fused- for what will seep and soak
Will be dissolved and will therefore die.
For just as food, dispersed through all the pores
Of body, and passed through limbs and all the frame,
Perishes, supplying from itself the stuff
For other nature, thus the soul and mind,
Though whole and new into a body going,
Are yet, by seeping in, dissolved away,
Whilst, as through pores, to all the frame there pass
Those particles from which created is
This nature of mind, now ruler of our body,
Born from that soul which perished, when divided
Along the frame. Wherefore it seems that soul
Hath both a natal and funeral hour.

Besides are seeds of soul there left behind
In the breathless body, or not? If there they are,
It cannot justly be immortal deemed,
Since, shorn of some parts lost, 'thas gone away:
But if, borne off with members uncorrupt,
'Thas fled so absolutely all away
It leaves not one remainder of itself
Behind in body, whence do cadavers, then,
From out their putrid flesh exhale the worms,
And whence does such a mass of living things,
Boneless and bloodless, o'er the bloated frame
Bubble and swarm? But if perchance thou thinkest
That souls from outward into worms can wind,
And each into a separate body come,
And reckonest not why many thousand souls
Collect where only one has gone away,
Here is a point, in sooth, that seems to need
Inquiry and a putting to the test:
Whether the souls go on a hunt for seeds
Of worms wherewith to build their dwelling places,
Or enter bodies ready-made, as 'twere.
But why themselves they thus should do and toil
'Tis hard to say, since, being free of body,
They flit around, harassed by no disease,

Nor cold nor famine; for the body labours
By more of kinship to these flaws of life,
And mind by contact with that body suffers
So many ills. But grant it be for them
However useful to construct a body
To which to enter in, 'tis plain they can't.
Then, souls for self no frames nor bodies make,
Nor is there how they once might enter in
To bodies ready-made- for they cannot
Be nicely interwoven with the same,
And there'll be formed no interplay of sense
Common to each.

Again, why is't there goes
Impetuous rage with lion's breed morose,
And cunning with foxes, and to deer why given
The ancestral fear and tendency to flee,
And why in short do all the rest of traits
Engender from the very start of life
In the members and mentality, if not
Because one certain power of mind that came
From its own seed and breed waxes the same
Along with all the body? But were mind
Immortal, were it wont to change its bodies,
How topsy-turvy would earth's creatures act!
The Hyrcan hound would flee the onset oft
Of antlered stag, the scurrying hawk would quake
Along the winds of air at the coming dove,
And men would dote, and savage beasts be wise;
For false the reasoning of those that say
Immortal mind is changed by change of body-
For what is changed dissolves, and therefore dies.
For parts are re-disposed and leave their order;
Wherefore they must be also capable
Of dissolution through the frame at last,
That they along with body perish all.
But should some say that always souls of men
Go into human bodies, I will ask:
How can a wise become a dullard soul?
And why is never a child's a prudent soul?
And the mare's filly why not trained so well
As sturdy strength of steed? We may be sure
They'll take their refuge in the thought that mind
Becomes a weakling in a weakling frame.
Yet be this so, 'tis needful to confess
The soul but mortal, since, so altered now

Throughout the frame, it loses the life and sense
It had before. Or how can mind wax strong
Co-equally with body and attain
The craved flower of life, unless it be
The body's colleague in its origins?
Or what's the purport of its going forth
From aged limbs?- fears it, perhaps, to stay,
Pent in a crumbled body? Or lest its house,
Outworn by venerable length of days,
May topple down upon it? But indeed
For an immortal, perils are there none.

-
Again, at parturitions of the wild
And at the rites of Love, that souls should stand
Ready hard by seems ludicrous enough-
Immortals waiting for their mortal limbs
In numbers innumerable, contending madly
Which shall be first and chief to enter in!-
Unless perchance among the souls there be
Such treaties stablished that the first to come
Flying along, shall enter in the first,
And that they make no rivalries of strength!

-
Again, in ether can't exist a tree,
Nor clouds in ocean deeps, nor in the fields
Can fishes live, nor blood in timber be,
Nor sap in boulders: fixed and arranged
Where everything may grow and have its place.
Thus nature of mind cannot arise alone
Without the body, nor exist afar
From thews and blood. But if 'twere possible,
Much rather might this very power of mind
Be in the head, the shoulders or the heels,
And, born in any part soever, yet
In the same man, in the same vessel abide.
But since within this body even of ours
Stands fixed and appears arranged sure
Where soul and mind can each exist and grow,
Deny we must the more that they can have
Duration and birth, wholly outside the frame.
For, verily, the mortal to conjoin
With the eternal, and to feign they feel
Together, and can function each with each,
Is but to dote: for what can be conceived
Of more unlike, discrepant, ill-assorted,

Than something mortal in a union joined
With an immortal and a secular
To bear the outrageous tempests?

Then, again,

Whatever abides eternal must indeed
Either repel all strokes, because 'tis made
Of solid body, and permit no entrance
Of aught with power to sunder from within
The parts compact- as are those seeds of stuff
Whose nature we've exhibited before;
Or else be able to endure through time
For this: because they are from blows exempt,
As is the void, the which abides untouched,
Unsmitten by any stroke; or else because
There is no room around, whereto things can,
As 'twere, depart in dissolution all,-
Even as the sum of sums eternal is,
Without or place beyond whereto things may
Asunder fly, or bodies which can smite,
And thus dissolve them by the blows of might.

But if perchance the soul's to be adjudged
Immortal, mainly on ground 'tis kept secure
In vital forces- either because there come
Never at all things hostile to its weal,
Or else because what come somehow retire,
Repelled or ere we feel the harm they work,

-
For, lo, besides that, when the frame's diseased,
Soul sickens too, there cometh, many a time,
That which torments it with the things to be,
Keeps it in dread, and wearies it with cares;
And even when evil acts are of the past,
Still gnaw the old transgressions bitterly.
Add, too, that frenzy, peculiar to the mind,
And that oblivion of the things that were;
Add its submergence in the murky waves
Of drowse and torpor.

BOOK_3|FOLLY_OF_FEAR_OF_DEATH
FOLLY OF THE FEAR OF DEATH

-
Therefore death to us
Is nothing, nor concerns us in the least,
Since nature of mind is mortal evermore.
And just as in the ages gone before

We felt no touch of ill, when all sides round
To battle came the Carthaginian host,
And the times, shaken by tumultuous war,
Under the aery coasts of arching heaven
Shuddered and trembled, and all humankind
Doubted to which the empery should fall
By land and sea, thus when we are no more,
When comes that sundering of our body and soul
Through which we're fashioned to a single state,
Verily naught to us, us then no more,
Can come to pass, naught move our senses then-
No, not if earth confounded were with sea,
And sea with heaven. But if indeed do feel
The nature of mind and energy of soul,
After their severance from this body of ours,
Yet nothing 'tis to us who in the bonds
And wedlock of the soul and body live,
Through which we're fashioned to a single state.
And, even if time collected after death
The matter of our frames and set it all
Again in place as now, and if again
To us the light of life were given, O yet
That process too would not concern us aught,
When once the self-succession of our sense
Has been asunder broken. And now and here,
Little enough we're busied with the selves
We were aforetime, nor, concerning them,
Suffer a sore distress. For shouldst thou gaze
Backwards across all yesterdays of time
The immeasurable, thinking how manifold
The motions of matter are, then couldst thou well
Credit this too: often these very seeds
(From which we are to-day) of old were set
In the same order as they are to-day-
Yet this we can't to consciousness recall
Through the remembering mind. For there hath been
An interposed pause of life, and wide
Have all the motions wandered everywhere
From these our senses. For if woe and ail
Perchance are toward, then the man to whom
The bane can happen must himself be there
At that same time. But death precludeth this,
Forbidding life to him on whom might crowd
Such irk and care; and granted 'tis to know:
Nothing for us there is to dread in death,

No wretchedness for him who is no more,
The same estate as if ne'er born before,
When death immortal hath ta'en the mortal life.

Hence, where thou seest a man to grieve because
When dead he rots with body laid away,
Or perishes in flames or jaws of beasts,
Know well: he rings not true, and that beneath
Still works an unseen sting upon his heart,
However he deny that he believes.
His shall be aught of feeling after death.
For he, I fancy, grants not what he says,
Nor what that presupposes, and he fails
To pluck himself with all his roots from life
And cast that self away, quite unawares
Feigning that some remainder's left behind.
For when in life one pictures to oneself
His body dead by beasts and vultures torn,
He pities his state, dividing not himself
Therefrom, removing not the self enough
From the body flung away, imagining
Himself that body, and projecting there
His own sense, as he stands beside it: hence
He grieves that he is mortal born, nor marks
That in true death there is no second self
Alive and able to sorrow for self destroyed,
Or stand lamenting that the self lies there
Mangled or burning. For if it an evil is
Dead to be jerked about by jaw and fang
Of the wild brutes, I see not why 'twere not
Bitter to lie on fires and roast in flames,
Or suffocate in honey, and, reclined
On the smooth oblong of an icy slab,
Grow stiff in cold, or sink with load of earth
Down-crushing from above.

"Thee now no more
The joyful house and best of wives shall welcome,
Nor little sons run up to snatch their kisses
And touch with silent happiness thy heart.
Thou shalt not speed in undertakings more,
Nor be the warder of thine own no more.
Poor wretch," they say, "one hostile hour hath ta'en
Wretchedly from thee all life's many guerdons,"
But add not, "yet no longer unto thee
Remains a remnant of desire for them"

If this they only well perceived with mind
And followed up with maxims, they would free
Their state of man from anguish and from fear.
"O even as here thou art, aslumber in death,
So shalt thou slumber down the rest of time,
Released from every harrying pang. But we,
We have bewept thee with insatiate woe,
Standing beside whilst on the awful pyre
Thou wert made ashes; and no day shall take
For us the eternal sorrow from the breast."
But ask the mourner what's the bitterness
That man should waste in an eternal grief,
If, after all, the thing's but sleep and rest?
For when the soul and frame together are sunk
In slumber, no one then demands his self
Or being. Well, this sleep may be forever,
Without desire of any selfhood more,
For all it matters unto us asleep.

Yet not at all do those primordial germs
Roam round our members, at that time, afar
From their own motions that produce our senses-
Since, when he's startled from his sleep, a man
Collects his senses. Death is, then, to us
Much less- if there can be a less than that
Which is itself a nothing: for there comes
Hard upon death a scattering more great
Of the throng of matter, and no man wakes up
On whom once falls the icy pause of life.

This too, O often from the soul men say,
Along their couches holding of the cups,
With faces shaded by fresh wreaths awry:
"Brief is this fruit of joy to paltry man,
Soon, soon departed, and thereafter, no,
It may not be recalled."- As if, forsooth,
It were their prime of evils in great death
To parch, poor tongues, with thirst and arid drought,
Or chafe for any lack.

Once more, if Nature
Should of a sudden send a voice abroad,
And her own self inveigh against us so:
"Mortal, what hast thou of such grave concern
That thou indulgest in too sickly plaints?
Why this bemoaning and beweeeping death?
For if thy life aforesaid and behind
To thee was grateful, and not all thy good

Was heaped as in sieve to flow away
And perish unavailingly, why not,
Even like a banqueter, depart the halls,
Laden with life? why not with mind content
Take now, thou fool, thy unafflicted rest?
But if whatever thou enjoyed hath been
Lavished and lost, and life is now offence,
Why seekest more to add- which in its turn
Will perish foully and fall out in vain?
O why not rather make an end of life,
Of labour? For all I may devise or find
To pleasure thee is nothing: all things are
The same forever. Though not yet thy body
Wrinkles with years, nor yet the frame exhausts
Outworn, still things abide the same, even if
Thou goest on to conquer all of time
With length of days, yea, if thou never diest"-
What were our answer, but that Nature here
Urges just suit and in her words lays down
True cause of action? Yet should one complain,
Riper in years and elder, and lament,
Poor devil, his death more sorely than is fit,
Then would she not, with greater right, on him
Cry out, inveighing with a voice more shrill:
"Off with thy tears, and choke thy whines, buffoon!
Thou wrinklest- after thou hast had the sum
Of the guerdons of life; yet, since thou cravest ever
What's not at hand, contemning present good,
That life has slipped away, unperfected
And unavailing unto thee. And now,
Or ere thou guessed it, death beside thy head
Stands- and before thou canst be going home
Sated and laden with the goodly feast.
But now yield all that's alien to thine age,-
Up, with good grace! make room for sons: thou must."
Justly, I fancy, would she reason thus,
Justly inveigh and gird: since ever the old
Outcrowded by the new gives way, and ever
The one thing from the others is repaired.
Nor no man is consigned to the abyss
Of Tartarus, the black. For stuff must be,
That thus the after-generations grow,-
Though these, their life completed, follow thee;
And thus like thee are generations all-
Already fallen, or some time to fall.

So one thing from another rises ever;
And in fee-simple life is given to none,
But unto all mere usufruct.

Look back:

Nothing to us was all fore-passed eld
Of time the eternal, ere we had a birth.
And Nature holds this like a mirror up
Of time-to-be when we are dead and gone.
And what is there so horrible appears?
Now what is there so sad about it all?
Is't not serener far than any sleep?

And, verily, those tortures said to be
In Acheron, the deep, they all are ours
Here in this life. No Tantalus, benumbed
With baseless terror, as the fables tell,
Fears the huge boulder hanging in the air:
But, rather, in life an empty dread of gods
Urges mortality, and each one fears
Such fall of fortune as may chance to him.
Nor eat the vultures into Tityus
Prostrate in Acheron, nor can they find,
Forsooth, throughout eternal ages, aught
To pry around for in that mighty breast.
However hugely he extend his bulk-
Who hath for outspread limbs not acres nine,
But the whole earth- he shall not able be
To bear eternal pain nor furnish food
From his own frame forever. But for us
A Tityus is he whom vultures rend
Prostrate in love, whom anxious anguish eats,
Whom troubles of any unappeased desires
Asunder rip. We have before our eyes
Here in this life also a Sisyphus
In him who seeketh of the populace
The rods, the axes fell, and evermore
Retires a beaten and a gloomy man.
For to seek after power- an empty name,
Nor given at all- and ever in the search
To endure a world of toil, O this it is
To shove with shoulder up the hill a stone
Which yet comes rolling back from off the top,
And headlong makes for levels of the plain.
Then to be always feeding an ingrate mind,
Filling with good things, satisfying never-
As do the seasons of the year for us,

When they return and bring their progenies
And varied charms, and we are never filled
With the fruits of life- O this, I fancy, 'tis
To pour, like those young virgins in the tale,
Waters into a sieve, unfilled forever.

-
Cerberus and Furies, and that Lack of Light
-

Tartarus, out-belching from his mouth the surge
Of horrible heat- the which are nowhere, nor
Indeed can be: but in this life is fear
Of retributions just and expiations
For evil acts: the dungeon and the leap
From that dread rock of infamy, the stripes,
The executioners, the oaken rack,
The iron plates, bitumen, and the torch.
And even though these are absent, yet the mind,
With a fore-fearing conscience, plies its goads
And burns beneath the lash, nor sees meanwhile
What terminus of ills, what end of pine
Can ever be, and feareth lest the same
But grow more heavy after death. Of truth,
The life of fools is Acheron on earth.

This also to thy very self sometimes
Repeat thou mayst: "Lo, even good Ancus left
The sunshine with his eyes, in divers things
A better man than thou, O worthless hind;
And many other kings and lords of rule
Thereafter have gone under, once who swayed
O'er mighty peoples. And he also, he-
Who whilom paved a highway down the sea,
And gave his legionaries thoroughfare
Along the deep, and taught them how to cross
The pools of brine afoot, and did contemn,
Trampling upon it with his cavalry,
The bellowings of ocean- poured his soul
From dying body, as his light was ta'en.
And Scipio's son, the thunderbolt of war,
Horror of Carthage, gave his bones to earth,
Like to the lowliest villein in the house.
Add finders-out of sciences and arts;
Add comrades of the Heliconian dames,
Among whom Homer, sceptered o'er them all
Now lies in slumber sunken with the rest.
Then, too, Democritus, when ripened eld

Admonished him his memory waned away,
Of own accord offered his head to death.
Even Epicurus went, his light of life
Run out, the man in genius who o'er-topped
The human race, extinguishing all others,
As sun, in ether arisen, all the stars.
Wilt thou, then, dally, thou complain to go? -
For whom already life's as good as dead,
Whilst yet thou livest and lookest? - who in sleep
Wastest thy life - time's major part, and snorest
Even when awake, and ceasest not to see
The stuff of dreams, and bearest a mind beset
By baseless terror, nor discoverest oft
What's wrong with thee, when, like a sotted wretch,
Thou'rt jostled along by many crowding cares,
And wanderest reeling round, with mind aswim."
If men, in that same way as on the mind
They feel the load that wearies with its weight,
Could also know the causes whence it comes,
And why so great the heap of ill on heart,
O not in this sort would they live their life,
As now so much we see them, knowing not
What 'tis they want, and seeking ever and ever
A change of place, as if to drop the burden.
The man who sickens of his home goes out,
Forth from his splendid halls, and straight - returns,
Feeling i'faith no better off abroad.
He races, driving his Gallic ponies along,
Down to his villa, madly, - as in haste
To hurry help to a house afire. - At once
He yawns, as soon as foot has touched the threshold,
Or drowsily goes off in sleep and seeks
Forgetfulness, or maybe bustles about
And makes for town again. In such a way
Each human flees himself - a self in sooth,
As happens, he by no means can escape;
And willy-nilly he cleaves to it and loathes,
Sick, sick, and guessing not the cause of ail.
Yet should he see but that, O chiefly then,
Leaving all else, he'd study to divine
The nature of things, since here is in debate
Eternal time and not the single hour,
Mortal's estate in whatsoever remains
After great death.

And too, when all is said,

What evil lust of life is this so great
Subdues us to live, so dreadfully distraught
In perils and alarms? one fixed end
Of life abideth for mortality;
Death's not to shun, and we must go to meet.
Besides we're busied with the same devices,
Ever and ever, and we are at them ever,
And there's no new delight that may be forged
By living on. But whilst the thing we long for
Is lacking, that seems good above all else;
Thereafter, when we've touched it, something else
We long for; ever one equal thirst of life
Grips us agape. And doubtful 'tis what fortune
The future times may carry, or what be
That chance may bring, or what the issue next
Awaiting us. Nor by prolonging life
Take we the least away from death's own time,
Nor can we pluck one moment off, whereby
To minish the aeons of our state of death.
Therefore, O man, by living on, fulfil
As many generations as thou may:
Eternal death shall there be waiting still;
And he who died with light of yesterday
Shall be no briefer time in death's No-more
Than he who perished months or years before.

BOOK_4

BOOK IV

BOOK_4|PROEM

PROEM

-

I wander afield, thriving in sturdy thought,
Through unpathed haunts of the Pierides,
Trodden by step of none before. I joy
To come on undefiled fountains there,
To drain them deep; I joy to pluck new flowers,
To seek for this my head a signal crown
From regions where the Muses never yet
Have garlanded the temples of a man:

First, since I teach concerning mighty things,
And go right on to loose from round the mind
The tightened coils of dread Religion;
Next, since, concerning themes so dark, I frame
Song so pellucid, touching all throughout
Even with the Muses' charm- which, as 'twould seem,
Is not without a reasonable ground:
For as physicians, when they seek to give
Young boys the nauseous wormwood, first do touch
The brim around the cup with the sweet juice
And yellow of the honey, in order that
The thoughtless age of boyhood be cajoled
As far as the lips, and meanwhile swallow down
The wormwood's bitter draught, and, though befooled,
Be yet not merely duped, but rather thus
Grow strong again with recreated health:
So now I too (since this my doctrine seems
In general somewhat woeful unto those
Who've had it not in hand, and since the crowd
Starts back from it in horror) have desired
To expound our doctrine unto thee in song
Soft-speaking and Pierian, and, as 'twere,
To touch it with sweet honey of the Muse-
If by such method haply I might hold
The mind of thee upon these lines of ours,
Till thou dost learn the nature of all things
And understandest their utility.

BOOK_4|THE_IMAGES
EXISTENCE AND CHARACTER OF
THE IMAGES

-

But since I've taught already of what sort
The seeds of all things are, and how distinct
In divers forms they flit of own accord,
Stirred with a motion everlasting on,
And in what mode things be from them create,
And since I've taught what the mind's nature is,
And of what things 'tis with the body knit
And thrives in strength, and by what mode uptorn
That mind returns to its primordials,
Now will I undertake an argument-
One for these matters of supreme concern-
That there exist those somewhats which we call
The images of things: these, like to films

Scaled off the utmost outside of the things,
Flit hither and thither through the atmosphere,
And the same terrify our intellects,
Coming upon us waking or in sleep,
When oft we peer at wonderful strange shapes
And images of people lorn of light,
Which oft have horribly roused us when we lay
In slumber- that haply nevermore may we
Suppose that souls get loose from Acheron,
Or shades go floating in among the living,
Or aught of us is left behind at death,
When body and mind, destroyed together, each
Back to its own primordials goes away.

-
And thus I say that effigies of things,
And tenuous shapes from off the things are sent,
From off the utmost outside of the things,
Which are like films or may be named a rind,
Because the image bears like look and form
With whatso body has shed it fluttering forth-
A fact thou mayst, however dull thy wits,
Well learn from this: mainly, because we see
Even 'mongst visible objects many be
That send forth bodies, loosely some diffused-
Like smoke from oaken logs and heat from fires-
And some more interwoven and condensed-
As when the locusts in the summertime
Put off their glossy tunics, or when calves
At birth drop membranes from their body's surface,
Or when, again, the slippery serpent doffs
Its vestments 'mongst the thorns- for oft we see
The breres augmented with their flying spoils:
Since such takes place, 'tis likewise certain too
That tenuous images from things are sent,
From off the utmost outside of the things.
For why those kinds should drop and part from things,
Rather than others tenuous and thin,
No power has man to open mouth to tell;
Especially, since on outsides of things
Are bodies many and minute which could,
In the same order which they had before,
And with the figure of their form preserved,
Be thrown abroad, and much more swiftly too,
Being less subject to impediments,
As few in number and placed along the front.

For truly many things we see discharge
Their stuff at large, not only from their cores
Deep-set within, as we have said above,
But from their surfaces at times no less-
Their very colours too. And commonly
The awnings, saffron, red and dusky blue,
Stretched overhead in mighty theatres,
Upon their poles and cross-beams fluttering,
Have such an action quite; for there they dye
And make to undulate with their every hue
The circled throng below, and all the stage,
And rich attire in the patrician seats.
And ever the more the theatre's dark walls
Around them shut, the more all things within
Laugh in the bright suffusion of strange glints,
The daylight being withdrawn. And therefore, since
The canvas hangings thus discharge their dye
From off their surface, things in general must
Likewise their tenuous effigies discharge,
Because in either case they are off-thrown
From off the surface. So there are indeed
Such certain prints and vestiges of forms
Which flit around, of subtlest texture made,
Invisible, when separate, each and one.
Again, all odour, smoke, and heat, and such
Streams out of things diffusedly, because,
Whilst coming from the deeps of body forth
And rising out, along their bending path
They're torn asunder, nor have gateways straight
Wherethrough to mass themselves and struggle abroad.
But contrariwise, when such a tenuous film
Of outside colour is thrown off, there's naught
Can rend it, since 'tis placed along the front
Ready to hand. Lastly those images
Which to our eyes in mirrors do appear,
In water, or in any shining surface,
Must be, since furnished with like look of things,
Fashioned from images of things sent out.
There are, then, tenuous effigies of forms,
Like unto them, which no one can divine
When taken singly, which do yet give back,
When by continued and recurrent discharge
Expelled, a picture from the mirrors' plane.
Nor otherwise, it seems, can they be kept
So well conserved that thus be given back

Figures so like each object.

Now then, learn

How tenuous is the nature of an image.
And in the first place, since primordials be
So far beneath our senses, and much less
E'en than those objects which begin to grow
Too small for eyes to note, learn now in few
How nice are the beginnings of all things-
That this, too, I may yet confirm in proof:
First, living creatures are sometimes so small
That even their third part can nowise be seen;
Judge, then, the size of any inward organ-
What of their sphered heart, their eyes, their limbs,
The skeleton?- How tiny thus they are!
And what besides of those first particles
Whence soul and mind must fashioned be?- Seest not
How nice and how minute? Besides, whatever
Exhales from out its body a sharp smell-
The nauseous absinth, or the panacea,
Strong southernwood, or bitter centaury-
If never so lightly with thy [fingers] twain
Perchance [thou touch] a one of them

Then why not rather know that images
Flit hither and thither, many, in many modes,
Bodiless and invisible?

But lest

Haply thou holdest that those images
Which come from objects are the sole that flit,
Others indeed there be of own accord
Begot, self-formed in earth's aery skies,
Which, moulded to innumerable shapes,
Are borne aloft, and, fluid as they are,
Cease not to change appearance and to turn
Into new outlines of all sorts of forms;
As we behold the clouds grow thick on high
And smirch the serene vision of the world,
Stroking the air with motions. For oft are seen
The giants' faces flying far along
And trailing a spread of shadow; and at times
The mighty mountains and mountain-sundered rocks
Going before and crossing on the sun,
Whereafter a monstrous beast dragging amain
And leading in the other thunderheads.
Now [hear] how easy and how swift they be

Engendered, and perpetually flow off
From things and gliding pass away....

-
For ever every outside streams away
From off all objects, since discharge they may;
And when this outside reaches other things,
As chiefly glass, it passes through; but where
It reaches the rough rocks or stuff of wood,
There 'tis so rent that it cannot give back
An image. But when gleaming objects dense,
As chiefly mirrors, have been set before it,
Nothing of this sort happens. For it can't
Go, as through glass, nor yet be rent- its safety,
By virtue of that smoothness, being sure.
'Tis therefore that from them the images
Stream back to us; and howso suddenly
Thou place, at any instant, anything
Before a mirror, there an image shows;
Proving that ever from a body's surface
Flow off thin textures and thin shapes of things.
Thus many images in little time
Are gendered; so their origin is named
Rightly a speedy. And even as the sun
Must send below, in little time, to earth
So many beams to keep all things so full
Of light incessant; thus, on grounds the same,
From things there must be borne, in many modes,
To every quarter round, upon the moment,
The many images of things; because
Unto whatever face of things we turn
The mirror, things of form and hue the same
Respond. Besides, though but a moment since
Serenest was the weather of the sky,
So fiercely sudden is it foully thick
That ye might think that round about all murk
Had parted forth from Acheron and filled
The mighty vaults of sky- so grievously,
As gathers thus the storm-clouds' gruesome night,
Do faces of black horror hang on high-
Of which how small a part an image is
There's none to tell or reckon out in words.

