CHAPTER 8
TIME

Arguments against its existence (Book 4, Lesson 15)

1. Time includes the past, present and future. But the past and the future do not exist. Therefore time does not exist.
2. Even present time does not exist, because time is divisible, whereas the "now" which exists, being indivisible, is not a part of time.

The question arises whether successive "nows" are distinct or the same. On the one hand it seems they are not distinct, since two parts of time cannot exist together unless one contains the other, as a year contains a month. But between two "nows" there are an infinity of "nows", so that one can never contain or even touch the other. Therefore, if time is continuous, the same "now" must perdure.

On the other hand, it seems that each "now" is distinct: No finite divisible thing can have just one boundary; thus a line must have two terminal points. But the "now" is a demarcation of time, and periods of time are determined by two points of time (= past or future "nows"). Therefore each "now" must be distinct. Likewise, if the same "now" perdured through all time, there would be no way of distinguishing the time of things that happened a thousand years ago from things that exist today.

How time is related to motion (Book 4, Lesson 16)

Time is not the same as motion, because motion exists in the particular things that are in motion, whereas time is everywhere and among all things. Besides, every motion is either slow or fast, but time is neither; rather it is the measure of what is fast or slow, since something is fast if it is moved a great distance in a short time.

On the other hand, time is not independent of motion. A sign of this is that we think little or no time has passed (or time has gone fast) if nothing is happening around us or we become so absorbed in something that we are unaware of what is happening around us.

Therefore time is not motion, but it does not exist without motion.

Definition of time (Book 4, Lesson 17)

Time is connected with motion. This is obvious by our perceiving the two together. Even if we in a silent dark room, we perceive the succession of our thoughts and imaginings, and by this are aware that time is elapsing.

The latter case would make it appear that time depends on the motion of the mind. In that case time will not be a thing of nature but a rational being. On the other hand, if time follows upon any and every motion, then there are as many times as there are motions, which is absurd.

The problem of multiple times is solved if we measure the multiple motions of this world by reference to regular cosmic motions, such as the daily revolution of the earth on its axis, the annual orbital movement of the earth around the sun, and the 28 day orbital movement of the moon around the earth. These are the constants of our world of experience, and it is by these motions that time is calculated.

If time is calculated according to such a basic local motion, and this motion is the continuous passage of the earth over a continuous orbit or position in reference to the sun, then time must be continuous. Because positions can be demarcated in the path of these motions, the motions themselves can be demarcated by points which are before or after each other. Because there is a priority and posteriority of motion, there is a priority and posteriority of time.

The priority and posteriority of motion are the same as motion as to subject, but are different formalities. *Time*, precisely, is **the number of motion**. That is because time is a counting of the different "befores" and "afters" of a motion. We could re-phrase our definition to say that *time* is **the numbering of motion according to before and after**. The "before" and "after" are not those of time, so that the definition would be circular, but the "before" and "after" of motion as it crosses different points of place.

As a number, time is not an abstract number, such as used in pure mathematics, but a concrete quantity that we can call a "numbered number", as when we say ten men or 100 horses. *Time* is the **number of before and after in motion**. Although number is discrete quantity, time is a continuous quantity on account of the thing counted, just as ten measures of cloth is a continuous quantity, even though ten is a discrete quantity.

The meaning of "now" (Book 4, Lesson 18 & 21)

Just as the parts of motion are always other and other, so also the parts of time. But what always exists throughout the whole of time is the same, namely, the "now" which, as to its nature is always the same, although in conception it varies according as it is prior and subsequent. Thus the "now" measures time not in as much as it is always the same thing, but in as much as in conception it is other and other, i.e. "before" and "after".

[Other words for "now" are: a "point in time", an "instant", a "moment", but the latter two are more often understood as infinitesimal segments of time.]

In so far as the "now" constantly changes with the succession of time and of motion, in that sense it is other and not always the same, but in so far as the "now" is a certain being, abstracted from "before" and "after", in that sense it is always of the same nature. "Now" is comparable to a moving car along a road; in its nature it is always the same, yet different when considered located at different positions along its path. Just as the mobile object is more known to us than motion, and motion is known through the mobile object, so time is known through the "now".

It is plain that if there is no time there will be no "now", and if there is no "now" there will be no time. Time is the number of local motion, but a single "now" is not the number of motion (since it is indivisible), but a principle of motion, just as "one" is the principle of number.

Just as the unity of the mobile (e.g. the car on the road) gives unity to the movement (since a change of vehicles would mean different movements), so time derives its unity from the moving "now". And like the moving point of a line as it is drawn, the on-going "now" both gives unity to time and distinguishes its parts. Points are only potential in a line and are actualized only when demarcated as the end of one segment and the beginning of another, as at an angle, which is one point serving two lines. Angular motion (like a bouncing ball), however, is multiple, with the two motions connected at two contiguous