-
Now come; with what swift motion they are borne,
These images, and what the speed assigned
To them across the breezes swimming on-

So that o'er lengths of space a little hour
Alone is wasted, toward whatever region
Each with its divers impulse tends- I'll tell
In verses sweeter than they many are;
Even as the swan's slight note is better far
Than that dispersed clamour of the cranes
Among the southwind's aery clouds. And first,
One oft may see that objects which are light
And made of tiny bodies are the swift;
In which class is the sun's light and his heat,
Since made from small primordial elements
Which, as it were, are forward knocked along
And through the interspaces of the air
To pass delay not, urged by blows behind;
For light by light is instantly supplied
And gleam by following gleam is spurred and driven.
Thus likewise must the images have power
Through unimaginable space to speed
Within a point of time,- first, since a cause
Exceeding small there is, which at their back
Far forward drives them and propels, where, too,
They're carried with such winged lightness on;
And, secondly, since furnished, when sent off,
With texture of such rareness that they can
Through objects whatsoever penetrate
And ooze, as 'twere, through intervening air.
Besides, if those fine particles of things
Which from so deep within are sent abroad,
As light and heat of sun, are seen to glide
And spread themselves through all the space of heaven
Upon one instant of the day, and fly
O'er sea and lands and flood the heaven, what then
Of those which on the outside stand prepared,
When they're hurled off with not a thing to check
Their going out? Dost thou not see indeed
How swifter and how farther must they go
And speed through manifold the length of space
In time the same that from the sun the rays
O'erspread the heaven? This also seems to be
Example chief and true with what swift speed
The images of things are borne about:
That soon as ever under open skies
Is spread the shining water, all at once,
If stars be out in heaven, upgleam from earth,
Sere and radiant in the water there,

The constellations of the universe-
Now seest thou not in what a point of time
An image from the shores of ether falls
Unto the shores of earth? Wherefore, again,
And yet again, 'tis needful to confess
With wondrous...

BOOK_4|SENSES_&_MENTAL_PICTURES
THE SENSES AND MENTAL PICTURES

-
Bodies that strike the eyes, awaking sight.
From certain things flow odours evermore,
As cold from rivers, heat from sun, and spray
From waves of ocean, eater-out of walls
Around the coasts. Nor ever cease to flit
The varied voices, sounds athrough the air.
Then too there comes into the mouth at times
The wet of a salt taste, when by the sea
We roam about; and so, whene'er we watch
The wormword being mixed, its bitter stings.
To such degree from all things is each thing
Borne streamingly along, and sent about
To every region round; and Nature grants
Nor rest nor respite of the onward flow,
Since 'tis incessantly we feeling have,
And all the time are suffered to descry
And smell all things at hand, and hear them sound.
Besides, since shape examined by our hands
Within the dark is known to be the same
As that by eyes perceived within the light
And lustrous day, both touch and sight must be
By one like cause aroused. So, if we test
A square and get its stimulus on us
Within the dark, within the light what square
Can fall upon our sight, except a square
That images the things? Wherefore it seems
The source of seeing is in images,
Nor without these can anything be viewed.

-
Now these same films I name are borne about
And tossed and scattered into regions all.
But since we do perceive alone through eyes,
It follows hence that whitherso we turn
Our sight, all things do strike against it there
With form and hue. And just how far from us

Each thing may be away, the image yields
To us the power to see and chance to tell:
For when 'tis sent, at once it shoves ahead
And drives along the air that's in the space
Betwixt it and our eyes. And thus this air
All glides athrough our eyeballs, and, as 'twere,
Brushes athrough our pupils and thuswise
Passes across. Therefore it comes we see
How far from us each thing may be away,
And the more air there be that's driven before,
And too the longer be the brushing breeze
Against our eyes, the farther off removed
Each thing is seen to be: forsooth, this work
With mightily swift order all goes on,
So that upon one instant we may see
What kind the object and how far away.

-
Nor over-marvellous must this be deemed
In these affairs that, though the films which strike
Upon the eyes cannot be singly seen,
The things themselves may be perceived. For thus
When the wind beats upon us stroke by stroke
And when the sharp cold streams, 'tis not our wont
To feel each private particle of wind
Or of that cold, but rather all at once;
And so we see how blows affect our body,
As if one thing were beating on the same
And giving us the feel of its own body
Outside of us. Again, whene'er we thump
With finger-tip upon a stone, we touch
But the rock's surface and the outer hue,
Nor feel that hue by contact- rather feel
The very hardness deep within the rock.

-
Now come, and why beyond a looking-glass
An image may be seen, perceive. For seen
It soothly is, removed far within.
'Tis the same sort as objects peered upon
Outside in their true shape, whene'er a door
Yields through itself an open peering-place,
And lets us see so many things outside
Beyond the house. Also that sight is made
By a twofold twin air: for first is seen
The air inside the door-posts; next the doors,
The twain to left and right; and afterwards

A light beyond comes brushing through our eyes,
Then other air, then objects peered upon
Outside in their true shape. And thus, when first
The image of the glass projects itself,
As to our gaze it comes, it shoves ahead
And drives along the air that's in the space
Betwixt it and our eyes, and brings to pass
That we perceive the air ere yet the glass.
But when we've also seen the glass itself,
Forthwith that image which from us is borne
Reaches the glass, and there thrown back again
Comes back unto our eyes, and driving rolls
Ahead of itself another air, that then
'Tis this we see before itself, and thus
It looks so far removed behind the glass.
Wherefore again, again, there's naught for wonder

-
In those which render from the mirror's plane
A vision back, since each thing comes to pass
By means of the two airs. Now, in the glass
The right part of our members is observed
Upon the left, because, when comes the image
Hitting against the level of the glass,
'Tis not returned unshifted; but forced off
Backwards in line direct and not oblique,-
Exactly as whoso his plaster-mask
Should dash, before 'twere dry, on post or beam,
And it should straightway keep, at clinging there,
Its shape, reversed, facing him who threw,
And so remould the features it gives back:
It comes that now the right eye is the left,
The left the right. An image too may be
From mirror into mirror handed on,
Until of idol-films even five or six
Have thus been gendered. For whatever things
Shall hide back yonder in the house, the same,
However far removed in twisting ways,
May still be all brought forth through bending paths
And by these several mirrors seen to be
Within the house, since Nature so compels
All things to be borne backward and spring off
At equal angles from all other things.
To such degree the image gleams across
From mirror unto mirror; where 'twas left
It comes to be the right, and then again

Returns and changes round unto the left.
Again, those little sides of mirrors curved
Proportionate to the bulge of our own flank
Send back to us their idols with the right
Upon the right; and this is so because
Either the image is passed on along
From mirror unto mirror, and thereafter,
When twice dashed off, flies back unto ourselves;
Or else the image wheels itself around,
When once unto the mirror it has come,
Since the curved surface teaches it to turn
To usward. Further, thou might'st well believe
That these film-idols step along with us
And set their feet in unison with ours
And imitate our carriage, since from that
Part of a mirror whence thou hast withdrawn
Straightway no images can be returned.

Further, our eye-balls tend to flee the bright
And shun to gaze thereon; the sun even blinds,
If thou goest on to strain them unto him,
Because his strength is mighty, and the films
Heavily downward from on high are borne
Through the pure ether and the viewless winds,
And strike the eyes, disordering their joints.
So piecing lustre often burns the eyes,
Because it holdeth many seeds of fire
Which, working into eyes, engender pain.
Again, whatever jaundiced people view
Becomes wan-yellow, since from out their bodies
Flow many seeds wan-yellow forth to meet
The films of things, and many too are mixed
Within their eye, which by contagion paint
All things with sallowness. Again, we view
From dark recesses things that stand in light,
Because, when first has entered and possessed
The open eyes this nearer darkling air,
Swiftly the shining air and luminous
Followeth in, which purges then the eyes
And scatters asunder of that other air
The sable shadows, for in large degrees
This air is nimbler, nicer, and more strong.
And soon as ever 'thas filled and oped with light
The pathways of the eyeballs, which before
Black air had blocked, there follow straightaway

Those films of things out-standing in the light,
Provoking vision- what we cannot do
From out the light with objects in the dark,
Because that denser darkling air behind
Followeth in, and fills each aperture
And thus blockades the pathways of the eyes
That there no images of any things
Can be thrown in and agitate the eyes.

-
And when from far away we do behold
The squared towers of a city, oft
Rounded they seem,- on this account because
Each distant angle is perceived obtuse,
Or rather it is not perceived at all;
And perishes its blow nor to our gaze
Arrives its stroke, since through such length of air
Are borne along the idols that the air
Makes blunt the idol of the angle's point
By numerous collidings. When thuswise
The angles of the tower each and all
Have quite escaped the sense, the stones appear
As rubbed and rounded on a turner's wheel-
Yet not like objects near and truly round,
But with a semblance to them, shadowily.
Likewise, our shadow in the sun appears
To move along and follow our own steps
And imitate our carriage- if thou thinkest
Air that is thus bereft of light can walk,
Following the gait and motion of mankind.
For what we use to name a shadow, sure
Is naught but air deprived of light. No marvel:
Because the earth from spot to spot is reft
Progressively of light of sun, whenever
In moving round we get within its way,
While any spot of earth by us abandoned
Is filled with light again, on this account
It comes to pass that what was body's shadow
Seems still the same to follow after us
In one straight course. Since, evermore pour in
New lights of rays, and perish then the old,
Just like the wool that's drawn into the flame.
Therefore the earth is easily spoiled of light
And easily refilled and from herself
Washeth the black shadows quite away.

-

And yet in this we don't at all concede
That eyes be cheated. For their task it is
To note in whatsoever place be light,
In what be shadow: whether or no the gleams
Be still the same, and whether the shadow which
Just now was here is that one passing thither,
Or whether the facts be what we said above,
'Tis after all the reasoning of mind
That must decide; nor can our eyeballs know
The nature of reality. And so
Attach thou not this fault of mind to eyes,
Nor lightly think our senses everywhere
Are tottering. The ship in which we sail
Is borne along, although it seems to stand;
The ship that bides in roadstead is supposed
There to be passing by. And hills and fields
Seem fleeing fast astern, past which we urge
The ship and fly under the bellying sails.
The stars, each one, do seem to pause, affixed
To the ethereal caverns, though they all
Forever are in motion, rising out
And thence revisiting their far descents
When they have measured with their bodies bright
The span of heaven. And likewise sun and moon
Seem biding in a roadstead,- objects which,
As plain fact proves, are really borne along.
Between two mountains far away aloft
From midst the whirl of waters open lies
A gaping exit for the fleet, and yet
They seem conjoined in a single isle.
When boys themselves have stopped their spinning round,
The halls still seem to whirl and posts to reel,
Until they now must almost think the roofs
Threaten to ruin down upon their heads.
And now, when Nature begins to lift on high
The sun's red splendour and the tremulous fires,
And raise him o'er the mountain-tops, those mountains-
O'er which he seemeth then to thee to be,
His glowing self hard by atingeing them
With his own fire- are yet away from us
Scarcely two thousand arrow-shots, indeed
Oft scarce five hundred courses of a dart;
Although between those mountains and the sun
Lie the huge plains of ocean spread beneath
The vasty shores of ether, and intervene

A thousand lands, possessed by many a folk
And generations of wild beasts. Again,
A pool of water of but a finger's depth,
Which lies between the stones along the pave,
Offers a vision downward into earth
As far, as from the earth o'erspread on high
The gulfs of heaven; that thus thou seemest to view
Clouds down below and heavenly bodies plunged
Wondrously in heaven under earth.
Then too, when in the middle of the stream
Sticks fast our dashing horse, and down we gaze
Into the river's rapid waves, some force
Seems then to bear the body of the horse,
Though standing still, reversely from his course,
And swiftly push up-stream. And wheresoe'er
We cast our eyes across, all objects seem
Thus to be onward borne and flow along
In the same way as we. A portico,
Albeit it stands well propped from end to end
On equal columns, parallel and big,
Contracts by stages in a narrow cone,
When from one end the long, long whole is seen,-
Until, conjoining ceiling with the floor,
And the whole right side with the left, it draws
Together to a cone's nigh-viewless point.
To sailors on the main the sun he seems
From out the waves to rise, and in the waves
To set and bury his light- because indeed
They gaze on naught but water and the sky.
Again, to gazers ignorant of the sea,
Vessels in port seem, as with broken poops,
To lean upon the water, quite agog;
For any portion of the oars that's raised
Above the briny spray is straight, and straight
The rudders from above. But other parts,
Those sunk, immersed below the water-line,
Seem broken all and bended and inclined
Sloping to upwards, and turned back to float
Almost atop the water. And when the winds
Carry the scattered drifts along the sky
In the night-time, then seem to glide along
The radiant constellations 'gainst the clouds
And there on high to take far other course
From that whereon in truth they're borne. And then,
If haply our hand be set beneath one eye

And press below thereon, then to our gaze
Each object which we gaze on seems to be,
By some sensation twain- then twain the lights
Of lampions burgeoning in flowers of flame,
And twain the furniture in all the house,
Two-fold the visages of fellow-men,
And twain their bodies. And again, when sleep
Has bound our members down in slumber soft
And all the body lies in deep repose,
Yet then we seem to self to be awake
And move our members; and in night's blind gloom
We think to mark the daylight and the sun;
And, shut within a room, yet still we seem
To change our skies, our oceans, rivers, hills,
To cross the plains afoot, and hear new sounds,
Though still the austere silence of the night
Abides around us, and to speak replies,
Though voiceless. Other cases of the sort
Wondrously many do we see, which all
Seek, so to say, to injure faith in sense-
In vain, because the largest part of these
Deceives through mere opinions of the mind,
Which we do add ourselves, feigning to see
What by the senses are not seen at all.
For naught is harder than to separate
Plain facts from dubious, which the mind forthwith
Adds by itself.

Again, if one suppose
That naught is known, he knows not whether this
Itself is able to be known, since he
Confesses naught to know. Therefore with him
I waive discussion- who has set his head
Even where his feet should be. But let me grant
That this he knows,- I question: whence he knows
What 'tis to know and not-to-know in turn,
And what created concept of the truth,
And what device has proved the dubious
To differ from the certain?- since in things
He's heretofore seen naught of true. Thou'lt find
That from the senses first hath been create
Concept of truth, nor can the senses be
Rebutted. For criterion must be found
Worthy of greater trust, which shall defeat
Through own authority the false by true;
What, then, than these our senses must there be

Worthy a greater trust? Shall reason, sprung
From some false sense, prevail to contradict
Those senses, sprung as reason wholly is
From out of the senses?- For lest these be true,
All reason also then is falsified.
Or shall the ears have power to blame the eyes,
Or yet the touch the ears? Again, shall taste
Accuse this touch or shall the nose confute
Or eyes defeat it? Methinks not so it is:
For unto each has been divided of
Its function quite apart, its power to each;
And thus we're still constrained to perceive
The soft, the cold, the hot apart, apart
All divers hues and whatso things there be
Conjoined with hues. Likewise the tasting tongue
Has its own power apart, and smells apart
And sounds apart are known. And thus it is
That no one sense can e'er convict another.
Nor shall one sense have power to blame itself,
Because it always must be deemed the same,
Worthy of equal trust. And therefore what
At any time unto these senses showed,
The same is true. And if the reason be
Unable to unravel us the cause
Why objects, which at hand were square, afar
Seemed rounded, yet it more availeth us,
Lacking the reason, to pretend a cause
For each configuration, than to let
From out our hands escape the obvious things
And injure primal faith in sense, and wreck
All those foundations upon which do rest
Our life and safety. For not only reason
Would topple down; but even our very life
Would straightaway collapse, unless we dared
To trust our senses and to keep away
From headlong heights and places to be shunned
Of a like peril, and to seek with speed
Their opposites! Again, as in a building,
If the first plumb-line be askew, and if
The square deceiving swerve from lines exact,
And if the level waver but the least
In any part, the whole construction then
Must turn out faulty- shelving and askew,
Leaning to back and front, incongruous,
That now some portions seem about to fall,

And falls the whole ere long- betrayed indeed
By first deceiving estimates: so too
Thy calculations in affairs of life
Must be askew and false, if sprung for thee
From senses false. So all that troop of words
Marshalled against the senses is quite vain.

And now remains to demonstrate with ease
How other senses each their things perceive.

Firstly, a sound and every voice is heard,
When, getting into ears, they strike the sense
With their own body. For confess we must
Even voice and sound to be corporeal,
Because they're able on the sense to strike.
Besides voice often scrapes against the throat,
And screams in going out do make more rough
The wind-pipe- naturally enough, methinks,
When, through the narrow exit rising up
In larger throng, these primal germs of voice
Have thus begun to issue forth. In sooth,
Also the door of the mouth is scraped against
By air blown outward from distended cheeks.

-
And thus no doubt there is, that voice and words
Consist of elements corporeal,
With power to pain. Nor art thou unaware
Likewise how much of body's ta'en away,
How much from very thews and powers of men
May be withdrawn by steady talk, prolonged
Even from the rising splendour of the morn
To shadows of black evening,- above all
If 't be outpoured with most exceeding shouts.
Therefore the voice must be corporeal,
Since the long talker loses from his frame
A part.

Moreover, roughness in the sound
Comes from the roughness in the primal germs,
As a smooth sound from smooth ones is create;
Nor have these elements a form the same
When the trump rumbles with a hollow roar,
As when barbaric Berecynthian pipe
Buzzes with raucous boomings, or when swans
By night from icy shores of Helicon
With wailing voices raise their liquid dirge.

-
Thus, when from deep within our frame we force

These voices, and at mouth expel them forth,
The mobile tongue, artificer of words,
Makes them articulate, and too the lips
By their formations share in shaping them.
Hence when the space is short from starting-point
To where that voice arrives, the very words
Must too be plainly heard, distinctly marked.
For then the voice conserves its own formation,
Conserves its shape. But if the space between
Be longer than is fit, the words must be
Through the much air confounded, and the voice
Disordered in its flight across the winds-
And so it haps, that thou canst sound perceive,
Yet not determine what the words may mean;
To such degree confounded and encumbered
The voice approaches us. Again, one word,
Sent from the crier's mouth, may rouse all ears
Among the populace. And thus one voice
Scatters asunder into many voices,
Since it divides itself for separate ears,
Imprinting form of word and a clear tone.
But whatso part of voices fails to hit
The ears themselves perishes, borne beyond,
Idly diffused among the winds. A part,
Beating on solid porticoes, tossed back
Returns a sound; and sometimes mocks the ear
With a mere phantom of a word. When this
Thou well hast noted, thou canst render count
Unto thyself and others why it is
Along the lonely places that the rocks
Give back like shapes of words in order like,
When search we after comrades wandering
Among the shady mountains, and aloud
Call unto them, the scattered. I have seen
Spots that gave back even voices six or seven
For one thrown forth- for so the very hills,
Dashing them back against the hills, kept on
With their reverberations. And these spots
The neighbouring country-side doth feign to be
Haunts of the goat-foot satyrs and the nymphs;
And tells ye there be fauns, by whose night noise
And antic revels yonder they declare
The voiceless silences are broken oft,
And tones of strings are made and wailings sweet
Which the pipe, beat by players' finger-tips,

Pours out; and far and wide the farmer-race
Begins to hear, when, shaking the garmentings
Of pine upon his half-beast head, god-Pan
With puckered lip oft runneth o'er and o'er
The open reeds,- lest flute should cease to pour
The woodland music! Other prodigies
And wonders of this ilk they love to tell,
Lest they be thought to dwell in lonely spots
And even by gods deserted. This is why
They boast of marvels in their story-tellings;
Or by some other reason are led on-
Greedy, as all mankind hath ever been,
To prattle fables into ears.

Again,

One need not wonder how it comes about
That through those places (through which eyes cannot
View objects manifest) sounds yet may pass
And assail the ears. For often we observe
People conversing, though the doors be closed;
No marvel either, since all voice unharmed
Can wind through bended apertures of things,
While idol-films decline to- for they're rent,
Unless along straight apertures they swim,
Like those in glass, through which all images
Do fly across. And yet this voice itself,
In passing through shut chambers of a house,
Is dulled, and in a jumble enters ears,
And sound we seem to hear far more than words.
Moreover, a voice is into all directions
Divided up, since off from one another
New voices are engendered, when one voice
Hath once leapt forth, outstarting into many-
As oft a spark of fire is wont to sprinkle
Itself into its several fires. And so,
Voices do fill those places hid behind,
Which all are in a hubbub round about,
Astir with sound. But idol-films do tend,
As once set forth, in straight directions all;
Wherefore one can inside a wall see naught,
Yet catch the voices from beyond the same.

-
Nor tongue and palate, whereby we flavour feel,
Present more problems for more work of thought.
Firstly, we feel a flavour in the mouth,
When forth we squeeze it, in chewing up our food,-

As any one perchance begins to squeeze
With hand and dry a sponge with water soaked.
Next, all which forth we squeeze is spread about
Along the pores and intertwined paths
Of the loose-textured tongue. And so, when smooth
The bodies of the oozy flavour, then
Delightfully they touch, delightfully
They treat all spots, around the wet and trickling
Enclosures of the tongue. And contrariwise,
They sting and pain the sense with their assault,
According as with roughness they're supplied.
Next, only up to palate is the pleasure
Coming from flavour; for in truth when down
'Thas plunged along the throat, no pleasure is,
Whilst into all the frame it spreads around;
Nor aught it matters with what food is fed
The body, if only what thou take thou canst
Distribute well digested to the frame
And keep the stomach in a moist career.
Now, how it is we see some food for some,
Others for others....

I will unfold, or wherefore what to some
Is foul and bitter, yet the same to others
Can seem delectable to eat,- why here
So great the distance and the difference is
That what is food to one to some becomes
Fierce poison, as a certain snake there is
Which, touched by spittle of a man, will waste
And end itself by gnawing up its coil.
Again, fierce poison is the hellebore
To us, but puts the fat on goats and quails.
That thou mayst know by what devices this
Is brought about, in chief thou must recall
What we have said before, that seeds are kept
Commixed in things in divers modes. Again,
As all the breathing creatures which take food
Are outwardly unlike, and outer cut
And contour of their members bounds them round,
Each differing kind by kind, they thus consist
Of seeds of varying shape. And furthermore,
Since seeds do differ, divers too must be
The interstices and paths (which we do call
The apertures) in all the members, even
In mouth and palate too. Thus some must be

More small or yet more large, three-cornered some
And others squared, and many others round,
And certain of them many-angled too
In many modes. For, as the combination
And motion of their divers shapes demand,
The shapes of apertures must be diverse
And paths must vary according to their walls
That bound them. Hence when what is sweet to some,
Becomes to others bitter, for him to whom
'Tis sweet, the smoothest particles must needs
Have entered caressingly the palate's pores.
And, contrariwise, with those to whom that sweet
Is sour within the mouth, beyond a doubt
The rough and barbed particles have got
Into the narrows of the apertures.
Now easy it is from these affairs to know
Whatever...

Indeed, where one from o'er-abundant bile
Is stricken with fever, or in other wise
Feels the roused violence of some malady,
There the whole frame is now upset, and there
All the positions of the seeds are changed,-
So that the bodies which before were fit
To cause the savour, now are fit no more,
And now more apt are others which be able
To get within the pores and gender sour.
Both sorts, in sooth, are intermixed in honey-
What oft we've proved above to thee before.
Now come, and I will indicate what wise
Impact of odour on the nostrils touches.
And first, 'tis needful there be many things
From whence the streaming flow of varied odours
May roll along, and we're constrained to think
They stream and dart and sprinkle themselves about
Impartially. But for some breathing creatures
One odour is more apt, to others another-
Because of differing forms of seeds and pores.
Thus on and on along the zephyrs bees
Are led by odour of honey, vultures too
By carcasses. Again, the forward power
Of scent in dogs doth lead the hunter on
Whithersoever the splay-foot of wild beast
Hath hastened its career; and the white goose,
The saviour of the Roman citadel,

Forescents afar the odour of mankind.
Thus, diversely to divers ones is given
Peculiar smell that leadeth each along
To his own food or makes him start aback
From loathsome poison, and in this wise are
The generations of the wild preserved.

Yet is this pungence not alone in odours
Or in the class of flavours; but, likewise,
The look of things and hues agree not all
So well with senses unto all, but that
Some unto some will be, to gaze upon,
More keen and painful. Lo, the raving lions,
They dare not face and gaze upon the cock
Who's wont with wings to flap away the night
From off the stage, and call the beaming morn
With clarion voice- and lions straightway thus
Bethink themselves of flight, because, ye see,
Within the body of the cocks there be
Some certain seeds, which, into lions' eyes
Injected, bore into the pupils deep
And yield such piercing pain they can't hold out
Against the cocks, however fierce they be-
Whilst yet these seeds can't hurt our gaze the least,
Either because they do not penetrate,
Or since they have free exit from the eyes
As soon as penetrating, so that thus
They cannot hurt our eyes in any part
By there remaining.

To speak once more of odour;
Whatever assail the nostrils, some can travel
A longer way than others. None of them,
However, 's borne so far as sound or voice-
While I omit all mention of such things
As hit the eyesight and assail the vision.
For slowly on a wandering course it comes
And perishes sooner, by degrees absorbed
Easily into all the winds of air;
And first, because from deep inside the thing
It is discharged with labour (for the fact
That every object, when 'tis shivered, ground,
Or crumbled by the fire, will smell the stronger
Is sign that odours flow and part away
From inner regions of the things). And next,
Thou mayest see that odour is create

Of larger primal germs than voice, because
It enters not through stony walls, wherethrough
Unfailingly the voice and sound are borne;
Wherefore, besides, thou wilt observe 'tis not
So easy to trace out in whatso place
The smelling object is. For, dallying on
Along the winds, the particles cool off,
And then the scurrying messengers of things
Arrive our senses, when no longer hot.
So dogs oft wander astray, and hunt the scent.

Now mark, and hear what objects move the mind,
And learn, in few, whence unto intellect
Do come what come. And first I tell thee this:
That many images of objects rove
In many modes to every region round-
So thin that easily the one with other,
When once they meet, uniteth in mid-air,
Like gossamer or gold-leaf. For, indeed,
Far thinner are they in their fabric than
Those images which take a hold on eyes
And smite the vision, since through body's pores
They penetrate, and inwardly stir up
The subtle nature of mind and smite the sense.
Thus, Centaurs and the limbs of Scyllas, thus
The Cerberus-visages of dogs we see,
And images of people gone before-
Dead men whose bones earth bosomed long ago;
Because the images of every kind
Are everywhere about us borne- in part
Those which are gendered in the very air
Of own accord, in part those others which
From divers things do part away, and those
Which are compounded, made from out their shapes.
For soothly from no living Centaur is
That phantom gendered, since no breed of beast
Like him was ever; but, when images
Of horse and man by chance have come together,
They easily cohere, as aforesaid,
At once, through subtle nature and fabric thin.
In the same fashion others of this ilk
Created are. And when they're quickly borne
In their exceeding lightness, easily
(As earlier I showed) one subtle image,
Compounded, moves by its one blow the mind,

Itself so subtle and so strangely quick.

-
That these things come to pass as I record,
From this thou easily canst understand:
So far as one is unto other like,
Seeing with mind as well as with the eyes
Must come to pass in fashion not unlike.
Well, now, since I have shown that I perceive
Haply a lion through those idol-films
Such as assail my eyes, 'tis thine to know
Also the mind is in like manner moved,
And sees, nor more nor less than eyes do see
(Except that it perceives more subtle films)
The lion and aught else through idol-films.
And when the sleep has overset our frame,
The mind's intelligence is now awake,
Still for no other reason, save that these-
The self-same films as when we are awake-
Assail our minds, to such degree indeed
That we do seem to see for sure the man
Whom, void of life, now death and earth have gained
Dominion over. And Nature forces this
To come to pass because the body's senses
Are resting, thwarted through the members all,
Unable now to conquer false with true;
And memory lies prone and languishes
In slumber, nor protests that he, the man
Whom the mind feigns to see alive, long since
Hath been the gain of death and dissolution.

-
And further, 'tis no marvel idols move
And toss their arms and other members round
In rhythmic time- and often in men's sleeps
It haps an image this is seen to do;
In sooth, when perishes the former image,
And other is gendered of another pose,
That former seemeth to have changed its gestures.
Of course the change must be conceived as speedy;
So great the swiftness and so great the store
Of idol-things, and (in an instant brief
As mind can mark) so great, again, the store
Of separate idol-parts to bring supplies.

-
It happens also that there is supplied
Sometimes an image not of kind the same;

But what before was woman, now at hand
Is seen to stand there, altered into male;
Or other visage, other age succeeds;
But slumber and oblivion take care
That we shall feel no wonder at the thing.

And much in these affairs demands inquiry,
And much, illumination- if we crave
With plainness to exhibit facts. And first,
Why doth the mind of one to whom the whim
To think has come behold forthwith that thing?
Or do the idols watch upon our will,
And doth an image unto us occur,
Directly we desire- if heart prefer
The sea, the land, or after all the sky?
Assemblies of the citizens, parades,
Banquets, and battles, these and all doth she,
Nature, create and furnish at our word?
Maugre the fact that in same place and spot
Another's mind is meditating things
All far unlike. And what, again, of this:
When we in sleep behold the idols step,
In measure, forward, moving supple limbs,
Whilst forth they put each supple arm in turn
With speedy motion, and with eyeing heads
Repeat the movement, as the foot keeps time?
Forsooth, the idols they are steeped in art,
And wander to and fro well taught indeed,-
Thus to be able in the time of night
To make such games! Or will the truth be this:
Because in one least moment that we mark-
That is, the uttering of a single sound-
There lurk yet many moments, which the reason
Discovers to exist, therefore it comes
That, in a moment how so brief ye will,
The divers idols are hard by, and ready
Each in its place diverse? So great the swiftness,
So great, again, the store of idol-things,
And so, when perishes the former image,
And other is gendered of another pose,
The former seemeth to have changed its gestures.
And since they be so tenuous, mind can mark
Sharply alone the ones it strains to see;
And thus the rest do perish one and all,
Save those for which the mind prepares itself.

Further, it doth prepare itself indeed,
And hopes to see what follows after each-
Hence this result. For hast thou not observed
How eyes, essaying to perceive the fine,
Will strain in preparation, otherwise
Unable sharply to perceive at all?
Yet know thou canst that, even in objects plain,
If thou attendest not, 'tis just the same
As if 'twere all the time removed and far.
What marvel, then, that mind doth lose the rest,
Save those to which 'thas given up itself?
So 'tis that we conjecture from small signs
Things wide and weighty, and involve ourselves
In snarls of self-deceit.

BOOK_4|SOME_VITAL_FUNCTIONS
SOME VITAL FUNCTIONS

-

In these affairs

We crave that thou wilt passionately flee
The one offence, and anxiously wilt shun
The error of presuming the clear lights
Of eyes created were that we might see;
Or thighs and knees, apropos upon the feet,
Thuswise can bended be, that we might step
With goodly strides ahead; or forearms joined
Unto the sturdy uppers, or serving hands
On either side were given, that we might do
Life's own demands. All such interpretation
Is aft-for-fore with inverse reasoning,
Since naught is born in body so that we
May use the same, but birth engenders use:
No seeing ere the lights of eyes were born,
No speaking ere the tongue created was;
But origin of tongue came long before
Discourse of words, and ears created were
Much earlier than any sound was heard;
And all the members, so meseems, were there
Before they got their use: and therefore, they
Could not be gendered for the sake of use.
But contrariwise, contending in the fight
With hand to hand, and rending of the joints,
And fouling of the limbs with gore, was there,
O long before the gleaming spears ere flew;
And Nature prompted man to shun a wound,

Before the left arm by the aid of art
Opposed the shielding targe. And, verily,
Yielding the weary body to repose,
Far ancients than cushions of soft beds,
And quenching thirst is earlier than cups.
These objects, therefore, which for use and life
Have been devised, can be conceived as found
For sake of using. But apart from such
Are all which first were born and afterwards
Gave knowledge of their own utility-
Chief in which sort we note the senses, limbs:
Wherefore, again, 'tis quite beyond thy power
To hold that these could thus have been create
For office of utility.

Likewise,

'Tis nothing strange that all the breathing creatures
Seek, even by nature of their frame, their food.
Yes, since I've taught thee that from off the things
Stream and depart innumerable bodies
In modes innumerable too; but most
Must be the bodies streaming from the living-
Which bodies, vexed by motion evermore,
Are through the mouth exhaled innumerable,
When weary creatures pant, or through the sweat
Squeezed forth innumerable from deep within.
Thus body rarefies, so undermined
In all its nature, and pain attends its state.
And so the food is taken to underprop
The tottering joints, and by its interfusion
To re-create their powers, and there stop up
The longing, open-mouthed through limbs and veins,
For eating. And the moist no less departs
Into all regions that demand the moist;
And many heaped-up particles of hot,
Which cause such burnings in these bellies of ours,
The liquid on arriving dissipates
And quenches like a fire, that parching heat
No longer now can scorch the frame. And so,
Thou seest how panting thirst is washed away
From off our body, how the hunger-pang
It, too, appeased.

Now, how it comes that we,
Whene'er we wish, can step with strides ahead,
And how 'tis given to move our limbs about,
And what device is wont to push ahead

This the big load of our corporeal frame,
I'll say to thee- do thou attend what's said.
I say that first some idol-films of walking
Into our mind do fall and smite the mind,
As said before. Thereafter will arises;
For no one starts to do a thing, before
The intellect previsions what it wills;
And what it there pre-visioneth depends
On what that image is. When, therefore, mind
Doth so bestir itself that it doth will
To go and step along, it strikes at once
That energy of soul that's sown about
In all the body through the limbs and frame-
And this is easy of performance, since
The soul is close conjoined with the mind.
Next, soul in turn strikes body, and by degrees
Thus the whole mass is pushed along and moved.
Then too the body rarefies, and air,
Forsooth as ever of such nimbleness,
Comes on and penetrates abundantly
Through opened pores, and thus is sprinkled round
Unto all smallest places in our frame.
Thus then by these twain factors, severally,
Body is borne like ship with oars and wind.
Nor yet in these affairs is aught for wonder
That particles so fine can whirl around
So great a body and turn this weight of ours;
For wind, so tenuous with its subtle body,
Yet pushes, driving on the mighty ship
Of mighty bulk; one hand directs the same,
Whatever its momentum, and one helm
Whirls it around, whither ye please; and loads,
Many and huge, are moved and hoisted high
By enginery of pulley-blocks and wheels,
With but light strain.

Now, by what modes this sleep
Pours through our members waters of repose
And frees the breast from cares of mind, I'll tell
In verses sweeter than they many are;
Even as the swan's slight note is better far
Than that dispersed clamour of the cranes
Among the south wind's aery clouds. Do thou
Give me sharp ears and a sagacious mind,-
That thou mayst not deny the things to be
Whereof I'm speaking, nor depart away

With bosom scorning these the spoken truths,
Thyself at fault unable to perceive.
Sleep chiefly comes when energy of soul
Hath now been scattered through the frame, and part
Expelled abroad and gone away, and part
Crammed back and settling deep within the frame-
Whereafter then our loosened members droop.
For doubt is none that by the work of soul
Exist in us this sense, and when by slumber
That sense is thwarted, we are bound to think
The soul confounded and expelled abroad-
Yet not entirely, else the frame would lie
Drenched in the everlasting cold of death.
In sooth, where no one part of soul remained
Lurking among the members, even as fire
Lurks buried under many ashes, whence
Could sense amain rekindled be in members,
As flame can rise anew from unseen fire?

-
By what devices this strange state and new
May be occasioned, and by what the soul
Can be confounded and the frame grow faint,
I will untangle: see to it, thou, that I
Pour forth my words not unto empty winds.
In first place, body on its outer parts-
Since these are touched by neighbouring aery gusts-
Must there be thumped and strook by blows of air
Repeatedly. And therefore almost all
Are covered either with hides, or else with shells,
Or with the horny callus, or with bark.
Yet this same air lashes their inner parts,
When creatures draw a breath or blow it out.
Wherefore, since body thus is flogged alike
Upon the inside and the out, and blows
Come in upon us through the little pores
Even inward to our body's primal parts
And primal elements, there comes to pass
By slow degrees, along our members then,
A kind of overthrow; for then confounded
Are those arrangements of the primal germs
Of body and of mind. It comes to pass
That next a part of soul's expelled abroad,
A part retreateth in recesses hid,
A part, too, scattered all about the frame,
Cannot become united nor engage

In interchange of motion. Nature now
So hedges off approaches and the paths;
And thus the sense, its motions all deranged,
Retires down deep within; and since there's naught,
As 'twere, to prop the frame, the body weakens,
And all the members languish, and the arms
And eyelids fall, and, as ye lie abed,
Even there the houghs will sag and loose their powers.
Again, sleep follows after food, because
The food produces same result as air,
Whilst being scattered round through all the veins;
And much the heaviest is that slumber which,
Full or fatigued, thou takest; since 'tis then
That the most bodies disarrange themselves,
Bruised by labours hard. And in same wise,
This three-fold change: a forcing of the soul
Down deeper, more a casting-forth of it,
A moving more divided in its parts
And scattered more.

And to whate'er pursuit
A man most clings absorbed, or what the affairs
On which we theretofore have tarried much,
And mind hath strained upon the more, we seem
In sleep not rarely to go at the same.
The lawyers seem to plead and cite decrees,
Commanders they to fight and go at frays,
Sailors to live in combat with the winds,
And we ourselves indeed to make this book,
And still to seek the nature of the world
And set it down, when once discovered, here
In these my country's leaves. Thus all pursuits,
All arts in general seem in sleeps to mock
And master the minds of men. And whosoever
Day after day for long to games have given
Attention undivided, still they keep
(As oft we note), even when they've ceased to grasp
Those games with their own senses, open paths
Within the mind wherethrough the idol-films
Of just those games can come. And thus it is
For many a day thereafter those appear
Floating before the eyes, that even awake
They think they view the dancers moving round
Their supple limbs, and catch with both the ears
The liquid song of harp and speaking chords,
And view the same assembly on the seats,

And manifold bright glories of the stage-
So great the influence of pursuit and zest,
And of the affairs wherein 'thas been the wont
Of men to be engaged-nor only men,
But soothly all the animals. Behold,
Thou'lt see the sturdy horses, though outstretched,
Yet sweating in their sleep, and panting ever,
And straining utmost strength, as if for prize,
As if, with barriers opened now...
And hounds of huntsmen oft in soft repose
Yet toss asudden all their legs about,
And growl and bark, and with their nostrils sniff
The winds again, again, though indeed
They'd caught the scented foot-prints of wild beasts,
And, even when wakened, often they pursue
The phantom images of stags, as though
They did perceive them fleeing on before,
Until the illusion's shaken off and dogs
Come to themselves again. And fawning breed
Of house-bred whelps do feel the sudden urge
To shake their bodies and start from off the ground,
As if beholding stranger-visages.
And ever the fiercer be the stock, the more
In sleep the same is ever bound to rage.
But fleet the divers tribes of birds and vex
With sudden wings by night the groves of gods,
When in their gentle slumbers they have dreamed
Of hawks in chase, aswooping on for fight.
Again, the minds of mortals which perform
With mighty motions mighty enterprises,
Often in sleep will do and dare the same
In manner like. Kings take the towns by storm,
Succumb to capture, battle on the field,
Raise a wild cry as if their throats were cut
Even then and there. And many wrestle on
And groan with pains, and fill all regions round
With mighty cries and wild, as if then gnawed
By fangs of panther or of lion fierce.
Many amid their slumbers talk about
Their mighty enterprises, and have often
Enough become the proof of their own crimes.
Many meet death; many, as if headlong
From lofty mountains tumbling down to earth
With all their frame, are frenzied in their fright;
And after sleep, as if still mad in mind,

They scarce come to, confounded as they are
By ferment of their frame. The thirsty man,
Likewise, he sits beside delightful spring
Or river and gulpeth down with gaping throat
Nigh the whole stream. And oft the innocent young,
By sleep o'ermastered, think they lift their dress
By pail or public jordan and then void
The water filtered down their frame entire
And drench the Babylonian coverlets,
Magnificently bright. Again, those males
Into the surging channels of whose years
Now first has passed the seed (engendered
Within their members by the ripened days)
Are in their sleep confronted from without
By idol-images of some fair form-
Tidings of glorious face and lovely bloom,
Which stir and goad the regions turgid now
With seed abundant; so that, as it were
With all the matter acted duly out,
They pour the billows of a potent stream
And stain their garment.

And as said before,
That seed is roused in us when once ripe age
Has made our body strong...

-
As divers causes give to divers things
Impulse and irritation, so one force
In human kind rouses the human seed
To spurt from man. As soon as ever it issues,
Forced from its first abodes, it passes down
In the whole body through the limbs and frame,
Meeting in certain regions of our thews,
And stirs amain the genitals of man.
The goaded regions swell with seed, and then
Comes the delight to dart the same at what
The mad desire so yearns, and body seeks
That object, whence the mind by love is pierced.
For well-nigh each man falleth toward his wound,
And our blood spurts even toward the spot from whence
The stroke wherewith we are strook, and if indeed
The foe be close, the red jet reaches him.
Thus, one who gets a stroke from Venus' shafts-
Whether a boy with limbs effeminate
Assault him, or a woman darting love
From all her body- that one strains to get

Even to the thing whereby he's hit, and longs
To join with it and cast into its frame
The fluid drawn even from within its own.
For the mute craving doth presage delight.

BOOK_4|THE_PASSION_OF_LOVE
THE PASSION OF LOVE

-
This craving 'tis that's Venus unto us:
From this, engender all the lures of love,
From this, O first hath into human hearts
Trickled that drop of joyance which ere long
Is by chill care succeeded. Since, indeed,
Though she thou lovest now be far away,
Yet idol-images of her are near
And the sweet name is floating in thy ear.
But it behooves to flee those images;
And scare afar whatever feeds thy love;
And turn elsewhere thy mind; and vent the sperm,
Within thee gathered, into sundry bodies,
Nor, with thy thoughts still busied with one love,
Keep it for one delight, and so store up
Care for thyself and pain inevitable.
For, lo, the ulcer just by nourishing
Grows to more life with deep inveteracy,
And day by day the fury swells aflame,
And the woe waxes heavier day by day-
Unless thou dost destroy even by new blows
The former wounds of love, and curest them
While yet they're fresh, by wandering freely round
After the freely-wandering Venus, or
Canst lead elsewhere the tumults of thy mind.
Nor doth that man who keeps away from love
Yet lack the fruits of Venus; rather takes
Those pleasures which are free of penalties.
For the delights of Venus, verily,
Are more unmixed for mortals sane-of-soul
Than for those sick-at-heart with love-pining.
Yea, in the very moment of possessing,
Surges the heat of lovers to and fro,
Restive, uncertain; and they cannot fix
On what to first enjoy with eyes and hands.
The parts they sought for, those they squeeze so tight,
And pain the creature's body, close their teeth
Often against her lips, and smite with kiss

Mouth into mouth,- because this same delight
Is not unmixed; and underneath are stings
Which goad a man to hurt the very thing,
Whate'er it be, from whence arise for him
Those germs of madness. But with gentle touch
Venus subdues the pangs in midst of love,
And the admixture of a fondling joy
Doth curb the bites of passion. For they hope
That by the very body whence they caught
The heats of love their flames can be put out.
But Nature protests 'tis all quite otherwise;
For this same love it is the one sole thing
Of which, the more we have, the fiercer burns
The breast with fell desire. For food and drink
Are taken within our members; and, since they
Can stop up certain parts, thus, easily
Desire of water is glutted and of bread.
But, lo, from human face and lovely bloom
Naught penetrates our frame to be enjoyed
Save flimsy idol-images and vain-
A sorry hope which oft the winds disperse.
As when the thirsty man in slumber seeks
To drink, and water ne'er is granted him
Wherewith to quench the heat within his members,
But after idols of the liquids strives
And toils in vain, and thirsts even whilst he gulps
In middle of the torrent, thus in love
Venus deludes with idol-images
The lovers. Nor they cannot sate their lust
By merely gazing on the bodies, nor
They cannot with their palms and fingers rub
Aught from each tender limb, the while they stray
Uncertain over all the body. Then,
At last, with members intertwined, when they
Enjoy the flower of their age, when now
Their bodies have sweet presage of keen joys,
And Venus is about to sow the fields
Of woman, greedily their frames they lock,
And mingle the slaver of their mouths, and breathe
Into each other, pressing teeth on mouths-
Yet to no purpose, since they're powerless
To rub off aught, or penetrate and pass
With body entire into body- for oft
They seem to strive and struggle thus to do;
So eagerly they cling in Venus' bonds,

Whilst melt away their members, overcome
By violence of delight. But when at last
Lust, gathered in the thews, hath spent itself,
There come a brief pause in the raging heat-
But then a madness just the same returns
And that old fury visits them again,
When once again they seek and crave to reach
They know not what, all powerless to find
The artifice to subjugate the bane.
In such uncertain state they waste away
With unseen wound.

 To which be added too,
They squander powers and with the travail wane;
Be added too, they spend their futile years
Under another's beck and call; their duties
Neglected languish and their honest name
Reeleth sick, sick; and meantime their estates
Are lost in Babylonian tapestries;
And unguents and dainty Sicyonian shoes
Laugh on their feet; and (as ye may be sure)
Big emeralds of green light are set in gold;
And rich sea-purple dress by constant wear
Grows shabby and all soaked with Venus' sweat;
And the well-earned ancestral property
Becometh head-bands, coifs, and many a time
The cloaks, or garments Alidensian
Or of the Cean isle. And banquets, set
With rarest cloth and viands, are prepared-
And games of chance, and many a drinking cup,
And unguents, crowns and garlands. All in vain,
Since from amid the well-spring of delights
Bubbles some drop of bitter to torment
Among the very flowers- when haply mind
Gnaws into self, now stricken with remorse
For slothful years and ruin in bordels,
Or else because she's left him all in doubt
By launching some sly word, which still like fire
Lives wildly, cleaving to his eager heart;
Or else because he thinks she darts her eyes
Too much about and gazes at another,
And in her face sees traces of a laugh.

-
These ills are found in prospering love and true;
But in crossed love and helpless there be such
As through shut eyelids thou canst still take in-

Uncounted ills; so that 'tis better far
To watch beforehand, in the way I've shown,
And guard against enticements. For to shun
A fall into the hunting-snares of love
Is not so hard, as to get out again,
When tangled in the very nets, and burst
The stoutly-knotted cords of Aphrodite.
Yet even when there enmeshed with tangled feet,
Still canst thou scape the danger-lest indeed
Thou standest in the way of thine own good,
And overlookest first all blemishes
Of mind and body of thy much preferred,
Desirable dame. For so men do,
Eyeless with passion, and assign to them
Graces not theirs in fact. And thus we see
Creatures in many a wise crooked and ugly
The prosperous sweethearts in a high esteem;
And lovers gird each other and advise
To placate Venus, since their friends are smit
With a base passion- miserable dupes
Who seldom mark their own worst bane of all.
The black-skinned girl is "tawny like the honey";
The filthy and the fetid's "negligee";
The cat-eyed she's "a little Pallas," she;
The sinewy and wizened's "a gazelle";
The pudgy and the pigmy is "piquant,
One of the Graces sure"; the big and bulky
O she's "an Admiration, imposante";
The stuttering and tongue-tied "sweetly lisps";
The mute girl's "modest"; and the garrulous,
The spiteful spit-fire, is "a sparkling wit";
And she who scarcely lives for scrawniness
Becomes "a slender darling"; "delicate"
Is she who's nearly dead of coughing-fit;
The pousy female with protuberant breasts
She is "like Ceres when the goddess gave
Young Bacchus suck"; the pug-nosed lady-love
"A Satyress, a feminine Silenus";
The blubber-lipped is "all one luscious kiss"-
A weary while it were to tell the whole.
But let her face possess what charm ye will,
Let Venus' glory rise from all her limbs,-
Forsooth there still are others; and forsooth
We lived before without her; and forsooth
She does the same things- and we know she does-

All, as the ugly creature and she scents,
Yes she, her wretched self with vile perfumes;
Whom even her handmaids flee and giggle at
Behind her back. But he, the lover, in tears
Because shut out, covers her threshold o'er
Often with flowers and garlands, and anoints
Her haughty door-posts with the marjoram,
And prints, poor fellow, kisses on the doors-
Admitted at last, if haply but one whiff
Got to him on approaching, he would seek
Decent excuses to go out forthwith;
And his lament, long pondered, then would fall
Down at his heels; and there he'd damn himself
For his fatuity, observing how
He had assigned to that same lady more-
Than it is proper to concede to mortals.
And these our Venuses are 'ware of this.
Wherefore the more are they at pains to hide
All the-behind-the-scenes of life from those
Whom they desire to keep in bonds of love-
In vain, since ne'ertheless thou canst by thought
Drag all the matter forth into the light
And well search out the cause of all these smiles;
And if of graceful mind she be and kind,
Do thou, in thy turn, overlook the same,
And thus allow for poor mortality.

Nor sighs the woman always with feigned love,
Who links her body round man's body locked
And holds him fast, making his kisses wet
With lips sucked into lips; for oft she acts
Even from desire, and, seeking mutual joys,
Incites him there to run love's race-course through.
Nor otherwise can cattle, birds, wild beasts,
And sheep and mares submit unto the males,
Except that their own nature is in heat,
And burns abounding and with gladness takes
Once more the Venus of the mounting males.
And seest thou not how those whom mutual pleasure
Hath bound are tortured in their common bonds?
How often in the cross-roads dogs that pant
To get apart strain eagerly asunder
With utmost might?- When all the while they're fast
In the stout links of Venus. But they'd ne'er
So pull, except they knew those mutual joys-

So powerful to cast them unto snares
And hold them bound. Wherefore again, again,
Even as I say, there is a joint delight.

-
And when perchance, in mingling seed with his,
The female hath o'erpowered the force of male
And by a sudden fling hath seized it fast,
Then are the offspring, more from mothers' seed,
More like their mothers; as, from fathers' seed,
They're like to fathers. But whom seest to be
Partakers of each shape, one equal blend
Of parents' features, these are generate
From fathers' body and from mothers' blood,
When mutual and harmonious heat hath dashed
Together seeds, aroused along their frames
By Venus' goads, and neither of the twain
Mastereth or is mastered. Happens too
That sometimes offspring can to being come
In likeness of their grandsires, and bring back
Often the shapes of grandsires' sires, because
Their parents in their bodies oft retain
Concealed many primal germs, commixed
In many modes, which, starting with the stock,
Sire handeth down to son, himself a sire;
Whence Venus by a variable chance
Engenders shapes, and diversely brings back
Ancestral features, voices too, and hair.
A female generation rises forth
From seed paternal, and from mother's body
Exist created males: since sex proceeds
No more from singleness of seed than faces
Or bodies or limbs of ours: for every birth
Is from a twofold seed; and what's created
Hath, of that parent which it is more like,
More than its equal share; as thou canst mark,-
Whether the breed be male or female stock.

Nor do the powers divine grudge any man
The fruits of his seed-sowing, so that never
He be called "father" by sweet children his,
And end his days in sterile love forever.
What many men suppose; and gloomily
They sprinkle the altars with abundant blood,
And make the high platforms odorous with burnt gifts,
To render big by plenteous seed their wives-
And plague in vain godheads and sacred lots.

For sterile, are these men by seed too thick,
Or else by far too watery and thin.
Because the thin is powerless to cleave
Fast to the proper places, straightaway
It trickles from them, and, returned again,
Retires abortively. And then since seed
More gross and solid than will suit is spent
By some men, either it flies not forth amain
With spurt prolonged enough, or else it fails
To enter suitably the proper places,
Or, having entered, the seed is weakly mixed
With seed of the woman: harmonies of Venus
Are seen to matter vastly here; and some
Impregnate some more readily, and from some
Some women conceive more readily and become
Pregnant. And many women, sterile before
In several marriage-beds, have yet thereafter
Obtained the mates from whom they could conceive
The baby-boys, and with sweet progeny
Grow rich. And even for husbands (whose own wives,
Although of fertile wombs, have borne for them
No babies in the house) are also found
Concordant natures so that they at last
Can bulwark their old age with goodly sons.
A matter of great moment 'tis in truth,
That seeds may mingle readily with seeds
Suited for procreation, and that thick
Should mix with fluid seeds, with thick the fluid.
And in this business 'tis of some import
Upon what diet life is nourished:
For some foods thicken seeds within our members,
And others thin them out and waste away.
And in what modes the fond delight itself
Is carried on- this too importeth vastly.
For commonly 'tis thought that wives conceive
More readily in manner of wild-beasts,
After the custom of the four-foot breeds,
Because so postured, with the breasts beneath
And buttocks then upreared, the seeds can take
Their proper places. Nor is need the least
For wives to use the motions of blandishment;
For thus the woman hinders and resists
Her own conception, if too joyously
Herself she treats the Venus of the man
With haunches heaving, and with all her bosom

Now yielding like the billows of the sea-
Aye, from the ploughshare's even course and track
She throws the furrow, and from proper places
Deflects the spurt of seed. And courtesans
Are thuswise wont to move for their own ends,
To keep from pregnancy and lying in,
And all the while to render Venus more
A pleasure for the men- the which meseems
Our wives have never need of.

Sometimes too

It happens- and through no divinity
Nor arrows of Venus- that a sorry chit
Of scanty grace will be beloved by man;
For sometimes she herself by very deeds,
By her complying ways, and tidy habits,
Will easily accustom thee to pass
With her thy life-time- and, moreover, lo,
Long habitude can gender human love,
Even as an object smitten o'er and o'er
By blows, however lightly, yet at last
Is overcome and wavers. Seest thou not,
Besides, how drops of water falling down
Against the stones at last bore through the stones?

BOOK_5

BOOK V

BOOK_5|PROEM

PROEM

O who can build with puissant breast a song
Worthy the majesty of these great finds?
Or who in words so strong that he can frame
The fit laudations for deserts of him
Who left us heritors of such vast prizes,
By his own breast discovered and sought out?-
There shall be none, methinks, of mortal stock.
For if must needs be named for him the name
Demanded by the now known majesty
Of these high matters, then a god was he,-
Hear me, illustrious Memmius- a god;

Who first and chief found out that plan of life
Which now is called philosophy, and who
By cunning craft, out of such mighty waves,
Out of such mighty darkness, moored life
In havens so serene, in light so clear.
Compare those old discoveries divine
Of others: lo, according to the tale,
Ceres established for mortality
The grain, and Bacchus juice of vine-born grape,
Though life might yet without these things abide,
Even as report saith now some peoples live.
But man's well-being was impossible
Without a breast all free. Wherefore the more
That man doth justly seem to us a god,
From whom sweet solaces of life, afar
Distributed o'er populous domains,
Now soothe the minds of men. But if thou thinkest
Labours of Hercules excel the same,
Much farther from true reasoning thou farest.
For what could hurt us now that mighty maw
Of Nemeaeon Lion, or what the Boar
Who bristled in Arcadia? Or, again,
O what could Cretan Bull, or Hydra, pest
Of Lerna, fenced with vipers venomous?
Or what the triple-breasted power of her
The three-fold Geryon...

-
The sojourners in the Stymphalian fens
So dreadfully offend us, or the Steeds
Of Thracian Diomedes breathing fire
From out their nostrils off along the zones
Bistonian and Ismarian? And the Snake,
The dread fierce gazer, guardian of the golden
And gleaming apples of the Hesperides,
Coiled round the tree-trunk with tremendous bulk,
O what, again, could he inflict on us
Along the Atlantic shore and wastes of sea?-
Where neither one of us approacheth nigh
Nor no barbarian ventures. And the rest
Of all those monsters slain, even if alive,
Unconquered still, what injury could they do?
None, as I guess. For so the gluttoned earth
Swarms even now with savage beasts, even now
Is filled with anxious terrors through the woods
And mighty mountains and the forest deeps-

Quarters 'tis ours in general to avoid.
But lest the breast be purged, what conflicts then,
What perils, must bosom, in our own despite!
O then how great and keen the cares of lust
That split the man distraught! How great the fears!
And lo, the pride, grim greed, and wantonness-
How great the slaughters in their train! and lo,
Debaucheries and every breed of sloth!
Therefore that man who subjugated these,
And from the mind expelled, by words indeed,
Not arms, O shall it not be seemly him
To dignify by ranking with the gods?-
And all the more since he was wont to give,
Concerning the immortal gods themselves,
Many pronouncements with a tongue divine,
And to unfold by his pronouncements all
The nature of the world.

BOOK_5|AGAINST_TELEOLOGICAL_CONCEPT
ARGUMENT OF THE BOOK AND NEW
PROEM AGAINST TELEOLOGICAL
CONCEPT

-
And walking now
In his own footprints, I do follow through
His reasonings, and with pronouncements teach
The covenant whereby all things are framed,
How under that covenant they must abide
Nor ever prevail to abrogate the aeons'
Inexorable decrees- how (as we've found),
In class of mortal objects, o'er all else,
The mind exists of earth-born frame create
And impotent unscathed to abide
Across the mighty aeons, and how come
In sleep those idol-apparitions
That so befool intelligence when we
Do seem to view a man whom life has left.
Thus far we've gone; the order of my plan
Hath brought me now unto the point where I
Must make report how, too, the universe
Consists of mortal body, born in time,
And in what modes that congregated stuff
Established itself as earth and sky,
Ocean, and stars, and sun, and ball of moon;
And then what living creatures rose from out

The old telluric places, and what ones
Were never born at all; and in what mode
The human race began to name its things
And use the varied speech from man to man;
And in what modes hath bosomed in their breasts
That awe of gods, which halloweth in all lands
Fanes, altars, groves, lakes, idols of the gods.
Also I shall untangle by what power
The steersman Nature guides the sun's courses,
And the meanderings of the moon, lest we,
Perchance, should fancy that of own free will
They circle their perennial courses round,
Timing their motions for increase of crops
And living creatures, or lest we should think
They roll along by any plan of gods.
For even those men who have learned full well
That godheads lead a long life free of care,
If yet meanwhile they wonder by what plan
Things can go on (and chiefly yon high things
Observed o'erhead on the ethereal coasts),
Again are hurried back unto the fears
Of old religion and adopt again
Harsh masters, deemed almighty- wretched men,
Unwitting what can be and what cannot,
And by what law to each its scope prescribed,
Its boundary stone that clings so deep in Time.

But for the rest, lest we delay thee here
Longer by empty promises- behold,
Before all else, the seas, the lands, the sky:
O Memmius, their threefold nature, lo,
Their bodies three, three aspects so unlike,
Three frames so vast, a single day shall give
Unto annihilation! Then shall crash
That massive form and fabric of the world
Sustained so many aeons! Nor do I
Fail to perceive how strange and marvellous
This fact must strike the intellect of man,-
Annihilation of the sky and earth
That is to be,- and with what toil of words
'Tis mine to prove the same; as happens oft
When once ye offer to man's listening ears
Something before unheard of, but may not
Subject it to the view of eyes for him
Nor put it into hand- the sight and touch,

Whereby the opened highways of belief
Lead most directly into human breast
And regions of intelligence. But yet
I will speak out. The fact itself, perchance,
Will force belief in these my words, and thou
Mayst see, in little time, tremendously
With risen commotions of the lands all things
Quaking to pieces- which afar from us
May she, the steersman Nature, guide: and may
Reason, O rather than the fact itself,
Persuade us that all things can be o'erthrown
And sink with awful-sounding breakage down!

But ere on this I take a step to utter
Oracles holier and soundlier based
Than ever the Pythian pronounced for men
From out the tripod and the Delphian laurel,
I will unfold for thee with learned words
Many a consolation, lest perchance,
Still bridled by religion, thou suppose
Lands, sun, and sky, sea, constellations, moon,
Must dure forever, as of frame divine-
And so conclude that it is just that those,
(After the manner of the Giants), should all
Pay the huge penalties for monstrous crime,
Who by their reasonings do overshake
The ramparts of the universe and wish
There to put out the splendid sun of heaven,
Branding with mortal talk immortal things-
Though these same things are even so far removed
From any touch of deity and seem
So far unworthy of numbering with the gods,
That well they may be thought to furnish rather
A goodly instance of the sort of things
That lack the living motion, living sense.
For sure 'tis quite beside the mark to think
That judgment and the nature of the mind
In any kind of body can exist-
Just as in ether can't exist a tree,
Nor clouds in the salt sea, nor in the fields
Can fishes live, nor blood in timber be,
Nor sap in boulders: fixed and arranged
Where everything may grow and have its place.
Thus nature of mind cannot arise alone
Without the body, nor have its being far

From thews and blood. Yet if 'twere possible?-
Much rather might this very power of mind
Be in the head, the shoulders, or the heels,
And, born in any part soever, yet
In the same man, in the same vessel abide
But since within this body even of ours
Stands fixed and appears arranged sure
Where soul and mind can each exist and grow,
Deny we must the more that they can dure
Outside the body and the breathing form
In rotting clods of earth, in the sun's fire,
In water, or in ether's skiey coasts.
Therefore these things no whit are furnished
With sense divine, since never can they be
With life-force quickened.

Likewise, thou canst ne'er
Believe the sacred seats of gods are here
In any regions of this mundane world;
Indeed, the nature of the gods, so subtle,
So far removed from these our senses, scarce
Is seen even by intelligence of mind.
And since they've ever eluded touch and thrust
Of human hands, they cannot reach to grasp
Aught tangible to us. For what may not
Itself be touched in turn can never touch.
Wherefore, besides, also their seats must be
Unlike these seats of ours,- even subtle too,
As meet for subtle essence- as I'll prove
Hereafter unto thee with large discourse.
Further, to say that for the sake of men
They willed to prepare this world's magnificence,
And that 'tis therefore duty and behoof
To praise the work of gods as worthy praise,
And that 'tis sacrilege for men to shake
Ever by any force from out their seats
What hath been stablished by the Forethought old
To everlasting for races of mankind,
And that 'tis sacrilege to assault by words
And overtopple all from base to beam,-
Memmius, such notions to concoct and pile,
Is verily- to dote. Our gratefulness,
O what emoluments could it confer
Upon Immortals and upon the Blessed
That they should take a step to manage aught
For sake of us? Or what new factor could,

After so long a time, inveigle them-
The hitherto reposeful- to desire
To change their former life? For rather he
Whom old things chafe seems likely to rejoice
At new; but one that in fore-passed time
Hath chanced upon no ill, through goodly years.
O what could ever enkindle in such an one
Passion for strange experiment? Or what
The evil for us, if we had ne'er been born?-
As though, forsooth, in darkling realms and woe
Our life were lying till should dawn at last
The day-spring of creation! Whosoever
Hath been begotten wills perforce to stay
In life, so long as fond delight detains;
But whoso ne'er hath tasted love of life,
And ne'er was in the count of living things,
What hurts it him that he was never born?
Whence, further, first was planted in the gods
The archetype for gendering the world
And the fore-notion of what man is like,
So that they knew and pre-conceived with mind
Just what they wished to make? Or how were known
Ever the energies of primal germs,
And what those germs, by interchange of place,
Could thus produce, if nature's self had not
Given example for creating all?
For in such wise primordials of things,
Many in many modes, astir by blows
From immemorial aeons, in motion too
By their own weights, have evermore been wont
To be so borne along and in all modes
To meet together and to try all sorts
Which, by combining one with other, they
Are powerful to create, that thus it is
No marvel now, if they have also fallen
Into arrangements such, and if they've passed
Into vibrations such, as those whereby
This sum of things is carried on to-day
By fixed renewal. But knew I never what
The seeds primordial were, yet would I dare
This to affirm, even from deep judgments based
Upon the ways and conduct of the skies-
This to maintain by many a fact besides-
That in no wise the nature of all things
For us was fashioned by a power divine-

So great the faults it stands encumbered with.
First, mark all regions which are overarched
By the prodigious reaches of the sky:
One yawning part thereof the mountain-chains
And forests of the beasts do have and hold;
And cliffs, and desert fens, and wastes of sea
(Which sunder afar the beaches of the lands)
Possess it merely; and, again, thereof
Well-nigh two-thirds intolerable heat
And a perpetual fall of frost doth rob
From mortal kind. And what is left to till,
Even that the force of Nature would o'errun
With brambles, did not human force oppose,-
Long wont for livelihood to groan and sweat
Over the two-pronged mattock and to cleave
The soil in twain by pressing on the plough.

Unless, by the ploughshare turning the fruitful clods
And kneading the mould, we quicken into birth,
The crops spontaneously could not come up
Into the free bright air. Even then sometimes,
When things acquired by the sternest toil
Are now in leaf, are now in blossom all,
Either the skiey sun with baneful heats
Parches, or sudden rains or chilling rime
Destroys, or flaws of winds with furious whirl
Torment and twist. Beside these matters, why
Doth Nature feed and foster on land and sea
The dreadful breed of savage beasts, the foes
Of the human clan? Why do the seasons bring
Distempers with them? Wherefore stalks at large
Death, so untimely? Then, again, the babe,
Like to the castaway of the raging surf,
Lies naked on the ground, speechless, in want
Of every help for life, when Nature first
Hath poured him forth upon the shores of light
With birth-pangs from within the mother's womb,
And with a plaintive wail he fills the place,-
As well befitting one for whom remains
In life a journey through so many ills.
But all the flocks and herds and all wild beasts
Come forth and grow, nor need the little rattles,
Nor must be treated to the humouring nurse's
Dear, broken chatter; nor seek they divers clothes
To suit the changing skies; nor need, in fine,

Nor arms, nor lofty ramparts, wherewithal
Their own to guard- because the earth herself
And Nature, artificer of the world, bring forth
Aboundingly all things for all.

BOOK_5|THE_WORLD_IS_NOT_ETERNAL
THE WORLD IS NOT ETERNAL

-

And first,
Since body of earth and water, air's light breath,
And fiery exhalations (of which four
This sum of things is seen to be compact)
So all have birth and perishable frame,
Thus the whole nature of the world itself
Must be conceived as perishable too.
For, verily, those things of which we see
The parts and members to have birth in time
And perishable shapes, those same we mark
To be invariably born in time
And born to die. And therefore when I see
The mightiest members and the parts of this
Our world consumed and begot again,
'Tis mine to know that also sky above
And earth beneath began of old in time
And shall in time go under to disaster.

And lest in these affairs thou deemest me
To have seized upon this point by sleight to serve
My own caprice- because I have assumed
That earth and fire are mortal things indeed,
And have not doubted water and the air
Both perish too and have affirmed the same
To be again begotten and wax big-
Mark well the argument: in first place, lo,
Some certain parts of earth, grievously parched
By unremitting suns, and trampled on
By a vast throng of feet, exhale abroad
A powdery haze and flying clouds of dust,
Which the stout winds disperse in the whole air.
A part, moreover, of her sod and soil
Is summoned to inundation by the rains;
And rivers graze and gouge the banks away.
Besides, whatever takes a part its own
In fostering and increasing aught...

-

Is rendered back; and since, beyond a doubt,

Earth, the all-mother, is beheld to be
Likewise the common sepulchre of things,
Therefore thou seest her minished of her plenty,
And then again augmented with new growth.

And for the rest, that sea, and streams, and springs
Forever with new waters overflow
And that perennially the fluids well.
Needeth no words- the mighty flux itself
Of multitudinous waters round about
Declareth this. But whatso water first
Streams up is ever straightway carried off,
And thus it comes to pass that all in all
There is no overflow; in part because
The burly winds (that over-sweep amain)
And skiey sun (that with his rays dissolves)
Do minish the level seas; in part because
The water is diffused underground
Through all the lands. The brine is filtered off,
And then the liquid stuff seeps back again
And all re-gathers at the river-heads,
Whence in fresh-water currents on it flows
Over the lands, adown the channels which
Were cleft erstwhile and erstwhile bore along
The liquid-footed floods.

Now, then, of air
I'll speak, which hour by hour in all its body
Is changed innumerably. For whatso'er
Streams up in dust or vapour off of things,
The same is all and always borne along
Into the mighty ocean of the air;
And did not air in turn restore to things
Bodies, and thus recruit them as they stream,
All things by this time had resolved been
And changed into air. Therefore it never
Ceases to be engendered off of things
And to return to things, since verily
In constant flux do all things stream.

Likewise,
The abounding well-spring of the liquid light,
The ethereal sun, doth flood the heaven o'er
With constant flux of radiance ever new,
And with fresh light supplies the place of light,
Upon the instant. For whatever effulgence
Hath first streamed off, no matter where it falls,

Is lost unto the sun. And this 'tis thine
To know from these examples: soon as clouds
Have first begun to under-pass the sun,
And, as it were, to rend the days of light
In twain, at once the lower part of them
Is lost entire, and earth is overcast
Where'er the thunderheads are rolled along-
So know thou mayst that things forever need
A fresh replenishment of gleam and glow,
And each effulgence, foremost flashed forth,
Perisheth one by one. Nor otherwise
Can things be seen in sunlight, lest always
The fountain-head of light supply new light.
Indeed your earthly beacons of the night,
The hanging lampions and the torches, bright
With darting gleams and dense with livid soot,
Do hurry in like manner to supply
With ministering heat new light amain;
Are all alive to quiver with their fires,-
Are so alive, that thus the light ne'er leaves
The spots it shines on, as if rent in twain:
So speedily is its destruction veiled
By the swift birth of flame from all the fires.
Thus, then, we must suppose that sun and moon
And stars dart forth their light from under-births
Ever and ever new, and whatso flames
First rise do perish always one by one-
Lest, haply, thou shouldst think they each endure
Inviolable.

Again, perceivest not
How stones are also conquered by Time?-
Not how the lofty towers ruin down,
And boulders crumble?- Not how shrines of gods
And idols crack outworn?- Nor how indeed
The holy Influence hath yet no power
There to postpone the Terminals of Fate,
Or headway make 'gainst Nature's fixed decrees?
Again, behold we not the monuments
Of heroes, now in ruins, asking us,
In their turn likewise, if we don't believe
They also age with eld? Behold we not
The rended basalt ruining amain
Down from the lofty mountains, powerless
To dure and dree the mighty forces there
Of finite time?- for they would never fall

Rended asudden, if from infinite Past
They had prevailed against all engin'ries
Of the assaulting aeons, with no crash.

Again, now look at This, which round, above,
Contains the whole earth in its one embrace:
If from itself it procreates all things-
As some men tell- and takes them to itself
When once destroyed, entirely must it be
Of mortal birth and body; for whate'er
From out itself giveth to other things
Increase and food, the same perforce must be
Minished, and then recruited when it takes
Things back into itself.

Besides all this,

If there had been no origin-in-birth
Of lands and sky, and they had ever been
The everlasting, why, ere Theban war
And obsequies of Troy, have other bards
Not also chanted other high affairs?
Whither have sunk so oft so many deeds
Of heroes? Why do those deeds live no more,
Ingrafted in eternal monuments
Of glory? Verily, I guess, because
The Sum is new, and of a recent date
The nature of our universe, and had
Not long ago its own exordium.
Wherefore, even now some arts are being still
Refined, still increased: now unto ships
Is being added many a new device;
And but the other day musician-folk
Gave birth to melic sounds of organing;
And, then, this nature, this account of things
Hath been discovered latterly, and I
Myself have been discovered only now,
As first among the first, able to turn
The same into ancestral Roman speech.
Yet if, perchance, thou deemest that ere this
Existed all things even the same, but that
Perished the cycles of the human race
In fiery exhalations, or cities fell
By some tremendous quaking of the world,
Or rivers in fury, after constant rains,
Had plunged forth across the lands of earth
And whelmed the towns- then, all the more must thou
Confess, defeated by the argument,

That there shall be annihilation too
Of lands and sky. For at a time when things
Were being taxed by maladies so great,
And so great perils, if some cause more fell
Had then assailed them, far and wide they would
Have gone to disaster and supreme collapse.
And by no other reasoning are we
Seen to be mortal, save that all of us
Sicken in turn with those same maladies
With which have sickened in the past those men
Whom Nature hath removed from life.

Again,

Whatever abides eternal must indeed
Either repel all strokes, because 'tis made
Of solid body, and permit no entrance
Of aught with power to sunder from within
The parts compact- as are those seeds of stuff
Whose nature we've exhibited before;
Or else be able to endure through time
For this: because they are from blows exempt,
As is the void, the which abides untouched,
Unsmitten by any stroke; or else because
There is no room around, whereto things can,
As 'twere, depart in dissolution all-
Even as the sum of sums eternal is,
Without or place beyond whereto things may
Asunder fly, or bodies which can smite,
And thus dissolve them by the blows of might.
But not of solid body, as I've shown,
Exists the nature of the world, because
In things is intermingled there a void;
Nor is the world yet as the void, nor are,
Moreover, bodies lacking which, perchance,
Rising from out the infinite, can fall
With fury-whirlwinds all this sum of things,
Or bring upon them other cataclysm
Of peril strange; and yonder, too, abides
The infinite space and the profound abyss-
Whereinto, lo, the ramparts of the world
Can yet be shivered. Or some other power
Can pound upon them till they perish all.
Thus is the door of doom, O nowise barred
Against the sky, against the sun and earth
And deep-sea waters, but wide open stands
And gloats upon them, monstrous and agape.

Wherefore, again, 'tis needful to confess
That these same things are born in time; for things
Which are of mortal body could indeed
Never from infinite past until to-day
Have spurned the multitudinous assaults
Of the immeasurable aeons old.

-
Again, since battle so fiercely one with other
The four most mighty members the world,
Aroused in an all unholy war,
Seest not that there may be for them an end
Of the long strife?- Or when the skiey sun
And all the heat have won dominion o'er
The sucked-up waters all?- And this they try
Still to accomplish, though as yet they fail,-
For so aboundingly the streams supply
New store of waters that 'tis rather they
Who menace the world with inundations vast
From forth the unplumbed chasms of the sea.
But vain- since winds (that over-sweep amain)
And skiey sun (that with his rays dissolves)
Do minish the level seas and trust their power
To dry up all, before the waters can
Arrive at the end of their endeavouring.
Breathing such vasty warfare, they contend
In balanced strife the one with other still
Concerning mighty issues- though indeed
The fire was once the more victorious,
And once- as goes the tale- the water won
A kingdom in the fields. For fire o'ermastered
And licked up many things and burnt away,
What time the impetuous horses of the Sun
Snatched Phaethon headlong from his skiey road
Down the whole ether and over all the lands.
But the omnipotent Father in keen wrath
Then with the sudden smite of thunderbolt
Did hurl the mighty-minded hero off
Those horses to the earth. And Sol, his sire,
Meeting him as he fell, caught up in hand
The ever-blazing lampion of the world,
And drave together the pell-mell horses there
And yoked them all a-tremble, and amain,
Steering them over along their own old road,
Restored the cosmos- as forsooth we hear
From songs of ancient poets of the Greeks-

A tale too far away from truth, meseems.
For fire can win when from the infinite
Has risen a larger throng of particles
Of fiery stuff; and then its powers succumb,
Somehow subdued again, or else at last
It shrivels in torrid atmospheres the world.
And whilom water too began to win-
As goes the story- when it overwhelmed
The lives of men with billows; and thereafter,
When all that force of water-stuff which forth
From out the infinite had risen up
Did now retire, as somehow turned aside,
The rain-storms stopped, and streams their fury checked.

BOOK_5|FORMATION_OF_THE_WORLD
FORMATION OF THE WORLD AND
ASTRONOMICAL QUESTIONS

-
But in what modes that conflux of first-stuff
Did found the multitudinous universe
Of earth, and sky, and the unfathomed deeps
Of ocean, and courses of the sun and moon,
I'll now in order tell. For of a truth
Neither by counsel did the primal germs
'Stablish themselves, as by keen act of mind,
Each in its proper place; nor did they make,
Forsooth, a compact how each germ should move;
But, lo, because primordials of things,
Many in many modes, astir by blows
From immemorial aeons, in motion too
By their own weights, have evermore been wont
To be so borne along and in all modes
To meet together and to try all sorts
Which, by combining one with other, they
Are powerful to create: because of this
It comes to pass that those primordials,
Diffused far and wide through mighty aeons,
The while they unions try, and motions too,
Of every kind, meet at the last amain,
And so become oft the commencements fit
Of mighty things- earth, sea, and sky, and race
Of living creatures.

 In that long-ago
The wheel of the sun could nowhere be discerned
Flying far up with its abounding blaze,

Nor constellations of the mighty world,
Nor ocean, nor heaven, nor even earth nor air.
Nor aught of things like unto things of ours
Could then be seen- but only some strange storm
And a prodigious hurly-burly mass
Compounded of all kinds of primal germs,
Whose battling discords in disorder kept
Interstices, and paths, coherencies,
And weights, and blows, encounterings, and motions,
Because, by reason of their forms unlike
And varied shapes, they could not all thuswise
Remain conjoined nor harmoniously
Have interplay of movements. But from there
Portions began to fly asunder, and like
With like to join, and to block out a world,
And to divide its members and dispose
Its mightier parts- that is, to set secure
The lofty heavens from the lands, and cause
The sea to spread with waters separate,
And fires of ether separate and pure
Likewise to congregate apart.

For, lo,

First came together the earthy particles
(As being heavy and intertangled) there
In the mid-region, and all began to take
The lowest abodes; and ever the more they got
One with another intertangled, the more
They pressed from out their mass those particles
Which were to form the sea, the stars, the sun,
And moon, and ramparts of the mighty world-
For these consist of seeds more smooth and round
And of much smaller elements than earth.
And thus it was that ether, fraught with fire,
First broke away from out the earthen parts,
Athrough the innumerable pores of earth,
And raised itself aloft, and with itself
Bore lightly off the many starry fires;
And not far otherwise we often see

-
And the still lakes and the perennial streams
Exhale a mist, and even as earth herself
Is seen at times to smoke, when first at dawn
The light of the sun, the many-rayed, begins
To redden into gold, over the grass
Begemmed with dew. When all of these are brought

Together overhead, the clouds on high
With now concreted body weave a cover
Beneath the heavens. And thuswise ether too,
Light and diffusive, with concreted body
On all sides spread, on all sides bent itself
Into a dome, and, far and wide diffused
On unto every region on all sides,
Thus hedged all else within its greedy clasp.
Hard upon ether came the origins
Of sun and moon, whose globes revolve in air
Midway between the earth and mightiest ether,-
For neither took them, since they weighed too little
To sink and settle, but too much to glide
Along the upmost shores; and yet they are
In such a wise midway between the twain
As ever to whirl their living bodies round,
And ever to dure as parts of the wide Whole;
In the same fashion as certain members may
In us remain at rest, whilst others move.
When, then, these substances had been withdrawn,
Amain the earth, where now extend the vast
Cerulean zones of all the level seas,
Caved in, and down along the hollows poured
The whirlpools of her brine; and day by day
The more the tides of ether and rays of sun
On every side constrained into one mass
The earth by lashing it again, again,
Upon its outer edges (so that then,
Being thus beat upon, 'twas all condensed
About its proper centre), ever the more
The salty sweat, from out its body squeezed,
Augmented ocean and the fields of foam
By seeping through its frame, and all the more
Those many particles of heat and air
Escaping, began to fly aloft, and form,
By condensation there afar from earth,
The high refulgent circuits of the heavens.
The plains began to sink, and windy slopes
Of the high mountains to increase; for rocks
Could not subside, nor all the parts of ground
Settle alike to one same level there.

-
Thus, then, the massy weight of earth stood firm
With now concreted body, when (as 'twere)
All of the slime of the world, heavy and gross,

Had run together and settled at the bottom,
Like lees or bilge. Then ocean, then the air,
Then ether herself, the fraught-with-fire, were all
Left with their liquid bodies pure and free,
And each more lighter than the next below;
And ether, most light and liquid of the three,
Floats on above the long aerial winds,
Nor with the brawling of the winds of air
Mingles its liquid body. It doth leave
All there- those under-realms below her heights-
There to be overset in whirlwinds wild,-
Doth leave all there to brawl in wayward gusts,
Whilst, gliding with a fixed impulse still,
Itself it bears its fires along. For, lo,
That ether can flow thus steadily on, on,
With one unaltered urge, the Pontus proves-
That sea which floweth forth with fixed tides,
Keeping one onward tenor as it glides.

-
And that the earth may there abide at rest
In the mid-region of the world, it needs
Must vanish bit by bit in weight and lessen,
And have another substance underneath,
Conjoined to it from its earliest age
In linked unison with the vasty world's
Realms of the air in which it roots and lives.
On this account, the earth is not a load,
Nor presses down on winds of air beneath;
Even as unto a man his members be
Without all weight- the head is not a load
Unto the neck; nor do we feel the whole
Weight of the body to centre in the feet.
But whatso weights come on us from without,
Weights laid upon us, these harass and chafe,
Though often far lighter. For to such degree
It matters always what the innate powers
Of any given thing may be. The earth
Was, then, no alien substance fetched amain,
And from no alien firmament cast down
On alien air; but was conceived, like air,
In the first origin of this the world,
As a fixed portion of the same, as now
Our members are seen to be a part of us.

-
Besides, the earth, when of a sudden shook

By the big thunder, doth with her motion shake
All that's above her- which she ne'er could do
By any means, were earth not bounden fast
Unto the great world's realms of air and sky:
For they cohere together with common roots,
Conjoined both, even from their earliest age,
In linked unison. Aye, seest thou not
That this most subtle energy of soul
Supports our body, though so heavy a weight,-
Because, indeed, 'tis with it so conjoined
In linked unison? What power, in sum,
Can raise with agile leap our body aloft,
Save energy of mind which steers the limbs?
Now seest thou not how powerful may be
A subtle nature, when conjoined it is
With heavy body, as air is with the earth
Conjoined, and energy of mind with us?

Now let's us sing what makes the stars to move.
In first place, if the mighty sphere of heaven
Revolveth round, then needs we must aver
That on the upper and the under pole
Presses a certain air, and from without
Confines them and encloseth at each end;
And that, moreover, another air above
Streams on athwart the top of the sphere and tends
In same direction as are rolled along
The glittering stars of the eternal world;
Or that another still streams on below
To whirl the sphere from under up and on
In opposite direction- as we see
The rivers turn the wheels and water-scoops.
It may be also that the heavens do all
Remain at rest, whilst yet are borne along
The lucid constellations; either because
Swift tides of ether are by sky enclosed,
And whirl around, seeking a passage out,
And everywhere make roll the starry fires
Through the Summanian regions of the sky;
Or else because some air, streaming along
From an eternal quarter off beyond,
Whileth the driven fires, or, then, because
The fires themselves have power to creep along,
Going wherever their food invites and calls,
And feeding their flaming bodies everywhere
Throughout the sky. Yet which of these is cause

In this our world 'tis hard to say for sure;
But what can be throughout the universe,
In divers worlds on divers plan create,
This only do I show, and follow on
To assign unto the motions of the stars
Even several causes which 'tis possible
Exist throughout the universal All;
Of which yet one must be the cause even here
Which maketh motion for our constellations.
Yet to decide which one of them it be
Is not the least the business of a man
Advancing step by cautious step, as I.

Nor can the sun's wheel larger be by much
Nor its own blaze much less than either seems
Unto our senses. For from whatso spaces
Fires have the power on us to cast their beams
And blow their scorching exhalations forth
Against our members, those same distances
Take nothing by those intervals away
From bulk of flames; and to the sight the fire
Is nothing shrunken. Therefore, since the heat
And the outpoured light of skiey sun
Arrive our senses and caress our limbs,
Form too and bigness of the sun must look
Even here from earth just as they really be,
So that thou canst scarce nothing take or add.
And whether the journeying moon illuminate
The regions round with bastard beams, or throw
From off her proper body her own light,-
Whichever it be, she journeys with a form
Naught larger than the form doth seem to be
Which we with eyes of ours perceive. For all
The far removed objects of our gaze
Seem through much air confused in their look
Ere minished in their bigness. Wherefore, moon,
Since she presents bright look and clear-cut form,
May there on high by us on earth be seen
Just as she is with extreme bounds defined,
And just of the size. And lastly, whatso fires
Of ether thou from earth beholdest, these
Thou mayst consider as possibly of size
The least bit less, or larger by a hair
Than they appear- since whatso fires we view
Here in the lands of earth are seen to change

From time to time their size to less or more
Only the least, when more or less away,
So long as still they bicker clear, and still
Their glow's perceived.

Nor need there be for men
Astonishment that yonder sun so small
Can yet send forth so great a light as fills
Oceans and all the lands and sky aflood,
And with its fiery exhalations steeps
The world at large. For it may be, indeed,
That one vast-flowing well-spring of the whole
Wide world from here hath opened and out-gushed,
And shot its light abroad; because thuswise
The elements of fiery exhalations
From all the world around together come,
And thuswise flow into a bulk so big
That from one single fountain-head may stream
This heat and light. And seest thou not, indeed,
How widely one small water-spring may wet
The meadow-lands at times and flood the fields?
'Tis even possible, besides, that heat
From forth the sun's own fire, albeit that fire
Be not a great, may permeate the air
With the fierce hot- if but, perchance, the air
Be of condition and so tempered then
As to be kindled, even when beat upon
Only by little particles of heat-
Just as we sometimes see the standing grain
Or stubble straw in conflagration all
From one lone spark. And possibly the sun,
Agleam on high with rosy lampion,
Possesses about him with invisible heats
A plenteous fire, by no effulgence marked,
So that he maketh, he, the Fraught-with-fire,
Increase to such degree the force of rays.

Nor is there one sure cause revealed to men
How the sun journeys from his summer haunts
On to the mid-most winter turning-points
In Capricorn, the thence reverting veers
Back to solstitial goals of Cancer; nor
How 'tis the moon is seen each month to cross
That very distance which in traversing
The sun consumes the measure of a year.
I say, no one clear reason hath been given

For these affairs. Yet chief in likelihood
Seemeth the doctrine which the holy thought
Of great Democritus lays down: that ever
The nearer the constellations be to earth
The less can they by whirling of the sky
Be borne along, because those skiey powers
Of speed aloft do vanish and decrease
In under-regions, and the sun is thus
Left by degrees behind amongst those signs
That follow after, since the sun he lies
Far down below the starry signs that blaze;
And the moon lags even tardier than the sun:
In just so far as is her course removed
From upper heaven and nigh unto the lands,
In just so far she fails to keep the pace
With starry signs above; for just so far
As feebler is the whirl that bears her on,
(Being, indeed, still lower than the sun),
In just so far do all the starry signs,
Circling around, o'ertake her and o'erpass.
Therefore it happens that the moon appears
More swiftly to return to any sign
Along the Zodiac, than doth the sun,
Because those signs do visit her again
More swiftly than they visit the great sun.
It can be also that two streams of air
Alternately at fixed periods
Blow out from transverse regions of the world,
Of which the one may thrust the sun away
From summer-signs to mid-most winter goals
And rigors of the cold, and the other then
May cast him back from icy shades of chill
Even to the heat-fraught regions and the signs
That blaze along the Zodiac. So, too,
We must suppose the moon and all the stars,
Which through the mighty and sidereal years
Roll round in mighty orbits, may be sped
By streams of air from regions alternate.
Seest thou not also how the clouds be sped
By contrary winds to regions contrary,
The lower clouds diversely from the upper?
Then, why may yonder stars in ether there
Along their mighty orbits not be borne
By currents opposite the one to other?

But night o'erwhelms the lands with vasty murk
Either when sun, after his diurnal course,
Hath walked the ultimate regions of the sky
And wearily hath panted forth his fires,
Shivered by their long journeying and wasted
By traversing the multitudinous air,
Or else because the self-same force that drave
His orb along above the lands compels
Him then to turn his course beneath the lands.
Matuta also at a fixed hour
Spreadeth the roseate morning out along
The coasts of heaven and deploys the light,
Either because the self-same sun, returning
Under the lands, aspires to seize the sky,
Striving to set it blazing with his rays
Ere he himself appear, or else because
Fires then will congregate and many seeds
Of heat are wont, even at a fixed time,
To stream together- gendering evermore
New suns and light. Just so the story goes
That from the Idaean mountain-tops are seen
Dispersed fires upon the break of day
Which thence combine, as 'twere, into one ball
And form an orb. Nor yet in these affairs
Is aught for wonder that these seeds of fire
Can thus together stream at time so fixed
And shape anew the splendour of the sun.
For many facts we see which come to pass
At fixed time in all things: burgeon shrubs
At fixed time, and at a fixed time
They cast their flowers; and Eld commands the teeth,
At time as surely fixed, to drop away,
And Youth commands the growing boy to bloom
With the soft down and let from both his cheeks
The soft beard fall. And lastly, thunder-bolts,
Snow, rains, clouds, winds, at seasons of the year
Nowise unfixed, all do come to pass.
For where, even from their old primordial start
Causes have ever worked in such a way,
And where, even from the world's first origin,
Thuswise have things befallen, so even now
After a fixed order they come round
In sequence also.

Likewise, days may wax
Whilst the nights wane, and daylight minished be

Whilst nights do take their augmentations,
Either because the self-same sun, coursing
Under the lands and over in two arcs,
A longer and a briefer, doth dispart
The coasts of ether and divides in twain
His orbit all unequally, and adds,
As round he's borne, unto the one half there
As much as from the other half he's ta'en,
Until he then arrives that sign of heaven
Where the year's node renders the shades of night
Equal unto the periods of light.
For when the sun is midway on his course
Between the blasts of north wind and of south,
Heaven keeps his two goals parted equally,
By virtue of the fixed position old
Of the whole starry Zodiac, through which
That sun, in winding onward, takes a year,
Illumining the sky and all the lands
With oblique light- as men declare to us
Who by their diagrams have charted well
Those regions of the sky which be adorned
With the arranged signs of Zodiac.
Or else, because in certain parts the air
Under the lands is denser, the tremulous
Bright beams of fire do waver tardily,
Nor easily can penetrate that air
Nor yet emerge unto their rising-place:
For this it is that nights in winter time
Do linger long, ere comes the many-rayed
Round Badge of the day. Or else because, as said,
In alternating seasons of the year
Fires, now more quick, and now more slow, are wont
To stream together- the fires which make the sun
To rise in some one spot- therefore it is
That those men seem to speak the truth who hold
A new sun is with each new daybreak born.

-
The moon she possibly doth shine because
Strook by the rays of sun, and day by day
May turn unto our gaze her light, the more
She doth recede from orb of sun, until,
Facing him opposite across the world,
She hath with full effulgence gleamed abroad,
And, at her rising as she soars above,
Hath there observed his setting; thence likewise

She needs must hide, as 'twere, her light behind
By slow degrees, the nearer now she glides,
Along the circle of the Zodiac,
From her far place toward fires of yonder sun-
As those men hold who feign the moon to be
Just like a ball and to pursue a course
Betwixt the sun and earth. There is, again,
Some reason to suppose that moon may roll
With light her very own, and thus display
The varied shapes of her resplendence there.
For near her is, perchance, another body,
Invisible, because devoid of light,
Borne on and gliding all along with her,
Which in three modes may block and blot her disk.
Again, she may revolve upon herself,
Like to a ball's sphere- if perchance that be-
One half of her dyed o'er with glowing light,
And by the revolution of that sphere
She may beget for us her varying shapes,
Until she turns that fiery part of her
Full to the sight and open eyes of men;
Thence by slow stages round and back she whirls,
Withdrawing thus the luminiferous part
Of her sphered mass and ball, as, verily,
The Babylonian doctrine of Chaldees,
Refuting the art of Greek astrologers,
Labours, in opposition, to prove sure-
As if, forsooth, the thing for which each fights,
Might not alike be true- or aught there were
Wherefore thou mightest risk embracing one
More than the other notion. Then, again,
Why a new moon might not forevermore
Created be with fixed successions there
Of shapes and with configurations fixed,
And why each day that bright created moon
Might not miscarry and another be,
In its stead and place, engendered anew,
'Tis hard to show by reason, or by words
To prove absurd- since, lo, so many things
Can be create with fixed successions:
Spring-time and Venus come, and Venus' boy,
The winged harbinger, steps on before,
And hard on Zephyr's foot-prints Mother Flora,
Sprinkling the ways before them, filleth all
With colours and with odours excellent;

Whereafter follows arid Heat, and he
Companioned is by Ceres, dusty one,
And by the Etesian Breezes of the north
At rising of the dog-star of the year;
Then cometh Autumn on, and with him steps
Lord Bacchus, and then other Seasons too
And other Winds do follow- the high roar
Of great Voltumnus, and the Southwind strong
With thunder-bolts. At last earth's Shortest-Day
Bears on to men the snows and brings again
The numbing cold. And Winter follows her,
His teeth with chills a-chatter. Therefore, 'tis
The less a marvel, if at fixed time
A moon is thus begotten and again
At fixed time destroyed, since things so many
Can come to being thus at fixed time.

Likewise, the sun's eclipses and the moon's
Far occultations rightly thou mayst deem
As due to several causes. For, indeed,
Why should the moon be able to shut out
Earth from the light of sun, and on the side
To earthward thrust her high head under sun,
Opposing dark orb to his glowing beams-
And yet, at same time, one suppose the effect
Could not result from some one other body
Which glides devoid of light forevermore?
Again, why could not sun, in weakened state,
At fixed time for-lose his fires, and then,
When he has passed on along the air
Beyond the regions, hostile to his flames,
That quench and kill his fires, why could not he
Renew his light? And why should earth in turn
Have power to rob the moon of light, and there,
Herself on high, keep the sun hid beneath,
Whilst the moon glideth in her monthly course
Athrough the rigid shadows of the cone?-
And yet, at same time, some one other body
Not have the power to under-pass the moon,
Or glide along above the orb of sun,
Breaking his rays and outspread light asunder?
And still, if moon herself refulgent be
With her own sheen, why could she not at times
In some one quarter of the mighty world
Grow weak and weary, whilst she passeth through

Regions unfriendly to the beams her own?

BOOK_5|VEGETABLE_AND_ANIMAL_LIFE
ORIGINS OF VEGETABLE AND
ANIMAL LIFE

-
And now to what remains!- Since I've resolved
By what arrangements all things come to pass
Through the blue regions of the mighty world,-
How we can know what energy and cause
Started the various courses of the sun
And the moon's goings, and by what far means
They can succumb, the while with thwarted light,
And veil with shade the unsuspecting lands,
When, as it were, they blink, and then again
With open eye survey all regions wide,
Resplendent with white radiance- I do now
Return unto the world's primeval age
And tell what first the soft young fields of earth
With earliest parturition had decreed
To raise in air unto the shores of light
And to entrust unto the wayward winds.

-
In the beginning, earth gave forth, around
The hills and over all the length of plains,
The race of grasses and the shining green;
The flowery meadows sparkled all aglow
With greening colour, and thereafter, lo,
Unto the divers kinds of trees was given
An emulous impulse mightily to shoot,
With a free rein, aloft into the air.
As feathers and hairs and bristles are begot
The first on members of the four-foot breeds
And on the bodies of the strong-y-winged,
Thus then the new Earth first of all put forth
Grasses and shrubs, and afterward begat
The mortal generations, there upsprung-
Innumerable in modes innumerable-
After diverging fashions. For from sky
These breathing-creatures never can have dropped,
Nor the land-dwellers ever have come up
Out of sea-pools of salt. How true remains,
How merited is that adopted name
Of earth- "The Mother!"- since from out the earth
Are all begotten. And even now arise

From out the loams how many living things-
Concreted by the rains and heat of the sun.
Wherefore 'tis less a marvel, if they sprang
In Long Ago more many, and more big,
Matured of those days in the fresh young years
Of earth and ether. First of all, the race
Of the winged ones and parti-coloured birds,
Hatched out in spring-time, left their eggs behind;
As now-a-days in summer tree-crickets
Do leave their shiny husks of own accord,
Seeking their food and living. Then it was
This earth of thine first gave unto the day
The mortal generations; for prevailed
Among the fields abounding hot and wet.
And hence, where any fitting spot was given,
There 'gan to grow womb-cavities, by roots
Affixed to earth. And when in ripened time
The age of the young within (that sought the air
And fled earth's damps) had burst these wombs, O then
Would Nature thither turn the pores of earth
And make her spurt from open veins a juice
Like unto milk; even as a woman now
Is filled, at child-bearing, with the sweet milk,
Because all that swift stream of aliment
Is thither turned unto the mother-breasts.
There earth would furnish to the children food;
Warmth was their swaddling cloth, the grass their bed
Abounding in soft down. Earth's newness then
Would rouse no dour spells of the bitter cold,
Nor extreme heats nor winds of mighty powers-
For all things grow and gather strength through time
In like proportions; and then earth was young.

Wherefore, again, again, how merited
Is that adopted name of Earth- The Mother!-
Since she herself begat the human race,
And at one well-nigh fixed time brought forth
Each breast that ranges raving round about
Upon the mighty mountains and all birds
Aerial with many a varied shape.
But, lo, because her bearing years must end,
She ceased, like to a woman worn by eld.
For lapsing aeons change the nature of
The whole wide world, and all things needs must take
One status after other, nor aught persists

Forever like itself. All things depart;
Nature she changeth all, compelleth all
To transformation. Lo, this moulders down,
A-slack with weary eld, and that, again,
Prosper in glory, issuing from contempt.
In suchwise, then, the lapsing aeons change
The nature of the whole wide world, and earth
Taket h one status after other. And what
She bore of old, she now can bear no longer,
And what she never bore, she can to-day.

-
In those days also the telluric world
Strove to beget the monsters that upsprung
With their astounding visages and limbs-
The Man-woman- a thing betwixt the twain,
Yet neither, and from either sex remote-
Some gruesome Boggles orphaned of the feet,
Some widowed of the hands, dumb Horrors too
Without a mouth, or blind Ones of no eye,
Or Bulks all shackled by their legs and arms
Cleaving unto the body fore and aft,
Thuswise, that never could they do or go,
Nor shun disaster, nor take the good they would.
And other prodigies and monsters earth
Was then begetting of this sort- in vain,
Since Nature banned with horror their increase,
And powerless were they to reach unto
The coveted flower of fair maturity,
Or to find aliment, or to intertwine
In works of Venus. For we see there must
Concur in life conditions manifold,
If life is ever by begetting life
To forge the generations one by one:
First, foods must be; and, next, a path whereby
The seeds of impregnation in the frame
May ooze, released from the members all;
Last, the possession of those instruments
Whereby the male with female can unite,
The one with other in mutual ravishments.

-
And in the ages after monsters died,
Perforce there perished many a stock, unable
By propagation to forge a progeny.
For whatsoever creatures thou beholdest
Breathing the breath of life, the same have been

Even from their earliest age preserved alive
By cunning, or by valour, or at least
By speed of foot or wing. And many a stock
Remaineth yet, because of use to man,
And so committed to man's guardianship.
Valour hath saved alive fierce lion-breeds
And many another terrorizing race,
Cunning the foxes, flight the antlered stags.
Light-sleeping dogs with faithful heart in breast,
However, and every kind begot from seed
Of beasts of draft, as, too, the woolly flocks
And horned cattle, all, my Memmius,
Have been committed to guardianship of men.
For anxiously they fled the savage beasts,
And peace they sought and their abundant foods,
Obtained with never labours of their own,
Which we secure to them as fit rewards
For their good service. But those beasts to whom
Nature has granted naught of these same things-
Beasts quite unfit by own free will to thrive
And vain for any service unto us
In thanks for which we should permit their kind
To feed and be in our protection safe-
Those, of a truth, were wont to be exposed,
Enshackled in the gruesome bonds of doom,
As prey and booty for the rest, until
Nature reduced that stock to utter death.

-
But Centaurs ne'er have been, nor can there be
Creatures of twofold stock and double frame,
Compact of members alien in kind,
Yet formed with equal function, equal force
In every bodily part- a fact thou mayst,
However dull thy wits, well learn from this:
The horse, when his three years have rolled away,
Flowers in his prime of vigour; but the boy
Not so, for oft even then he gropes in sleep
After the milky nipples of the breasts,
An infant still. And later, when at last
The lusty powers of horses and stout limbs,
Now weak through lapsing life, do fail with age,
Lo, only then doth youth with flowering years
Begin for boys, and clothe their ruddy cheeks
With the soft down. So never deem, perchance,
That from a man and from the seed of horse,

The beast of draft, can Centaurs be composed
Or e'er exist alive, nor Scyllas be-
The half-fish bodies girdled with mad dogs-
Nor others of this sort, in whom we mark
Members discordant each with each; for ne'er
At one same time they reach their flower of age
Or gain and lose full vigour of their frame,
And never burn with one same lust of love,
And never in their habits they agree,
Nor find the same foods equally delightsome-
Sooth, as one oft may see the bearded goats
Batten upon the hemlock which to man
Is violent poison. Once again, since flame
Is wont to scorch and burn the tawny bulks
Of the great lions as much as other kinds
Of flesh and blood existing in the lands,
How could it be that she, Chimaera lone,
With triple body- fore, a lion she;
And aft, a dragon; and betwixt, a goat-
Might at the mouth from out the body belch
Infuriate flame? Wherefore, the man who feigns
Such beings could have been engendered
When earth was new and the young sky was fresh
(Basing his empty argument on new)
May babble with like reason many whims
Into our ears: he'll say, perhaps, that then
Rivers of gold through every landscape flowed,
That trees were wont with precious stones to flower,
Or that in those far aeons man was born
With such gigantic length and lift of limbs
As to be able, based upon his feet,
Deep oceans to bestride; or with his hands
To whirl the firmament around his head.
For though in earth were many seeds of things
In the old time when this telluric world
First poured the breeds of animals abroad,
Still that is nothing of a sign that then
Such hybrid creatures could have been begot
And limbs of all beasts heterogeneous
Have been together knit; because, indeed,
The divers kinds of grasses and the grains
And the delightsome trees- which even now
Spring up abounding from within the earth-
Can still ne'er be begotten with their stems
Begrafted into one; but each sole thing

Proceeds according to its proper wont
And all conserve their own distinctions based
In Nature's fixed decree.

BOOK_5|OF_MANKIND
ORIGINS AND SAVAGE PERIOD
OF MANKIND

-

But mortal man
Was then far hardier in the old champaign,
As well he should be, since a hardier earth
Had him begotten; builded too was he
Of bigger and more solid bones within,
And knit with stalwart sinews through the flesh,
Nor easily seized by either heat or cold,
Or alien food or any ail or irk.
And whilst so many lustrums of the sun
Rolled on across the sky, men led a life
After the roving habit of wild beasts.
Not then were sturdy guiders of curved ploughs,
And none knew then to work the fields with iron,
Or plant young shoots in holes of delved loam,
Or lop with hooked knives from off high trees
The boughs of yester-year. What sun and rains
To them had given, what earth of own accord
Created then, was boon enough to glad
Their simple hearts. Mid acorn-laden oaks
Would they refresh their bodies for the nonce;
And the wild berries of the arbutue-tree,
Which now thou seest to ripen purple-red
In winter time, the old telluric soil
Would bear then more abundant and more big.
And many coarse foods, too, in long ago
The blooming freshness of the rank young world
Produced, enough for those poor wretches there.
And rivers and springs would summon them of old
To slake the thirst, as now from the great hills
The water's down-rush calls aloud and far
The thirsty generations of the wild.
So, too, they sought the grottos of the Nymphs-
The woodland haunts discovered as they ranged-
From forth of which they knew that gliding rills
With gush and splash abounding laved the rocks,
The dripping rocks, and trickled from above
Over the verdant moss; and here and there

Welled up and burst across the open flats.
As yet they knew not to enkindle fire
Against the cold, nor hairy pelts to use
And clothe their bodies with the spoils of beasts;
But huddled in groves, and mountain-caves, and woods,
And 'mongst the thickets hid their squalid backs,
When driven to flee the lashings of the winds
And the big rains. Nor could they then regard
The general good, nor did they know to use
In common any customs, any laws:
Whatever of booty fortune unto each
Had proffered, each alone would bear away,
By instinct trained for self to thrive and live.
And Venus in the forests then would link
The lovers' bodies; for the woman yielded
Either from mutual flame, or from the man's
Impetuous fury and insatiate lust,
Or from a bribe- as acorn-nuts, choice pears,
Or the wild berries of the arbute-tree.
And trusting wondrous strength of hands and legs,
They'd chase the forest-wanderers, the beasts;
And many they'd conquer, but some few they fled,
A-skulk into their hiding-places...

With the flung stones and with the ponderous heft
Of gnarled branch. And by the time of night
O'ertaken, they would throw, like bristly boars,
Their wildman's limbs naked upon the earth,
Rolling themselves in leaves and fronded boughs.
Nor would they call with lamentations loud
Around the fields for daylight and the sun,
Quaking and wand'ring in shadows of the night;
But, silent and buried in a sleep, they'd wait
Until the sun with rosy flambeau brought
The glory to the sky. From childhood wont
Ever to see the dark and day begot
In times alternate, never might they be
Wildered by wild misgiving, lest a night
Eternal should possess the lands, with light
Of sun withdrawn forever. But their care
Was rather that the clans of savage beasts
Would often make their sleep-time horrible
For those poor wretches; and, from home y-driven,
They'd flee their rocky shelters at approach
Of boar, the spumy-lipped, or lion strong,

And in the midnight yield with terror up
To those fierce guests their beds of out-spread leaves.

-
And yet in those days not much more than now
Would generations of mortality
Leave the sweet light of fading life behind.
Indeed, in those days here and there a man,
More oftener snatched upon, and gulped by fangs,
Afforded the beasts a food that roared alive,
Echoing through groves and hills and forest trees,
Even as he viewed his living flesh entombed
Within a living grave; whilst those whom flight
Had saved, with bone and body bitten, shrieked,
Pressing their quivering palms to loathsome sores,
With horrible voices for eternal death-
Until, forlorn of help, and witless what
Might medicine their wounds, the writhing pangs
Took them from life. But not in those far times
Would one lone day give over unto doom
A soldiery in thousands marching on
Beneath the battle-banners, nor would then
The ramping breakers of the main seas dash
Whole argosies and crews upon the rocks.
But ocean uprisen would often rave in vain,
Without all end or outcome, and give up
Its empty menacings as lightly too;
Nor soft seductions of a serene sea
Could lure by laughing billows any man
Out to disaster: for the science bold
Of ship-sailing lay dark in those far times.
Again, 'twas then that lack of food gave o'er
Men's fainting limbs to dissolution: now
'Tis plenty overwhelms. Unwary, they
Oft for themselves themselves would then outpour
The poison; now, with nicer art, themselves
They give the drafts to others.

BOOK_5|BEGINNINGS_OF_CIVILIZATION
BEGINNINGS OF CIVILIZATION

-
Afterwards,
When huts they had procured and pelts and fire,
And when the woman, joined unto the man,
Withdrew with him into one dwelling place,
-

Were known; and when they saw an offspring born
From out themselves, then first the human race
Began to soften. For 'twas now that fire
Rendered their shivering frames less staunch to bear,
Under the canopy of the sky, the cold;
And Love reduced their shaggy hardiness;
And children, with the prattle and the kiss,
Soon broke the parents' haughty temper down.
Then, too, did neighbours 'gin to league as friends,
Eager to wrong no more or suffer wrong,
And urged for children and the womankind
Mercy, of fathers, whilst with cries and gestures
They stammered hints how meet it was that all
Should have compassion on the weak. And still,
Though concord not in every wise could then
Begotten be, a good, a goodly part
Kept faith inviolate- or else mankind
Long since had been unutterably cut off,
And propagation never could have brought
The species down the ages.

Lest, perchance,
Concerning these affairs thou ponderest
In silent meditation, let me say
'Twas lightning brought primevally to earth
The fire for mortals, and from thence hath spread
O'er all the lands the flames of heat. For thus
Even now we see so many objects, touched
By the celestial flames, to flash aglow,
When thunderbolt has dowered them with heat.
Yet also when a many-branched tree,
Beaten by winds, writhes swaying to and fro,
Pressing 'gainst branches of a neighbour tree,
There by the power of mighty rub and rub
Is fire engendered; and at times out-flares
The scorching heat of flame, when boughs do chafe
Against the trunks. And of these causes, either
May well have given to mortal men the fire.
Next, food to cook and soften in the flame
The sun instructed, since so oft they saw
How objects mellowed, when subdued by warmth
And by the raining blows of fiery beams,
Through all the fields.

And more and more each day
Would men more strong in sense, more wise in heart,
Teach them to change their earlier mode and life

By fire and new devices. Kings began
Cities to found and citadels to set,
As strongholds and asylums for themselves,
And flocks and fields to portion for each man
After the beauty, strength, and sense of each-
For beauty then imported much, and strength
Had its own rights supreme. Thereafter, wealth
Discovered was, and gold was brought to light,
Which soon of honour stripped both strong and fair;
For men, however beautiful in form
Or valorous, will follow in the main
The rich man's party. Yet were man to steer
His life by sounder reasoning, he'd own
Abounding riches, if with mind content
He lived by thrift; for never, as I guess,
Is there a lack of little in the world.
But men wished glory for themselves and power
Even that their fortunes on foundations firm
Might rest forever, and that they themselves,
The opulent, might pass a quiet life-
In vain, in vain; since, in the strife to climb
On to the heights of honour, men do make
Their pathway terrible; and even when once
They reach them, envy like the thunderbolt
At times will smite, O hurling headlong down
To murkiest Tartarus, in scorn; for, lo,
All summits, all regions loftier than the rest,
Smoke, blasted as by envy's thunderbolts;
So better far in quiet to obey,
Than to desire chief mastery of affairs
And ownership of empires. Be it so;
And let the weary sweat their life-blood out
All to no end, battling in hate along
The narrow path of man's ambition
Since all their wisdom is from others' lips,
And all they seek is known from what they've heard
And less from what they've thought. Nor is this folly
Greater to-day, nor greater soon to be,
Than' twas of old.

And therefore kings were slain,
And pristine majesty of golden thrones
And haughty sceptres lay o'erturned in dust;
And crowns, so splendid on the sovereign heads,
Soon bloody under the proletarian feet,
Groaned for their glories gone- for erst o'er-much

Dreaded, thereafter with more greedy zest
Trampled beneath the rabble heel. Thus things
Down to the vilest lees of brawling mobs
Succumbed, whilst each man sought unto himself
Dominion and supremacy. So next
Some wiser heads instructed men to found
The magisterial office, and did frame
Codes that they might consent to follow laws.
For humankind, o'er wearied with a life
Fostered by force, was ailing from its feuds;
And so the sooner of its own free will
Yielded to laws and strictest codes. For since
Each hand made ready in its wrath to take
A vengeance fiercer than by man's fair laws
Is now conceded, men on this account
Loathed the old life fostered by force. 'Tis thence
That fear of punishments defiles each prize
Of wicked days; for force and fraud ensnare
Each man around, and in the main recoil
On him from whence they sprung. Not easy 'tis
For one who violates by ugly deeds
The bonds of common peace to pass a life
Composed and tranquil. For albeit he 'scape
The race of gods and men, he yet must dread
'Twill not be hid forever- since, indeed,
So many, oft babbling on amid their dreams
Or raving in sickness, have betrayed themselves
(As stories tell) and published at last
Old secrets and the sins.

But Nature 'twas
Urged men to utter various sounds of tongue
And need and use did mould the names of things,
About in same wise as the lack-speech years
Compel young children unto gesturings,
Making them point with finger here and there
At what's before them. For each creature feels
By instinct to what use to put his powers.
Ere yet the bull-calf's scarce begotten horns
Project above his brows, with them he 'gins
Enraged to butt and savagely to thrust.
But whelps of panthers and the lion's cubs
With claws and paws and bites are at the fray
Already, when their teeth and claws be scarce
As yet engendered. So again, we see
All breeds of winged creatures trust to wings

And from their fledgling pinions seek to get
A fluttering assistance. Thus, to think
That in those days some man apportioned round
To things their names, and that from him men learned
Their first nomenclature, is foolery.
For why could he mark everything by words
And utter the various sounds of tongue, what time
The rest may be supposed powerless
To do the same? And, if the rest had not
Already one with other used words,
Whence was implanted in the teacher, then,
Fore-knowledge of their use, and whence was given
To him alone primordial faculty
To know and see in mind what 'twas he willed?
Besides, one only man could scarce subdue
An overmastered multitude to choose
To get by heart his names of things. A task
Not easy 'tis in any wise to teach
And to persuade the deaf concerning what
'Tis needful for to do. For ne'er would they
Allow, nor ne'er in anywise endure
Perpetual vain dingdong in their ears
Of spoken sounds unheard before. And what,
At last, in this affair so wondrous is,
That human race (in whom a voice and tongue
Were now in vigour) should by divers words
Denote its objects, as each divers sense
Might prompt?- since even the speechless herds, aye, since
The very generations of wild beasts
Are wont dissimilar and divers sounds
To rouse from in them, when there's fear or pain,
And when they burst with joys. And this, forsooth,
'Tis thine to know from plainest facts: when first
Huge flabby jowls of mad Molossian hounds,
Baring their hard white teeth, begin to snarl,
They threaten, with infuriate lips peeled back,
In sounds far other than with which they bark
And fill with voices all the regions round.
And when with fondling tongue they start to lick
Their puppies, or do toss them round with paws,
Feigning with gentle bites to gape and snap,
They fawn with yelps of voice far other than
Than when, alone within the house, they bay,
Or whimpering slink with cringing sides from blows.
Again the neighing of the horse, is that

Not seen to differ likewise, when the stud
In buoyant flower of his young years raves,
Goaded by winged Love, amongst the mares,
And when with widening nostrils out he snorts
The call to battle, and when haply he
Whinnies at times with terror-quaking limbs?
Lastly, the flying race, the dappled birds,
Hawks, ospreys, sea-gulls, searching food and life
Amid the ocean billows in the brine,
Utter at other times far other cries
Then when they fight for food, or with their prey
Struggle and strain. And birds there are which change
With changing weather their own raucous songs-
As long-lived generations of the crows
Or flocks of rooks, when they be said to cry
For rain and water and to call at times
For winds and gales. Ergo, if divers moods
Compel the brutes, though speechless evermore,
To send forth divers sounds, O truly then
How much more likely 'twere that mortal men
In those days could with many a different sound
Denote each separate thing.

And now what cause
Hath spread divinities of gods abroad
Through mighty nations, and filled the cities full
Of the high altars, and led to practices
Of solemn rites in season- rites which still
Flourish in midst of great affairs of state
And midst great centres of man's civic life,
The rites whence still a poor mortality
Is grafted that quaking awe which rears aloft
Still the new temples of gods from land to land
And drives mankind to visit them in throngs
On holy days- 'tis not so hard to give
Reason thereof in speech. Because, in sooth,
Even in those days would the race of man
Be seeing excelling visages of gods
With mind awake; and in his sleeps, yet more-
Bodies of wondrous growth. And, thus, to these
Would men attribute sense, because they seemed
To move their limbs and speak pronouncements high,
Befitting glorious visage and vast powers.
And men would give them an eternal life,
Because their visages forevermore
Were there before them, and their shapes remained,

And chiefly, however, because men would not think
Beings augmented with such mighty powers
Could well by any force o'ermastered be.
And men would think them in their happiness
Excelling far, because the fear of death
Vexed no one of them at all, and since
At same time in men's sleeps men saw them do
So many wonders, and yet feel therefrom
Themselves no weariness. Besides, men marked
How in a fixed order rolled around
The systems of the sky, and changed times
On annual seasons, nor were able then
To know thereof the causes. Therefore 'twas
Men would take refuge in consigning all
Unto divinities, and in feigning all
Was guided by their nod. And in the sky
They set the seats and vaults of gods, because
Across the sky night and the moon are seen
To roll along- moon, day, and night, and night's
Old awesome constellations evermore,
And the night-wandering fireballs of the sky,
And flying flames, clouds, and the sun, the rains,
Snow and the winds, the lightnings, and the hail,
And the swift rumblings, and the hollow roar
Of mighty menacings forevermore.

O humankind unhappy!- when it ascribed
Unto divinities such awesome deeds,
And coupled thereto rigours of fierce wrath!
What groans did men on that sad day beget
Even for themselves, and O what wounds for us,
What tears for our children's children! Nor, O man,
Is thy true piety in this: with head
Under the veil, still to be seen to turn
Fronting a stone, and ever to approach
Unto all altars; nor so prone on earth
Forward to fall, to spread upturned palms
Before the shrines of gods, nor yet to dew
Altars with profuse blood of four-foot beasts,
Nor vows with vows to link. But rather this:
To look on all things with a master eye
And mind at peace. For when we gaze aloft
Upon the skiey vaults of yon great world
And ether, fixed high o'er twinkling stars,
And into our thought there come the journeyings
Of sun and moon, O then into our breasts,

O'erburdened already with their other ills,
Begins forthwith to rear its sudden head
One more misgiving: lest o'er us, percase,
It be the gods' immeasurable power
That rolls, with varied motion, round and round
The far white constellations. For the lack
Of aught of reasons tries the puzzled mind:
Whether was ever a birth-time of the world,
And whether, likewise, any end shall be.
How far the ramparts of the world can still
Outstand this strain of ever-roused motion,
Or whether, divinely with eternal weal
Endowed, they can through endless tracts of age
Glide on, defying the o'er-mighty powers
Of the immeasurable ages. Lo,
What man is there whose mind with dread of gods
Cringes not close, whose limbs with terror-spell
Crouch not together, when the parched earth
Quakes with the horrible thunderbolt amain,
And across the mighty sky the rumblings run?
Do not the peoples and the nations shake,
And haughty kings do they not hug their limbs,
Strook through with fear of the divinities,
Lest for aught foully done or madly said
The heavy time be now at hand to pay?
When, too, fierce force of fury-winds at sea
Sweepeth a navy's admiral down the main
With his stout legions and his elephants,
Doth he not seek the peace of gods with vows,
And beg in prayer, a-tremble, lulled winds
And friendly gales?- in vain, since, often up-caught
In fury-cyclones, is he borne along,
For all his mouthings, to the shoals of doom.
Ah, so irrevocably some hidden power
Betramples forevermore affairs of men,
And visibly grindeth with its heel in mire
The lictors' glorious rods and axes dire,
Having them in derision! Again, when earth
From end to end is rocking under foot,
And shaken cities ruin down, or threaten
Upon the verge, what wonder is it then
That mortal generations abase themselves,
And unto gods in all affairs of earth
Assign as last resort almighty powers
And wondrous energies to govern all?

-

Now for the rest: copper and gold and iron
Discovered were, and with them silver's weight
And power of lead, when with prodigious heat
The conflagrations burned the forest trees
Among the mighty mountains, by a bolt
Of lightning from the sky, or else because
Men, warring in the woodlands, on their foes
Had hurled fire to frighten and dismay,
Or yet because, by goodness of the soil
Invited, men desired to clear rich fields
And turn the countryside to pasture-lands,
Or slay the wild and thrive upon the spoils.
(For hunting by pit-fall and by fire arose
Before the art of hedging the covert round
With net or stirring it with dogs of chase.)
Howso the fact, and from what cause soever
The flamy heat with awful crack and roar
Had there devoured to their deepest roots
The forest trees and baked the earth with fire,
Then from the boiling veins began to ooze
O rivulets of silver and of gold,
Of lead and copper too, collecting soon
Into the hollow places of the ground.
And when men saw the cooled lumps anon
To shine with splendour-sheen upon the ground,
Much taken with that lustrous smooth delight,
They 'gan to pry them out, and saw how each
Had got a shape like to its earthy mould.
Then would it enter their heads how these same lumps,
If melted by heat, could into any form
Or figure of things be run, and how, again,
If hammered out, they could be nicely drawn
To sharpest points or finest edge, and thus
Yield to the forgers tools and give them power
To chop the forest down, to hew the logs,
To shave the beams and planks, besides to bore
And punch and drill. And men began such work
At first as much with tools of silver and gold
As with the impetuous strength of the stout copper;
But vainly- since their over-mastered power
Would soon give way, unable to endure,
Like copper, such hard labour. In those days
Copper it was that was the thing of price;
And gold lay useless, blunted with dull edge.

Now lies the copper low, and gold hath come
Unto the loftiest honours. Thus it is
That rolling ages change the times of things:
What erst was of a price, becomes at last
A discard of no honour; whilst another
Succeeds to glory, issuing from contempt,
And day by day is sought for more and more,
And, when 'tis found, doth flower in men's praise,
Objects of wondrous honour.

Now, Memmius,
How nature of iron discovered was, thou mayst
Of thine own self divine. Man's ancient arms
Were hands, and nails and teeth, stones too and boughs-
Breakage of forest trees- and flame and fire,
As soon as known. Thereafter force of iron
And copper discovered was; and copper's use
Was known ere iron's, since more tractable
Its nature is and its abundance more.
With copper men to work the soil began,
With copper to rouse the hurly waves of war,
To straw the monstrous wounds, and seize away
Another's flocks and fields. For unto them,
Thus armed, all things naked of defence
Readily yielded. Then by slow degrees
The sword of iron succeeded, and the shape
Of brazen sickle into scorn was turned:
With iron to cleave the soil of earth they 'gan,
And the contentions of uncertain war
Were rendered equal.

And, lo, man was wont
Armed to mount upon the ribs of horse
And guide him with the rein, and play about
With right hand free, oft times before he tried
Perils of war in yoked chariot;
And yoked pairs abreast came earlier
Than yokes of four, or scythed chariots
Whereinto clomb the men-at-arms. And next
The Punic folk did train the elephants-
Those curst Lucanian oxen, hideous,
The serpent-handed, with turrets on their bulks-
To dure the wounds of war and panic-strike
The mighty troops of Mars. Thus Discord sad
Begot the one Thing after other, to be
The terror of the nations under arms,
And day by day to horrors of old war

She added an increase.

Bulls, too, they tried

In war's grim business; and essayed to send
Outrageous boars against the foes. And some
Sent on before their ranks puissant lions
With armed trainers and with masters fierce
To guide and hold in chains- and yet in vain,
Since fleshed with pell-mell slaughter, fierce they flew,
And blindly through the squadrons havoc wrought,
Shaking the frightful crests upon their heads,
Now here, now there. Nor could the horsemen calm
Their horses, panic-breasted at the roar,
And rein them round to front the foe. With spring
The infuriate she-lions would up-leap
Now here, now there; and whoso came apace
Against them, these they'd rend across the face;
And others unwitting from behind they'd tear
Down from their mounts, and twining round them, bring
Tumbling to earth, o'er-mastered by the wound,
And with those powerful fangs and hooked claws
Fasten upon them. Bulls would toss their friends,
And trample under foot, and from beneath
Rip flanks and bellies of horses with their horns,
And with a threat'ning forehead jam the sod;
And boars would gore with stout tusks their allies,
Splashing in fury their own blood on spears
Splintered in their own bodies, and would fell
In rout and ruin infantry and horse.
For there the beasts-of-saddle tried to scape
The savage thrusts of tusk by shying off,
Or rearing up with hoofs a-paw in air.
In vain- since there thou mightest see them sink,
Their sinews severed, and with heavy fall
Bestrew the ground. And such of these as men
Supposed well-trained long ago at home,
Were in the thick of action seen to foam
In fury, from the wounds, the shrieks, the flight,
The panic, and the tumult; nor could men
Aught of their numbers rally. For each breed
And various of the wild beasts fled apart
Hither or thither, as often in wars to-day
Flee those Lucanian oxen, by the steel
Grievously mangled, after they have wrought
Upon their friends so many a dreadful doom.
(If 'twas, indeed, that thus they did at all:

But scarcely I'll believe that men could not
With mind foreknow and see, as sure to come,
Such foul and general disaster. This
We, then, may hold as true in the great All,
In divers worlds on divers plan create,-
Somewhere afar more likely than upon
One certain earth.) But men chose this to do
Less in the hope of conquering than to give
Their enemies a goodly cause of woe,
Even though thereby they perished themselves,
Since weak in numbers and since wanting arms.

Now, clothes of roughly interplaited strands
Were earlier than loom-wove coverings;
The loom-wove later than man's iron is,
Since iron is needful in the weaving art,
Nor by no other means can there be wrought
Such polished tools- the treadles, spindles, shuttles,
And sounding yarn-beams. And Nature forced the men,
Before the woman kind, to work the wool:
For all the male kind far excels in skill,
And cleverer is by much- until at last
The rugged farmer folk jeered at such tasks,
And so were eager soon to give them o'er
To women's hands, and in more hardy toil
To harden arms and hands.

But Nature herself,
Mother of things, was the first seed-sower
And primal grafter; since the berries and acorns,
Dropping from off the trees, would there beneath
Put forth in season swarms of little shoots;
Hence too men's fondness for ingrafting slips
Upon the boughs and setting out in holes
The young shrubs o'er the fields. Then would they try
Ever new modes of tilling their loved crofts,
And mark they would how earth improved the taste
Of the wild fruits by fond and fostering care.
And day by day they'd force the woods to move
Still higher up the mountain, and to yield
The place below for tilth, that there they might,
On plains and uplands, have their meadow-plats,
Cisterns and runnels, crops of standing grain,
And happy vineyards, and that all along
O'er hillocks, intervalles, and plains might run
The silvery-green belt of olive-trees,

Marking the plotted landscape; even as now
Thou seest so marked with varied loveliness
All the terrain which men adorn and plant
With rows of goodly fruit-trees and hedge round
With thriving shrubberies sown.

But by the mouth

To imitate the liquid notes of birds
Was earlier far 'mongst men than power to make,
By measured song, melodious verse and give
Delight to ears. And whistlings of the wind
Athrough the hollows of the reeds first taught
The peasantry to blow into the stalks
Of hollow hemlock-herb. Then bit by bit
They learned sweet plainings, such as pipe out-pours,
Beaten by finger-tips of singing men,
When heard through unpathed groves and forest deeps
And woodsy meadows, through the untrod haunts
Of shepherd folk and spots divinely still.
Thus time draws forward each and everything
Little by little unto the midst of men,
And reason uplifts it to the shores of light.
These tunes would sooth and glad the minds of mortals
When sated with food- for songs are welcome then.
And often, lounging with friends in the soft grass
Beside a river of water, underneath
A big tree's branches, merrily they'd refresh
Their frames, with no vast outlay- most of all
If the weather were smiling and the times of the year
Were painting the green of the grass around with flowers.
Then jokes, then talk, then peals of jollity
Would circle round; for then the rustic muse
Was in her glory; then would antic Mirth
Prompt them to garland head and shoulders about
With chaplets of intertwined flowers and leaves,
And to dance onward, out of tune, with limbs
Clownishly swaying, and with clownish foot
To beat our Mother Earth- from whence arose
Laughter and peals of jollity, for, lo,
Such frolic acts were in their glory then,
Being more new and strange. And wakeful men
Found solaces for their unsleeping hours
In drawing forth variety of notes,
In modulating melodies, in running
With puckered lips along the tuned reeds,
Whence, even in our day do the watchmen guard

These old traditions, and have learned well
To keep true measure. And yet they no whit
Do get a larger fruit of gladsomeness
Than got the woodland aborigines
In olden times. For what we have at hand-
If theretofore naught sweeter we have known-
That chiefly pleases and seems best of all;
But then some later, likely better, find
Destroys its worth and changes our desires
Regarding good of yesterday.

And thus

Began the loathing of the acorn; thus
Abandoned were those beds with grasses strewn
And with the leaves beladen. Thus, again,
Fell into new contempt the pelts of beasts-
Erstwhile a robe of honour, which, I guess,
Aroused in those days envy so malign
That the first wearer went to woeful death
By ambuscades- and yet that hairy prize,
Rent into rags by greedy foemen there
And splashed by blood, was ruined utterly
Beyond all use or vantage. Thus of old
'Twas pelts, and of to-day 'tis purple and gold
That cark men's lives with cares and weary with war.
Wherefore, methinks, resides the greater blame
With us vain men today: for cold would rack,
Without their pelts, the naked sons of earth;
But us it nothing hurts to do without
The purple vestment, broidered with gold
And with imposing figures, if we still
Make shift with some mean garment of the Plebs.
So man in vain futilities toils on
Forever and wastes in idle cares his years-
Because, of very truth, he hath not learnt
What the true end of getting is, nor yet
At all how far true pleasure may increase.
And 'tis desire for better and for more
Hath carried by degrees mortality
Out onward to the deep, and roused up
From the far bottom mighty waves of war.

But sun and moon, those watchmen of the world,
With their own lanterns traversing around
The mighty, the revolving vault, have taught
Unto mankind that seasons of the years
Return again, and that the Thing takes place

After a fixed plan and order fixed.

Already would they pass their life, hedged round
By the strong towers; and cultivate an earth
All portioned out and boundaried; already,
Would the sea flower and sail-winged ships;
Already men had, under treaty pacts,
Confederates and allies, when poets began
To hand heroic actions down in verse;
Nor long ere this had letters been devised-
Hence is our age unable to look back
On what has gone before, except where reason
Shows us a footprint.

Sailings on the seas,
Tillings of fields, walls, laws, and arms, and roads,
Dress and the like, all prizes, all delights
Of finer life, poems, pictures, chiselled shapes
Of polished sculptures- all these arts were learned
By practice and the mind's experience,
As men walked forward step by eager step.
Thus time draws forward each and everything
Little by little into the midst of men,
And reason uplifts it to the shores of light.
For one thing after other did men see
Grow clear by intellect, till with their arts
They've now achieved the supreme pinnacle.

BOOK_6

BOOK VI

BOOK_6|PROEM

PROEM

-

'Twas Athens first, the glorious in name,
That whilom gave to hapless sons of men
The sheaves of harvest, and re-ordered life,
And decreed laws; and she the first that gave
Life its sweet solaces, when she begat
A man of heart so wise, who whilom poured
All wisdom forth from his truth-speaking mouth;
The glory of whom, though dead, is yet to-day,

Because of those discoveries divine
Renowned of old, exalted to the sky.
For when saw he that well-nigh everything
Which needs of man most urgently require
Was ready to hand for mortals, and that life,
As far as might be, was established safe,
That men were lords in riches, honour, praise,
And eminent in goodly fame of sons,
And that they yet, O yet, within the home,
Still had the anxious heart which vexed life
Unpausingly with torments of the mind,
And raved perforce with angry plaints, then he,
Then he, the master, did perceive that 'twas
The vessel itself which worked the bane, and all,
However wholesome, which from here or there
Was gathered into it, was by that bane
Spoilt from within- in part, because he saw
The vessel so cracked and leaky that nowise
'Tcould ever be filled to brim; in part because
He marked how it polluted with foul taste
Whate'er it got within itself. So he,
The master, then by his truth-speaking words,
Purged the breasts of men, and set the bounds
Of lust and terror, and exhibited
The supreme good whither we all endeavour,
And showed the path whereby we might arrive
Thereunto by a little cross-cut straight,
And what of ills in all affairs of mortals
Upsprang and flitted deviously about
(Whether by chance or force), since Nature thus
Had destined; and from out what gates a man
Should sally to each combat. And he proved
That mostly vainly doth the human race
Roll in its bosom the grim waves of care.
For just as children tremble and fear all
In the viewless dark, so even we at times
Dread in the light so many things that be
No whit more fearsome than what children feign,
Shuddering, will be upon them in the dark.
This terror then, this darkness of the mind,
Not sunrise with its flaring spokes of light,
Nor glittering arrows of morning can disperse,
But only Nature's aspect and her law.
Wherefore the more will I go on to weave
In verses this my undertaken task.

-
And since I've taught thee that the world's great vaults
Are mortal and that sky is fashioned
Of frame e'en born in time, and whatsoe'er
Therein go on and must perforce go on

-
The most I have unravelled; what remains
Do thou take in, besides; since once for all
To climb into that chariot' renowned

-
Of winds arise; and they appeased are
So that all things again...

-
Which were, are changed now, with fury stilled;
All other movements through the earth and sky
Which mortals gaze upon (O anxious oft
In quaking thoughts!), and which abase their minds
With dread of deities and press them crushed
Down to the earth, because their ignorance
Of cosmic causes forces them to yield
All things unto the empery of gods
And to concede the kingly rule to them.
For even those men who have learned full well
That godheads lead a long life free of care,
If yet meanwhile they wonder by what plan
Things can go on (and chiefly yon high things
Observed o'erhead on the ethereal coasts),
Again are hurried back unto the fears
Of old religion and adopt again
Harsh masters, deemed almighty,- wretched men,
Unwitting what can be and what cannot,
And by what law to each its scope prescribed,
Its boundary stone that clings so deep in Time.
Wherefore the more are they borne wandering on
By blindfold reason. And, Memmius, unless
From out thy mind thou spewest all of this
And castest far from thee all thoughts which be
Unworthy gods and alien to their peace,
Then often will the holy majesties
Of the high gods be harmful unto thee,
As by thy thought degraded,- not, indeed,
That essence supreme of gods could be by this
So outraged as in wrath to thirst to seek
Revenues keen; but even because thyself
Thou plaguest with the notion that the gods,

Even they, the Calm Ones in serene repose,
Do roll the mighty waves of wrath on wrath;
Nor wilt thou enter with a serene breast
Shrines of the gods; nor wilt thou able be
In tranquil peace of mind to take and know
Those images which from their holy bodies
Are carried into intellects of men,
As the announcers of their form divine.
What sort of life will follow after this
'Tis thine to see. But that afar from us
Veriest reason may drive such life away,
Much yet remains to be embellished yet
In polished verses, albeit hath issued forth
So much from me already; lo, there is
The law and aspect of the sky to be
By reason grasped; there are the tempest times
And the bright lightnings to be hymned now-
Even what they do and from what cause soe'er
They're borne along- that thou mayst tremble not,
Marking off regions of prophetic skies
For auguries, O foolishly distraught,
Even as to whence the flying flame hath come,
Or to which half of heaven it turns, or how
Through walled places it hath wound its way,
Or, after proving its dominion there,
How it hath speeded forth from thence amain-
Whereof nowise the causes do men know,
And think divinities are working there.
Do thou, Calliope, ingenious Muse,
Solace of mortals and delight of gods,
Point out the course before me, as I race
On to the white line of the utmost goal,
That I may get with signal praise the crown,
With thee my guide!

BOOK_6\METEOROLOGICAL_PHENOMENA
GREAT METEOROLOGICAL
PHENOMENA, ETC.

-
And so in first place, then
With thunder are shaken the blue deeps of heaven,
Because the ethereal clouds, scudding aloft,
Together clash, what time 'gainst one another
The winds are battling. For never a sound there come
From out the serene regions of the sky;

But wheresoever in a host more dense
The clouds foregather, thence more often comes
A crash with mighty rumbling. And, again,
Clouds cannot be of so condensed a frame
As stones and timbers, nor again so fine
As mists and flying smoke; for then perforce
They'd either fall, borne down by their brute weight,
Like stones, or, like the smoke, they'd powerless be
To keep their mass, or to retain within
Frore snows and storms of hail. And they give forth
O'er skiey levels of the spreading world
A sound on high, as linen-awning, stretched
O'er mighty theatres, gives forth at times
A cracking roar, when much 'tis beaten about
Betwixt the poles and cross-beams. Sometimes, too,
Asunder rent by wanton gusts, it raves
And imitates the tearing sound of sheets
Of paper- even this kind of noise thou mayst
In thunder hear- or sound as when winds whirl
With lashings and do buffet about in air
A hanging cloth and flying paper-sheets.
For sometimes, too, it chanches that the clouds
Cannot together crash head-on, but rather
Move side-wise and with motions contrary
Graze each the other's body without speed,
From whence that dry sound grateth on our ears,
So long drawn-out, until the clouds have passed
From out their close positions.

And, again,

In following wise all things seem oft to quake
At shock of heavy thunder, and mightiest walls
Of the wide reaches of the upper world
There on the instant to have sprung apart,
Riven asunder, what time a gathered blast
Of the fierce hurricane hath all at once
Twisted its way into a mass of clouds,
And, there enclosed, ever more and more
Compelleth by its spinning whirl the cloud
To grow all hollow with a thickened crust
Surrounding; for thereafter, when the force
And the keen onset of the wind have weakened
That crust, lo, then the cloud, to-split in twain,
Gives forth a hideous crash with bang and boom.
No marvel this; since oft a bladder small,
Filled up with air, will, when of sudden burst,

The shining sparks. But with our ears we get
The thunder after eyes behold the flash,
Because forever things arrive the ears
More tardily than the eyes- as thou mayst see
From this example too: when markest thou
Some man far yonder felling a great tree
With double-edged ax, it comes to pass
Thine eye beholds the swinging stroke before
The blow gives forth a sound athrough thine ears:
Thus also we behold the flashing ere
We hear the thunder, which discharged is
At same time with the fire and by same cause,
Born of the same collision.

In following wise

The clouds suffuse with leaping light the lands,
And the storm flashes with tremulous elan:
When the wind hath invaded a cloud, and, whirling there,
Hath wrought (as I have shown above) the cloud
Into a hollow with a thickened crust,
It becomes hot of own velocity:
Just as thou seest how motion will o'erheat
And set ablaze all objects- verily
A leaden ball, hurtling through length of space,
Even melts. Therefore, when this same wind a-fire
Hath split black cloud, it scatters the fire-seeds,
Which, so to say, have been pressed out by force
Of sudden from the cloud- and these do make
The pulsing flashes of flame; thence followeth
The detonation which attacks our ears
More tardily than aught which comes along
Unto the sight of eyeballs. This takes place-
As know thou mayst- at times when clouds are dense
And one upon the other piled aloft
With wonderful upheavings- nor be thou
Deceived because we see how broad their base
From underneath, and not how high they tower.
For make thine observations at a time
When winds shall bear athwart the horizon's blue
Clouds like to mountain-ranges moving on,
Or when about the sides of mighty peaks
Thou seest them one upon the other massed
And burdening downward, anchored in high repose,
With the winds sepulchred on all sides round:
Then canst thou know their mighty masses, then
Canst view their caverns, as if builded there

Of beetling crags; which, when the hurricanes
In gathered storm have filled utterly,
Then, prisoned in clouds, they rave around
With mighty roarings, and within those dens
Bluster like savage beasts, and now from here,
And now from there, send growlings through the clouds,
And seeking an outlet, whirl themselves about,
And roll from 'mid the clouds the seeds of fire,
And heap them multitudinously there,
And in the hollow furnaces within
Wheel flame around, until from bursted cloud
In forky flashes they have gleamed forth.

Again, from following cause it comes to pass
That yon swift golden hue of liquid fire
Darts downward to the earth: because the clouds
Themselves must hold abundant seeds of fire;
For, when they be without all moisture, then
They be for most part of a flamy hue
And a resplendent. And, indeed, they must
Even from the light of sun unto themselves
Take multitudinous seeds, and so perforce
Redden and pour their bright fires all abroad.
And therefore, when the wind hath driven and thrust,
Hath forced and squeezed into one spot these clouds,
They pour abroad the seeds of fire pressed out,
Which make to flash these colours of the flame.
Likewise, it lightens also when the clouds
Grow rare and thin along the sky; for, when
The wind with gentle touch unravels them
And breaketh asunder as they move, those seeds
Which make the lightnings must by nature fall;
At such an hour the horizon lightens round
Without the hideous terror of dread noise
And skiey uproar.

To proceed apace,
What sort of nature thunderbolts posses
Is by their strokes made manifest and by
The brand-marks of their searing heat on things,
And by the scorched scars exhaling round
The heavy fumes of sulphur. For all these
Are marks, O not of wind or rain, but fire.
Again, they often enkindle even the roofs
Of houses and inside the very rooms
With swift flame hold a fierce dominion.

Know thou that Nature fashioned this fire
Subtler than fires all other, with minute
And dartling bodies- a fire 'gainst which there's naught
Can in the least hold out: the thunderbolt,
The mighty, passes through the hedging walls
Of houses, like to voices or a shout-
Through stones, through bronze it passes, and it melts
Upon the instant bronze and gold; and makes,
Likewise, the wines sudden to vanish forth,
The wine-jars intact- because, ye see,
Its heat arriving renders loose and porous
Readily all the wine- jar's earthen sides,
And winding its way within, it scattereth
The elements primordial of the wine
With speedy dissolution- process which
Even in an age the fiery steam of sun
Could not accomplish, however puissant he
With his hot coruscations: so much more
Agile and overpowering is this force.

-

Now in what manner engendered are these things,
How fashioned of such impetuous strength
As to cleave towers asunder, and houses all
To overtopple, and to wrench apart
Timbers and beams, and heroes' monuments
To pile in ruins and upheave amain,
And to take breath forever out of men,
And to o'erthrow the cattle everywhere,-
Yes, by what force the lightnings do all this,
All this and more, I will unfold to thee,
Nor longer keep thee in mere promises.

-

The bolts of thunder, then, must be conceived
As all begotten in those crasser clouds
Up-piled aloft; for, from the sky serene
And from the clouds of lighter density,
None are sent forth forever. That 'tis so
Beyond a doubt, fact plain to sense declares:
To wit, at such a time the denser clouds
So mass themselves through all the upper air
That we might think that round about all murk
Had parted forth from Acheron and filled
The mighty vaults of sky- so grievously,
As gathers thus the storm-clouds' gruesome might,
Do faces of black horror hang on high-

When tempest begins its thunderbolts to forge.
Besides, full often also out at sea
A blackest thunderhead, like cataract
Of pitch hurled down from heaven, and far away
Bulging with murkiness, down on the waves
Falls with vast uproar, and draws on amain
The darkling tempests big with thunderbolts
And hurricanes, itself the while so crammed
Tremendously with fires and winds, that even
Back on the lands the people shudder round
And seek for cover. Therefore, as I said,
The storm must be conceived as o'er our head
Towering most high; for never would the clouds
O'erwhelm the lands with such a massy dark,
Unless up-builed heap on lofty heap,
To shut the round sun off. Nor could the clouds,
As on they come, engulf with rain so vast
As thus to make the rivers overflow
And fields to float, if ether were not thus
Furnished with lofty-piled clouds. Lo, then,
Here be all things fulfilled with winds and fires-
Hence the long lightnings and the thunders loud.
For, verily, I've taught thee even now
How cavernous clouds hold seeds innumerable
Of fiery exhalations, and they must
From off the sunbeams and the heat of these
Take many still. And so, when that same wind
(Which, haply, into one region of the sky
Collects those clouds) hath pressed from out the same
The many fiery seeds, and with that fire
Hath at the same time intermixed itself,
O then and there that wind, a whirlwind now,
Deep in the belly of the cloud spins round
In narrow confines, and sharpens there inside
In glowing furnaces the thunderbolt.
For in a two-fold manner is that wind
Enkindled all: it trembles into heat
Both by its own velocity and by
Repeated touch of fire. Thereafter, when
The energy of wind is heated through
And the fierce impulse of the fire hath sped
Deeply within, O then the thunderbolt,
Now ripened, so to say, doth suddenly
Splinter the cloud, and the aroused flash
Leaps onward, lumining with forky light

All places round. And followeth anon
A clap so heavy that the skiey vaults,
As if asunder burst, seem from on high
To engulf the earth. Then fearfully a quake
Pervades the lands, and 'long the lofty skies
Run the far rumblings. For at such a time
Nigh the whole tempest quakes, shook through and through,
And roused are the roarings- from which shock
Comes such resounding and abounding rain,
That all the murky ether seems to turn
Now into rain, and, as it tumbles down,
To summon the fields back to primeval floods:
So big the rains that be sent down on men
By burst of cloud and by the hurricane,
What time the thunder-clap, from burning bolt
That cracks the cloud, flies forth along. At times
The force of wind, excited from without,
Smiteth into a cloud already hot
With a ripe thunderbolt. And when that wind
Hath splintered that cloud, then down there cleaves forthwith
Yon fiery coil of flame which still we call,
Even with our fathers' word, a thunderbolt.
The same thing haps toward every other side
Whither that force hath swept. It happens, too,
That sometimes force of wind, though hurtled forth
Without all fire, yet in its voyage through space
Igniteth, whilst it comes along, along-
Losing some larger bodies which cannot
Pass, like the others, through the bulks of air-
And, scraping together out of air itself
Some smaller bodies, carries them along,
And these, commingling, by their flight make fire:
Much in the manner as oft a leaden ball
Grows hot upon its aery course, the while
It loseth many bodies of stark cold
And taketh into itself along the air
New particles of fire. It happens, too,
That force of blow itself arouses fire,
When force of wind, a-cold and hurtled forth
Without all fire, hath strook somewhere amain-
No marvel, because, when with terrific stroke
'Thas smitten, the elements of fiery-stuff
Can stream together from out the very wind
And, simultaneously, from out that thing
Which then and there receives the stroke: as flies

The fire when with the steel we hack the stone;
Nor yet, because the force of steel's a-cold,
Rush the less speedily together there
Under the stroke its seeds of radiance hot.
And therefore, thuswise must an object too
Be kindled by a thunderbolt, if haply
'Twas been adapt and suited to the flames.
Yet force of wind must not be rashly deemed
As altogether and entirely cold-
That force which is discharged from on high
With such stupendous power; but if 'tis not
Upon its course already kindled with fire,
It yet arriveth warmed and mixed with heat.

-
And, now, the speed and stroke of thunderbolt
Is so tremendous, and with glide so swift
Those thunderbolts rush on and down, because
Their roused force itself collects itself
First always in the clouds, and then prepares
For the huge effort of their going-forth;
Next, when the cloud no longer can retain
The increment of their fierce impetus,
Their force is pressed out, and therefore flies
With impetus so wondrous, like to shots
Hurled from the powerful Roman catapults.
Note, too, this force consists of elements
Both small and smooth, nor is there aught that can
With ease resist such nature. For it darts
Between and enters through the pores of things;
And so it never falters in delay
Despite innumerable collisions, but
Flies shooting onward with a swift elan.
Next, since by nature always every weight
Bears downward, doubled is the swiftness then
And that elan is still more wild and dread,
When, verily, to weight are added blows,
So that more madly and more fiercely then
The thunderbolt shakes into shivers all
That blocks its path, following on its way.
Then, too, because it comes along, along
With one continuing elan, it must
Take on velocity anew, anew,
Which still increases as it goes, and ever
Augments the bolt's vast powers and to the blow
Gives larger vigour; for it forces all,

All of the thunder's seeds of fire, to sweep
In a straight line unto one place, as 'twere,-
Casting them one by other, as they roll,
Into that onward course. Again, perchance,
In coming along, it pulls from out the air
Some certain bodies, which by their own blows
Enkindle its velocity. And, lo,
It comes through objects leaving them unharmed,
It goes through many things and leaves them whole,
Because the liquid fire flieth along
Athrough their pores. And much it does transfix,
When these primordial atoms of the bolt
Have fallen upon the atoms of these things
Precisely where the intertwined atoms
Are held together. And, further, easily
Brass it unbinds and quickly fuseth gold,
Because its force is so minutely made
Of tiny parts and elements so smooth
That easily they wind their way within,
And, when once in, quickly unbind all knots
And loosen all the bonds of union there.

-
And most in autumn is shaken the house of heaven,
The house so studded with the glittering stars,
And the whole earth around- most too in spring
When flowery times unfold themselves: for, lo,
In the cold season is there lack of fire,
And winds are scanty in the hot, and clouds
Have not so dense a bulk. But when, indeed,
The seasons of heaven are betwixt these twain,
The divers causes of the thunderbolt
Then all concur; for then both cold and heat
Are mixed in the cross-seas of the year,
So that a discord rises among things
And air in vast tumultuosity
Billows, infuriate with the fires and winds-
Of which the both are needed by the cloud
For fabrication of the thunderbolt.
For the first part of heat and last of cold
Is the time of spring; wherefore must things unlike
Do battle one with other, and, when mixed,
Tumultuously rage. And when rolls round
The latest heat mixed with the earliest chill-
The time which bears the name of autumn- then
Likewise fierce cold-spells wrestle with fierce heats.

On this account these seasons of the year
Are nominated "cross-seas."- And no marvel
If in those times the thunderbolts prevail
And storms are roused turbulent in heaven,
Since then both sides in dubious warfare rage
Tumultuously, the one with flames, the other
With winds and with waters mixed with winds.

-
This, this it is, O Memmius, to see through
The very nature of fire-fraught thunderbolt;
O this it is to mark by what blind force
It maketh each effect, and not, O not
To unwind Etrurian scrolls oracular,
Inquiring tokens of occult will of gods,
Even as to whence the flying flame hath come,
Or to which half of heaven it turns, or how
Through walled places it hath wound its way,
Or, after proving its dominion there,
How it hath speeded forth from thence amain,
Or what the thunderstroke portends of ill
From out high heaven. But if Jupiter
And other gods shake those refulgent vaults
With dread reverberations and hurl fire
Whither it pleases each, why smite they not
Mortals of reckless and revolting crimes,
That such may pant from a transpierced breast
Forth flames of the red levin- unto men
A drastic lesson?- why is rather he-
O he self-conscious of no foul offence-
Involved in flames, though innocent, and clasped
Up-caught in skiey whirlwind and in fire?
Nay, why, then, aim they at eternal wastes,
And spend themselves in vain?- perchance, even so
To exercise their arms and strengthen shoulders?
Why suffer they the Father's javelin
To be so blunted on the earth? And why
Doth he himself allow it, nor spare the same
Even for his enemies? O why most oft
Aims he at lofty places? Why behold we
Marks of his lightnings most on mountain tops?
Then for what reason shoots he at the sea?-
What sacrilege have waves and bulk of brine
And floating fields of foam been guilty of?
Besides, if 'tis his will that we beware
Against the lightning-stroke, why feareth he

To grant us power for to behold the shot?
And, contrariwise, if wills he to o'erwhelm us,
Quite off our guard, with fire, why thunders he
Off in yon quarter, so that we may shun?
Why rouseth he beforehand darkling air
And the far din and rumblings? And O how
Canst thou believe he shoots at one same time
Into diverse directions? Or darest thou
Contend that never hath it come to pass
That divers strokes have happened at one time?
But oft and often hath it come to pass,
And often still it must, that, even as showers
And rains o'er many regions fall, so too
Dart many thunderbolts at one same time.
Again, why never hurtles Jupiter
A bolt upon the lands nor pours abroad
Clap upon clap, when skies are cloudless all?
Or, say, doth he, so soon as ever the clouds
Have come thereunder, then into the same
Descend in person, and that from thence he may
Near-by decide upon the stroke of shaft?
And, lastly, why, with devastating bolt
Shakes he asunder holy shrines of gods
And his own thrones of splendour, and to-breaks
The well-wrought idols of divinities,
And robs of glory his own images
By wound of violence?

But to return apace,
Easy it is from these same facts to know
In just what wise those things (which from their sort
The Greeks have named "bellows") do come down,
Discharged from on high, upon the seas.
For it haps that sometimes from the sky descends
Upon the seas a column, as if pushed,
Round which the surges seethe, tremendously
Aroused by puffing gusts; and whatso'er
Of ships are caught within that tumult then
Come into extreme peril, dashed along.
This haps when sometimes wind's aroused force
Can't burst the cloud it tries to, but down-weighs
That cloud, until 'tis like a column from sky
Upon the seas pushed downward- gradually,
As if a Somewhat from on high were shoved
By fist and nether thrust of arm, and lengthened
Far to the waves. And when the force of wind

Hath rived this cloud, from out the cloud it rushes
Down on the seas, and starts among the waves
A wondrous seething, for the eddying whirl
Descends and downward draws along with it
That cloud of ductile body. And soon as ever
'Twas shoved unto the levels of the main
That laden cloud, the whirl suddenly then
Plunges its whole self into the waters there
And rouses all the sea with monstrous roar,
Constraining it to seethe. It happens too
That very vortex of the wind involves
Itself in clouds, scraping from out the air
The seeds of cloud, and counterfeits, as 'twere,
The "bellows" pushed from heaven. And when this shape
Hath dropped upon the lands and burst apart,
It belches forth immeasurable might
Of whirlwind and of blast. Yet since 'tis formed
At most but rarely, and on land the hills
Must block its way, 'tis seen more oft out there
On the broad prospect of the level main
Along the free horizons.

Into being

The clouds condense, when in this upper space
Of the high heaven have gathered suddenly,
As round they flew, unnumbered particles-
World's rougher ones, which can, though interlinked
With scanty couplings, yet be fastened firm,
The one on other caught. These particles
First cause small clouds to form; and, thereupon,
These catch the one on other and swarm in a flock
And grow by their conjoining, and by winds
Are borne along, along, until collects
The tempest fury. Happens, too, the nearer
The mountain summits neighbour to the sky,
The more unceasingly their far crags smoke
With the thick darkness of swart cloud, because
When first the mists do form, ere ever the eyes
Can there behold them (tenuous as they be),
The carrier-winds will drive them up and on
Unto the topmost summits of the mountain;
And then at last it happens, when they be
In vaster throng upgathered, that they can
By this very condensation lie revealed,
And that at same time they are seen to surge
From very vertex of the mountain up

Into far ether. For very fact and feeling,
As we up-climb high mountains, proveth clear
That windy are those upward regions free.
Besides, the clothes hung-out along the shore,
When in they take the clinging moisture, prove
That Nature lifts from over all the sea
Unnumbered particles. Whereby the more
'Tis manifest that many particles
Even from the salt upheavings of the main
Can rise together to augment the bulk
Of massed clouds. For moistures in these twain
Are near akin. Besides, from out all rivers,
As well as from the land itself, we see
Up-rising mists and steam, which like a breath
Are forced out from them and borne aloft,
To curtain heaven with their murk, and make,
By slow foregathering, the skiey clouds.
For, in addition, lo, the heat on high
Of constellated ether burdens down
Upon them, and by sort of condensation
Weaveth beneath the azure firmament
The reek of darkling cloud. It happens, too,
That hither to the skies from the Beyond
Do come those particles which make the clouds
And flying thunderheads. For I have taught
That this their number is innumerable
And infinite the sum of the Abyss,
And I have shown with what stupendous speed
Those bodies fly and how they're wont to pass
Amain through incommunicable space.
Therefore, 'tis not exceeding strange, if oft
In little time tempest and darkness cover
With bulking thunderheads hanging on high
The oceans and the lands, since everywhere
Through all the narrow tubes of yonder ether,
Yea, so to speak, through all the breathing-holes
Of the great upper-world encompassing,
There be for the primordial elements
Exits and entrances.

Now come, and how
The rainy moisture thickens into being
In the lofty clouds, and how upon the lands
'Tis then discharged in down-pour of large showers,
I will unfold. And first triumphantly
Will I persuade thee that up-rise together,

With clouds themselves, full many seeds of water
From out all things, and that they both increase-
Both clouds and water which is in the clouds-
In like proportion, as our frames increase
In like proportion with our blood, as well
As sweat or any moisture in our members.
Besides, the clouds take in from time to time
Much moisture risen from the broad marine,-
Whilst the winds bear them o'er the mighty sea,
Like hanging fleeces of white wool. Thuswise,
Even from all rivers is there lifted up
Moisture into the clouds. And when therein
The seeds of water so many in many ways
Have come together, augmented from all sides,
The close-jammed clouds then struggle to discharge
Their rain-storms for a two-fold reason: lo,
The wind's force crowds them, and the very excess
Of storm-clouds (massed in a vaster throng)
Giveth an urge and pressure from above
And makes the rains out-pour. Besides when, too,
The clouds are winnowed by the winds, or scattered
Smitten on top by heat of sun, they send
Their rainy moisture, and distil their drops,
Even as the wax, by fiery warmth on top,
Wasteth and liquefies abundantly.
But comes the violence of the bigger rains
When violently the clouds are weighted down
Both by their cumulated mass and by
The onset of the wind. And rains are wont
To endure awhile and to abide for long,
When many seeds of waters are aroused,
And clouds on clouds and racks on racks outstream
In piled layers and are borne along
From every quarter, and when all the earth
Smoking exhales her moisture. At such a time
When sun with beams amid the tempest-murk
Hath shone against the showers of black rains,
Then in the swart clouds there emerges bright
The radiance of the bow.

And as to things
Not mentioned here which of themselves do grow
Or of themselves are gendered, and all things
Which in the clouds condense to being- all,
Snow and the winds, hail and the hoar-frosts chill,
And freezing, mighty force- of lakes and pools

The mighty hardener, and mighty check
Which in the winter curbeth everywhere
The rivers as they go- 'tis easy still,
Soon to discover and with mind to see
How they all happen, whereby gendered,
When once thou well hast understood just what
Functions have been vouchsafed from of old
Unto the procreant atoms of the world.

Now come, and what the law of earthquakes is
Hearken, and first of all take care to know
That the under-earth, like to the earth around us,
Is full of windy caverns all about;
And many a pool and many a grim abyss
She bears within her bosom, ay, and cliffs
And jagged scarps; and many a river, hid
Beneath her chine, rolls rapidly along
Its billows and plunging boulders. For clear fact
Requires that earth must be in every part
Alike in constitution. Therefore, earth,
With these things underneath affixed and set,
Trembleth above, jarred by big down-tumbings,
When time hath undermined the huge caves,
The subterranean. Yea, whole mountains fall,
And instantly from spot of that big jar
There quiver the tremors far and wide abroad.
And with good reason: since houses on the street
Begin to quake throughout, when jarred by a cart
Of no large weight; and, too, the furniture
Within the house up-bounds, when a paving-block
Gives either iron rim of the wheels a jolt.
It happens, too, when some prodigious bulk
Of age-worn soil is rolled from mountain slopes
Into tremendous pools of water dark,
That the reeling land itself is rocked about
By the water's undulations; as a basin
Sometimes won't come to rest until the fluid
Within it ceases to be rocked about
In random undulations.

And besides,

When subterranean winds, up-gathered there
In the hollow deeps, bulk forward from one spot,
And press with the big urge of mighty powers
Against the lofty grottos, then the earth
Bulks to that quarter whither push amain
The headlong winds. Then all the builded houses

Above ground- and the more, the higher up-reared
Unto the sky- lean ominously, careening
Into the same direction; and the beams,
Wrenched forward, over-hang, ready to go.
Yet dread men to believe that there awaits
The nature of the mighty world a time
Of doom and cataclysm, albeit they see
So great a bulk of lands to bulge and break!
And lest the winds blew back again, no force
Could rein things in nor hold from sure career
On to disaster. But now because those winds
Blow back and forth in alternation strong,
And, so to say, rallying charge again,
And then repulsed retreat, on this account
Earth oftener threatens than she brings to pass
Collapses dire. For to one side she leans,
Then back she sways; and after tottering
Forward, recovers then her seats of poise.
Thus, this is why whole houses rock, the roofs
More than the middle stories, middle more
Than lowest, and the lowest least of all.

-
Arises, too, this same great earth-quaking,
When wind and some prodigious force of air,
Collected from without or down within
The old telluric deeps, have hurled themselves
Amain into those caverns sub-terrene,
And there at first tumultuously chafe
Among the vasty grottos, borne about
In mad rotations, till their lashed force
Aroused out-bursts abroad, and then and there,
Riving the deep earth, makes a mighty chasm-
What once in Syrian Sidon did befall,
And once in Peloponnesian Aegium,
Twain cities which such out-break of wild air
And earth's convulsion, following hard upon,
O'erthrew of old. And many a walled town,
Besides, hath fall'n by such omnipotent
Convulsions on the land, and in the sea
Engulfed hath sunken many a city down
With all its populace. But if, indeed,
They burst not forth, yet is the very rush
Of the wild air and fury-force of wind
Then dissipated, like an ague-fit,
Through the innumerable pores of earth,

To set her all a-shake- even as a chill,
When it hath gone into our marrow-bones,
Sets us convulsively, despite ourselves,
A-shivering and a-shaking. Therefore, men
With two-fold terror bustle in alarm
Through cities to and fro: they fear the roofs
Above the head; and underfoot they dread
The caverns, lest the nature of the earth
Suddenly rend them open, and she gape,
Herself asunder, with tremendous maw,
And, all confounded, seek to chock it full
With her own ruins. Let men, then, go on
Feigning at will that heaven and earth shall be
Inviolable, entrusted evermore
To an eternal weal: and yet at times
The very force of danger here at hand
Prods them on some side with this goad of fear-
This among others- that the earth, withdrawn
Abruptly from under their feet, be hurried down,
Down into the abyss, and the Sum-of-Things
Be following after, utterly fordone,
Till be but wrack and wreckage of a world.

BOOK_6|TELLURIC_PHENOMENA
EXTRAORDINARY AND PARADOXICAL
TELLURIC PHENOMENA

-
In chief, men marvel Nature renders not
Bigger and bigger the bulk of ocean, since
So vast the down-rush of the waters be,
And every river out of every realm
Cometh thereto; and add the random rains
And flying tempests, which spatter every sea
And every land bedew; add their own springs:
Yet all of these unto the ocean's sum
Shall be but as the increase of a drop.
Wherefore 'tis less a marvel that the sea,
The mighty ocean, increaseth not. Besides,
Sun with his heat draws off a mighty part:
Yea, we behold that sun with burning beams
To dry our garments dripping all with wet;
And many a sea, and far out-spread beneath,
Do we behold. Therefore, however slight
The portion of wet that sun on any spot
Culls from the level main, he still will take

From off the waves in such a wide expanse
Abundantly. Then, further, also winds,
Sweeping the level waters, can bear off
A mighty part of wet, since we behold
Oft in a single night the highways dried
By winds, and soft mud crusted o'er at dawn.

-
Again, I've taught thee that the clouds bear off
Much moisture too, up-taken from the reaches
Of the mighty main, and sprinkle it about
O'er all the zones, when rain is on the lands
And winds convey the aery racks of vapour.
Lastly, since earth is porous through her frame,
And neighbours on the seas, girdling their shores,
The water's wet must seep into the lands
From briny ocean, as from lands it comes
Into the seas. For brine is filtered off,
And then the liquid stuff seeps back again
And all re-poureth at the river-heads,
Whence in fresh-water currents it returns
Over the lands, adown the channels which
Were cleft erstwhile and erstwhile bore along
The liquid-footed floods.

And now the cause
Whereby athrough the throat of Aetna's Mount
Such vast tornado-fires out-breathe at times,
I will unfold: for with no middling might
Of devastation the flamy tempest rose
And held dominion in Sicilian fields:
Drawing upon itself the upturned faces
Of neighbouring clans, what time they saw afar
The skiey vaults a-fume and sparkling all,
And filled their bosoms with dread anxiety
Of what new thing Nature were travailing at.

-
In these affairs it much behooveth thee
To look both wide and deep, and far abroad
To peer to every quarter, that thou mayst
Remember how boundless is the Sum-of-Things,
And mark how infinitely small a part
Of the whole Sum is this one sky of ours-
O not so large a part as is one man
Of the whole earth. And plainly if thou viewest
This cosmic fact, placing it square in front,
And plainly understandest, thou wilt leave

Wondering at many things. For who of us
Wondereth if some one gets into his joints
A fever, gathering head with fiery heat,
Or any other dolorous disease
Along his members? For anon the foot
Grows blue and bulbous; often the sharp twinge
Seizes the teeth, attacks the very eyes;
Out-breaks the sacred fire, and, crawling on
Over the body, burneth every part
It seizeth on, and works its hideous way
Along the frame. No marvel this, since, lo,
Of things innumerable be seeds enough,
And this our earth and sky do bring to us
Enough of bane from whence can grow the strength
Of maladies uncounted. Thuswise, then,
We must suppose to all the sky and earth
Are ever supplied from out the infinite
All things, O all in stores enough whereby
The shaken earth can of a sudden move,
And fierce typhoons can over sea and lands
Go tearing on, and Aetna's fires o'erflow,
And heaven become a flame-burst. For that, too,
Happens at times, and the celestial vaults
Glow into fire, and rainy tempests rise
In heavier congregation, when, perchance,
The seeds of water have foregathered thus
From out the infinite. "Aye, but passing huge
The fiery turmoil of that conflagration!"
So sayst thou; well, huge many a river seems
To him that erstwhile ne'er a larger saw;
Thus, huge seems tree or man; and everything
Which mortal sees the biggest of each class,
That he imagines to be "huge"; though yet
All these, with sky and land and sea to boot,
Are all as nothing to the sum entire
Of the all-Sum.

But now I will unfold
At last how yonder suddenly angered flame
Out-blows abroad from vasty furnaces
Aetnaean. First, the mountain's nature is
All under-hollow, propped about, about
With caverns of basaltic piers. And, lo,
In all its grottos be there wind and air-
For wind is made when air hath been uproused
By violent agitation. When this air

Upstream, retard, and, forcing back his waves,
Fill him o'erfull and force his flow to stop.
For out of doubt these blasts which driven be
From icy constellations of the pole
Are borne straight up the river. Comes that river
From forth the sultry places down the south,
Rising far up in midmost realm of day,
Among black generations of strong men
With sun-baked skins. 'Tis possible, besides,
That a big bulk of piled sand may bar
His mouths against his onward waves, when sea,
Wild in the winds, tumbles the sand to inland;
Whereby the river's outlet were less free,
Likewise less headlong his descending floods.
It may be, too, that in this season rains
Are more abundant at its fountain head,
Because the Etesian blasts of those north winds
Then urge all clouds into those inland parts.
And, soothly, when they're thus foregathered there.
Urged yonder into midmost realm of day,
Then, crowded against the lofty mountain sides,
They're massed and powerfully pressed. Again,
Perchance, his waters wax, O far away,
Among the Aethiopians' lofty mountains,
When the all-beholding sun with thawing beams
Drives the white snows to flow into the vales.

Now come; and unto thee I will unfold,
As to the Birdless spots and Birdless tarns,
What sort of nature they are furnished with.
First, as to name of "birdless," - that derives
From very fact, because they noxious be
Unto all birds. For when above those spots
In horizontal flight the birds have come,
Forgetting to oar with wings, they furl their sails,
And, with down-drooping of their delicate necks,
Fall headlong into earth, if haply such
The nature of the spots, or into water,
If haply spreads there under Birdless tarn.
Such spot's at Cumae, where the mountains smoke,
Charged with the pungent sulphur, and increased
With steaming springs. And such a spot there is
Within the walls of Athens, even there
On summit of Acropolis, beside
Fane of Tritonian Pallas bountiful,

Where never cawing crows can wing their course,
Not even when smoke the altars with good gifts-
But evermore they flee- yet not from wrath
Of Pallas, grieved at that espial old,
As poets of the Greeks have sung the tale;
But very nature of the place compels.
In Syria also- as men say- a spot
Is to be seen, where also four-foot kinds,
As soon as ever they've set their steps within,
Collapse, o'ercome by its essential power,
As if there slaughtered to the under-gods.
Lo, all these wonders work by natural law,
And from what causes they are brought to pass
The origin is manifest; so, haply,
Let none believe that in these regions stands
The gate of Orcus, nor us then suppose,
Haply, that thence the under-gods draw down
Souls to dark shores of Acheron- as stags,
The wing-footed, are thought to draw to light,
By sniffing nostrils, from their dusky lairs
The wriggling generations of wild snakes.
How far removed from true reason is this,
Perceive thou straight; for now I'll try to say
Somewhat about the very fact.

And, first,

This do I say, as oft I've said before:
In earth are atoms of things of every sort;
And know, these all thus rise from out the earth-
Many life-giving which be good for food,
And many which can generate disease
And hasten death, O many primal seeds
Of many things in many modes- since earth
Contains them mingled and gives forth discrete.
And we have shown before that certain things
Be unto certain creatures suited more
For ends of life, by virtue of a nature,
A texture, and primordial shapes, unlike
For kinds alike. Then too 'tis thine to see
How many things oppressive be and foul
To man, and to sensation most malign:
Many meander miserably through ears;
Many in-wind athrough the nostrils too,
Malign and harsh when mortal draws a breath;
Of not a few must one avoid the touch;
Of not a few must one escape the sight;

And some there be all loathsome to the taste;
And many, besides, relax the languid limbs
Along the frame, and undermine the soul
In its abodes within. To certain trees
There hath been given so dolorous a shade
That often they gender achings of the head,
If one but be beneath, outstretched on the sward.
There is, again, on Helicon's high hills
A tree that's wont to kill a man outright
By fetid odour of its very flower.
And when the pungent stench of the night-lamp,
Extinguished but a moment since, assails
The nostrils, then and there it puts to sleep
A man afflicted with the falling sickness
And foamings at the mouth. A woman, too,
At the heavy castor drowns back in chair,
And from her delicate fingers slips away
Her gaudy handiwork, if haply she
Hath got the whiff at menstruation-time.
Once more, if thou delayest in hot baths,
When thou art over-full, how readily
From stool in middle of the steaming water
Thou tumblest in a fit! How readily
The heavy fumes of charcoal wind their way
Into the brain, unless beforehand we
Of water 've drunk. But when a burning fever,
O'ermastering man, hath seized upon his limbs,
Then odour of wine is like a hammer-blow.
And seest thou not how in the very earth
Sulphur is gendered and bitumen thickens
With noisome stench. What direful stenches, too,
Scaptensula out-breathes from down below,
When men pursue the veins of silver and gold,
With pick-axe probing round the hidden realms
Deep in the earth?- Or what of deadly bane
The mines of gold exhale? O what a look,
And what a ghastly hue they give to men!
And seest thou not, or hearest, how they're wont
In little time to perish, and how fail
The life-stores in those folk whom mighty power
Of grim necessity confineth there
In such a task? Thus, this telluric earth
Out-streams with all these dread effluvia
And breathes them out into the open world
And into the visible regions under heaven.

-
Thus, too, those Birdless places must up-send
An essence bearing death to winged things,
Which from the earth rises into the breezes
To poison part of skiey space, and when
Thither the winged is on pennons borne,
There, seized by the unseen poison, 'tis ensnared,
And from the horizontal of its flight
Drops to the spot whence sprang the effluvium.
And when 'thas there collapsed, then the same power
Of that effluvium takes from all its limbs
The relics of its life. That power first strikes
The creatures with a wildering dizziness,
And then thereafter, when they're once down-fallen
Into the poison's very fountains, then
Life, too, they vomit out perforce, because
So thick the stores of bane around them fume.

Again, at times it happens that this power,
This exhalation of the Birdless places,
Dispels the air betwixt the ground and birds,
Leaving well-nigh a void. And thither when
In horizontal flight the birds have come,
Forthwith their buoyancy of pennons limps,
All useless, and each effort of both wings
Falls out in vain. Here, when without all power
To buoy themselves and on their wings to lean,
Lo, Nature constrains them by their weight to slip
Down to the earth, and lying prostrate there
Along the well-nigh empty void, they spend
Their souls through all the openings of their frame.

-
Further, the water of wells is colder then
At summer time, because the earth by heat
Is rarefied, and sends abroad in air
Whatever seeds it peradventure have
Of its own fiery exhalations.
The more, then, the telluric ground is drained
Of heat, the colder grows the water hid
Within the earth. Further, when all the earth
Is by the cold compressed, and thus contracts
And, so to say, concretes, it happens, lo,
That by contracting it expresses then
Into the wells what heat it bears itself.

-
'Tis said at Hammon's fane a fountain is,

In daylight cold and hot in time of night.
This fountain men be-wonder over-much,
And think that suddenly it seethes in heat
By intense sun, the subterranean, when
Night with her terrible murk hath cloaked the lands-
What's not true reasoning by a long remove:
I' faith when sun o'erhead, touching with beams
An open body of water, had no power
To render it hot upon its upper side,
Though his high light possess such burning glare,
How, then, can he, when under the gross earth,
Make water boil and glut with fiery heat?-
And, specially, since scarcely potent he
Through hedging walls of houses to inject
His exhalations hot, with ardent rays.
What, then, the principle? Why, this, indeed:
The earth about that spring is porous more
Than elsewhere the telluric ground, and be
Many the seeds of fire hard by the water;
On this account, when night with dew-fraught shades
Hath whelmed the earth, anon the earth deep down
Grows chill, contracts; and thuswise squeezes out
Into the spring what seeds she holds of fire
(As one might squeeze with fist), which render hot
The touch and steam of the fluid. Next, when sun,
Up-risen, with his rays has split the soil
And rarefied the earth with waxing heat,
Again into their ancient abodes return
The seeds of fire, and all the Hot of water
Into the earth retires; and this is why
The fountain in the daylight gets so cold.
Besides, the water's wet is beat upon
By rays of sun, and, with the dawn, becomes
Rarer in texture under his pulsing blaze;
And, therefore, whatso seeds it holds of fire
It renders up, even as it renders oft
The frost that it contains within itself
And thaws its ice and looseneth the knots.
There is, moreover, a fountain cold in kind
That makes a bit of tow (above it held)
Take fire forthwith and shoot a flame; so, too,
A pitch-pine torch will kindle and flare round
Along its waves, wherever 'tis impelled
Afloat before the breeze. No marvel, this:
Because full many seeds of heat there be

Within the water; and, from earth itself
Out of the deeps must particles of fire
Athrough the entire fountain surge aloft,
And speed in exhalations into air
Forth and abroad (yet not in numbers enow
As to make hot the fountain). And, moreo'er,
Some force constrains them, scattered through the water,
Forthwith to burst abroad, and to combine
In flame above. Even as a fountain far
There is at Aradus amid the sea,
Which bubbles out sweet water and disparts
From round itself the salt waves; and, behold,
In many another region the broad main
Yields to the thirsty mariners timely help,
Belching sweet waters forth amid salt waves.
Just so, then, can those seeds of fire burst forth
Athrough that other fount, and bubble out
Abroad against the bit of tow; and when
They there collect or cleave unto the torch,
Forthwith they readily flash aflame, because
The tow and torches, also, in themselves
Have many seeds of latent fire. Indeed,
And seest thou not, when near the nightly lamps
Thou bringest a flaxen wick, extinguished
A moment since, it catches fire before
'Thas touched the flame, and in same wise a torch?
And many another object flashes aflame
When at a distance, touched by heat alone,
Before 'tis steeped in veritable fire.
This, then, we must suppose to come to pass
In that spring also.

Now to other things!

And I'll begin to treat by what decree
Of Nature it came to pass that iron can be
By that stone drawn which Greeks the magnet call
After the country's name (its origin
Being in country of Magnesian folk).
This stone men marvel at; and sure it oft
Maketh a chain of rings, depending, lo,
From off itself! Nay, thou mayest see at times
Five or yet more in order dangling down
And swaying in the delicate winds, whilst one
Depends from other, cleaving to under-side,
And ilk one feels the stone's own power and bonds-
So over-masteringly its power flows down.

In things of this sort, much must be made sure
Ere thou account of the thing itself canst give,
And the approaches roundabout must be;
Wherefore the more do I exact of thee
A mind and ears attent.

First, from all things
We see soever, evermore must flow,
Must be discharged and strewn about, about,
Bodies that strike the eyes, awaking sight.
From certain things flow odours evermore,
As cold from rivers, heat from sun, and spray
From waves of ocean, eater-out of walls
Along the coasts. Nor ever cease to seep
The varied echoings athrough the air.
Then, too, there comes into the mouth at times
The wet of a salt taste, when by the sea
We roam about; and so, whene'er we watch
The wormwood being mixed, its bitter stings.
To such degree from all things is each thing
Borne streamingly along, and sent about
To every region round; and Nature grants
Nor rest nor respite of the onward flow,
Since 'tis incessantly we feeling have,
And all the time are suffered to descry
And smell all things at hand and hear them sound.

Now will I seek again to bring to mind
How porous a body all things have- a fact
Made manifest in my first canto, too.
For truly, though to know this doth import
For many things, yet for this very thing
On which straightway I'm going to discourse,
'Tis needful most of all to make it sure
That naught's at hand but body mixed with void.
A first ensample: in grottos, rocks o'erhead
Sweat moisture and distil the oozy drops;
Likewise, from all our body seeps the sweat;
There grows the beard, and along our members all
And along our frame the hairs. Through all our veins
Disseminates the foods, and gives increase
And aliment down to the extreme parts,
Even to the tiniest finger-nails. Likewise,
Through solid bronze the cold and fiery heat
We feel to pass; likewise, we feel them pass
Through gold, through silver, when we clasp in hand
The brimming goblets. And, again, there flit

Voices through houses' hedging walls of stone;
Odour seeps through, and cold, and heat of fire
That's wont to penetrate even strength of iron.
Again, where corselet of the sky girds round

And at same time, some Influence of bane,
When from Beyond 'thas stolen into our world.
And tempests, gathering from the earth and sky,
Back to the sky and earth absorbed retire-
With reason, since there's naught that's fashioned not
With body porous.

Furthermore, not all
The particles which be from things thrown off
Are furnished with same qualities for sense,
Nor be for all things equally adapt.
A first ensample: the sun doth bake and parch
The earth; but ice he thaws, and with his beams
Compels the lofty snows, up-reared white
Upon the lofty hills, to waste away;
Then, wax, if set beneath the heat of him,
Melts to a liquid. And the fire, likewise,
Will melt the copper and will fuse the gold,
But hides and flesh it shrivels up and shrinks.
The water hardens the iron just off the fire,
But hides and flesh (made hard by heat) it softens.
The oleaster-tree as much delights
The bearded she-goats, verily as though
'Twere nectar-steeped and shed ambrosia;
Than which is naught that burgeons into leaf
More bitter food for man. A hog draws back
For marjoram oil, and every unguent fears
Fierce poison these unto the bristled hogs,
Yet unto us from time to time they seem,
As 'twere, to give new life. But, contrariwise,
Though unto us the mire be filth most foul,
To hogs that mire doth so delightsome seem
That they with wallowing from belly to back
Are never cloyed.

A point remains, besides,
Which best it seems to tell of, ere I go
To telling of the fact at hand itself.
Since to the varied things assigned be
The many pores, those pores must be diverse
In nature one from other, and each have
Its very shape, its own direction fixed.

And so, indeed, in breathing creatures be
The several senses, of which each takes in
Unto itself, in its own fashion ever,
Its own peculiar object. For we mark
How sounds do into one place penetrate,
Into another flavours of all juice,
And savour of smell into a third. Moreover,
One sort through rocks we see to seep, and, lo,
One sort to pass through wood, another still
Through gold, and others to go out and off
Through silver and through glass. For we do see
Through some pores form-and-look of things to flow,
Through others heat to go, and some things still
To speedier pass than others through same pores.
Of verity, the nature of these same paths,
Varying in many modes (as aforesaid)
Because of unlike nature and warp and woof
Of cosmic things, constrains it so to be.

Wherefore, since all these matters now have been
Established and settled well for us
As premises prepared, for what remains
'Twill not be hard to render clear account
By means of these, and the whole cause reveal
Whereby the magnet lures the strength of iron.
First, stream there must from off the lode-stone seeds
Innumerable, a very tide, which smites
By blows that air asunder lying betwixt
The stone and iron. And when is emptied out
This space, and a large place between the two
Is made a void, forthwith the primal germs
Of iron, headlong slipping, fall conjoined
Into the vacuum, and the ring itself
By reason thereof doth follow after and go
Thuswise with all its body. And naught there is
That of its own primordial elements
More thoroughly knit or tighter linked coheres
Than nature and cold roughness of stout iron.
Wherefore, 'tis less a marvel what I said,
That from such elements no bodies can
From out the iron collect in larger throng
And be into the vacuum borne along,
Without the ring itself do follow after.
And this it does, and followeth on until
'Thath reached the stone itself and cleaved to it

By links invisible. Moreover, likewise,
The motion's assisted by a thing of aid
(Whereby the process easier becomes)-
Namely, by this: as soon as rarer grows
That air in front of the ring, and space between
Is emptied more and made a void, forthwith
It happens all the air that lies behind
Conveys it onward, pushing from the rear.
For ever doth the circumambient air
Drub things unmoved, but here it pushes forth
The iron, because upon one side the space
Lies void and thus receives the iron in.
This air, whereof I am reminding thee,
Winding athrough the iron's abundant pores
So subtly into the tiny parts thereof,
Shoves it and pushes, as wind the ship and sails.
The same doth happen in all directions forth:
From whatso side a space is made a void,
Whether from crosswise or above, forthwith
The neighbour particles are borne along
Into the vacuum; for of verity,
They're set a-going by poundings from elsewhere,
Nor by themselves of own accord can they
Rise upwards into the air. Again, all things
Must in their framework hold some air, because
They are of framework porous, and the air
Encompasses and borders on all things.
Thus, then, this air in iron so deeply stored
Is tossed evermore in vexed motion,
And therefore drubs upon the ring sans doubt
And shakes it up inside....

-

In sooth, that ring is thither borne along
To where 'thas once plunged headlong- thither, lo,
Unto the void whereto it took its start.

-

It happens, too, at times that nature of iron
Shrinks from this stone away, accustomed
By turns to flee and follow. Yea, I've seen
Those Samothracian iron rings leap up,
And iron filings in the brazen bowls
Seethe furiously, when underneath was set
The magnet stone. So strongly iron seems
To crave to flee that rock. Such discord great
Is gendered by the interposed brass,

Because, forsooth, when first the tide of brass
Hath seized upon and held possession of
The iron's open passage-ways, thereafter
Cometh the tide of the stone, and in that iron
Findeth all spaces full, nor now hath holes
To swim through, as before. 'Tis thus constrained
With its own current 'gainst the iron's fabric
To dash and beat; by means whereof it spews
Forth from itself- and through the brass stirs up-
The things which otherwise without the brass
It sucks into itself. In these affairs
Marvel thou not that from this stone the tide
Prevails not likewise other things to move
With its own blows: for some stand firm by weight,
As gold; and some cannot be moved forever,
Because so porous in their framework they
That there the tide streams through without a break,
Of which sort stuff of wood is seen to be.
Therefore, when iron (which lies between the two)
Hath taken in some atoms of the brass,
Then do the streams of that Magnesian rock
Move iron by their smitings.

Yet these things
Are not so alien from others, that I
Of this same sort am ill prepared to name
Ensamples still of things exclusively
To one another adapt. Thou seest, first,
How lime alone cementeth stones: how wood
Only by glue-of-bull with wood is joined-
So firmly too that oftener the boards
Crack open along the weakness of the grain
Ere ever those taurine bonds will lax their hold.
The vine-born juices with the water-springs
Are bold to mix, though not the heavy pitch
With the light oil-of-olive. And purple dye
Of shell-fish so uniteth with the wool's
Body alone that it cannot be ta'en
Away forever- nay, though thou gavest toil
To restore the same with the Neptunian flood,
Nay, though all ocean willed to wash it out
With all its waves. Again, gold unto gold
Doth not one substance bind, and only one?
And is not brass by tin joined unto brass?
And other ensamples how many might one find!
What then? Nor is there unto thee a need

Of such long ways and roundabout, nor boots it
For me much toil on this to spend. More fit
It is in few words briefly to embrace
Things many: things whose textures fall together
So mutually adapt, that cavities
To solids correspond, these cavities
Of this thing to the solid parts of that,
And those of that to solid parts of this-
Such joinings are the best. Again, some things
Can be the one with other coupled and held,
Linked by hooks and eyes, as 'twere; and this
Seems more the fact with iron and this stone.

Now, of diseases what the law, and whence
The Influence of bane upgathering can
Upon the race of man and herds of cattle
Kindle a devastation fraught with death,
I will unfold. And, first, I've taught above
That seeds there be of many things to us
Life-giving, and that, contrariwise, there must
Fly many round bringing disease and death.
When these have, haply, chanced to collect
And to derange the atmosphere of earth,
The air becometh baneful. And, lo, all
That Influence of bane, that pestilence,
Or from Beyond down through our atmosphere,
Like clouds and mists, descends, or else collects
From earth herself and rises, when, a-soak
And beat by rains unseasonable and suns,
Our earth hath then contracted stench and rot.
Seest thou not, also, that whoso arrive
In region far from fatherland and home
Are by the strangeness of the clime and waters
Distempered?- since conditions vary much.
For in what else may we suppose the clime
Among the Britons to differ from Aegypt's own
(Where totters awry the axis of the world),
Or in what else to differ Pontic clime
From Gades' and from climes adown the south,
On to black generations of strong men
With sun-baked skins? Even as we thus do see
Four climes diverse under the four main-winds
And under the four main-regions of the sky,
So, too, are seen the colour and face of men
Vastly to disagree, and fixed diseases
To seize the generations, kind by kind:

There is the elephant-disease which down
In midmost Aegypt, hard by streams of Nile,
Engendered is- and never elsewhere.
In Attica the feet are oft attacked,
And in Achaean lands the eyes. And so
The divers spots to divers parts and limbs
Are noxious; 'tis a variable air
That causes this. Thus when an atmosphere,
Alien by chance to us, begins to heave,
And noxious airs begin to crawl along,
They creep and wind like unto mist and cloud,
Slowly, and everything upon their way
They disarrange and force to change its state.
It happens, too, that when they've come at last
Into this atmosphere of ours, they taint
And make it like themselves and alien.
Therefore, asudden this devastation strange,
This pestilence, upon the waters falls,
Or settles on the very crops of grain
Or other meat of men and feed of flocks.
Or it remains a subtle force, suspense
In the atmosphere itself; and when therefrom
We draw our inhalations of mixed air,
Into our body equally its bane
Also we must suck in. In manner like,
Oft comes the pestilence upon the kine,
And sickness, too, upon the sluggish sheep.
Nor aught it matters whether journey we
To regions adverse to ourselves and change
The atmospheric cloak, or whether Nature
Herself import a tainted atmosphere
To us or something strange to our own use
Which can attack us soon as ever it come.

BOOK_6|THE_PLAGUE_AT_ATHENS
THE PLAGUE ATHENS

-
'Twas such a manner of disease, 'twas such
Mortal miasma in Cecropian lands
Whilom reduced the plains to dead men's bones,
Unpeopled the highways, drained of citizens
The Athenian town. For coming from afar,
Rising in lands of Aegypt, traversing
Reaches of air and floating fields of foam,
At last on all Pandion's folk it swooped;

Whereat by troops unto disease and death
Were they o'er-given. At first, they'd bear about
A skull on fire with heat, and eyeballs twain
Red with suffusion of blank glare. Their throats,
Black on the inside, sweated oozy blood;
And the walled pathway of the voice of man
Was clogged with ulcers; and the very tongue,
The mind's interpreter, would trickle gore,
Weakened by torments, tardy, rough to touch.
Next when that Influence of bane had chocked,
Down through the throat, the breast, and streamed had
E'en into sullen heart of those sick folk,
Then, verily, all the fences of man's life
Began to topple. From the mouth the breath
Would roll a noisome stink, as stink to heaven
Rotting cadavers flung unburied out.
And, lo, thereafter, all the body's strength
And every power of mind would languish, now
In very doorway of destruction.
And anxious anguish and ululation (mixed
With many a groan) companioned alway
The intolerable torments. Night and day,
Recurrent spasms of vomiting would rack
Always their thews and members, breaking down
With sheer exhaustion men already spent.
And yet on no one's body couldst thou mark
The skin with o'er-much heat to burn aglow,
But rather the body unto touch of hands
Would offer a warmish feeling, and thereby
Show red all over, with ulcers, so to say,
Inbranded, like the "sacred fires" o'erspread
Along the members. The inward parts of men,
In truth, would blaze unto the very bones;
A flame, like flame in furnaces, would blaze
Within the stomach. Nor couldst aught apply
Unto their members light enough and thin
For shift of aid- but coolness and a breeze
Ever and ever. Some would plunge those limbs
On fire with bane into the icy streams,
Hurling the body naked into the waves;
Many would headlong fling them deeply down
The water-pits, tumbling with eager mouth
Already agape. The insatiable thirst
That whelmed their parched bodies, lo, would make
A goodly shower seem like to scanty drops.

Respite of torment was there none. Their frames
Forspent lay prone. With silent lips of fear
Would Medicine mumble low, the while she saw
So many a time men roll their eyeballs round,
Staring wide-open, unvisited of sleep,
The heralds of old death. And in those months
Was given many another sign of death:
The intellect of mind by sorrow and dread
Deranged, the sad brow, the countenance
Fierce and delirious, the tormented ears
Beset with ringings, the breath quick and short
Or huge and intermittent, soaking sweat
A-glisten on neck, the spittle in fine gout
Tainted with colour of crocus and so salt,
The cough scarce wheezing through the rattling throat.
Aye, and the sinews in the fingered hands
Were sure to contract, and sure the jointed frame
To shiver, and up from feet the cold to mount
Inch after inch: and toward the supreme hour
At last the pinched nostrils, nose's tip
A very point, eyes sunken, temples hollow,
Skin cold and hard, the shuddering grimace,
The pulled and puffy flesh above the brows!-
O not long after would their frames lie prone
In rigid death. And by about the eighth
Resplendent light of sun, or at the most
On the ninth flaming of his flambeau, they
Would render up the life. If any then
Had 'scaped the doom of that destruction, yet
Him there awaited in the after days
A wasting and a death from ulcers vile
And black discharges of the belly, or else
Through the clogged nostrils would there ooze along
Much fouled blood, oft with an aching head:
Hither would stream a man's whole strength and flesh.
And whoso had survived that virulent flow
Of the vile blood, yet into thews of him
And into his joints and very genitals
Would pass the old disease. And some there were,
Dreading the doorways of destruction
So much, lived on, deprived by the knife
Of the male member; not a few, though lopped
Of hands and feet, would yet persist in life,
And some there were who lost their eyeballs: O
So fierce a fear of death had fallen on them!

And some, besides, were by oblivion
Of all things seized, that even themselves they know
No longer. And though corpse on corpse lay piled
Unburied on ground, the race of birds and beasts
Would or spring back, scurrying to escape
The virulent stench, or, if they'd tasted there,
Would languish in approaching death. But yet
Hardly at all during those many suns
Appeared a fowl, nor from the woods went forth
The sullen generations of wild beasts-
They languished with disease and died and died.
In chief, the faithful dogs, in all the streets
Outstretched, would yield their breath distressfully
For so that Influence of bane would twist
Life from their members. Nor was found one sure
And universal principle of cure:
For what to one had given the power to take
The vital winds of air into his mouth,
And to gaze upward at the vaults of sky,
The same to others was their death and doom.
In those affairs, O awfulest of all,
O pitiable most was this, was this:
Whoso once saw himself in that disease
Entangled, ay, as damned unto death,
Would lie in wanhope, with a sullen heart,
Would, in fore-vision of his funeral,
Give up the ghost, O then and there. For, lo,
At no time did they cease one from another
To catch contagion of the greedy plague,-
As though but woolly flocks and horned herds;
And this in chief would heap the dead on dead:
For who forbore to look to their own sick,
O these (too eager of life, of death afeard)
Would then, soon after, slaughtering Neglect
Visit with vengeance of evil death and base-
Themselves deserted and forlorn of help.
But who had stayed at hand would perish there
By that contagion and the toil which then
A sense of honour and the pleading voice
Of weary watchers, mixed with voice of wail
Of dying folk, forced them to undergo.
This kind of death each nobler soul would meet.
The funerals, uncompanioned, forsaken,
Like rivals contended to be hurried through.

And men contending to ensepulchre
Pile upon pile the throng of their own dead:
And weary with woe and weeping wandered home;
And then the most would take to bed from grief.
Nor could be found not one, whom nor disease
Nor death, nor woe had not in those dread times
Attacked.

-
By now the shepherds and neatherds all,
Yea, even the sturdy guiders of curved ploughs,
Began to sicken, and their bodies would lie
Huddled within back-corners of their huts,
Delivered by squalor and disease to death.
O often and often couldst thou then have seen
On lifeless children lifeless parents prone,
Or offspring on their fathers', mothers' corpse
Yielding the life. And into the city poured
O not in least part from the countryside
That tribulation, which the peasantry
Sick, sick, brought thither, thronging from every quarter,
Plague-stricken mob. All places would they crowd,
All buildings too; whereby the more would death
Up-pile a-heap the folk so crammed in town.
Ah, many a body thirst had dragged and rolled
Along the highways there was lying strewn
Besides Silenus-headed water-fountains,-
The life-breath choked from that too dear desire
Of pleasant waters. Ah, everywhere along
The open places of the populace,
And along the highways, O thou mightest see
Of many a half-dead body the sagged limbs,
Rough with squalor, wrapped around with rags,
Perish from very nastiness, with naught
But skin upon the bones, well-nigh already
Buried- in ulcers vile and obscene filth.
All holy temples, too, of deities
Had Death becrammed with the carcasses;
And stood each fane of the Celestial Ones
Laden with stark cadavers everywhere-
Places which warders of the shrines had crowded
With many a guest. For now no longer men
Did mightily esteem the old Divine,
The worship of the gods: the woe at hand
Did over-master. Nor in the city then
Remained those rites of sepulture, with which

That pious folk had evermore been wont
To buried be. For it was wildered all
In wild alarms, and each and every one
With sullen sorrow would bury his own dead,
As present shift allowed. And sudden stress
And poverty to many an awful act
Impelled; and with a monstrous screaming they
Would, on the frames of alien funeral pyres,
Place their own kin, and thrust the torch beneath
Oft brawling with much bloodshed round about
Rather than quit dead bodies loved in life.

-

-

-THE END-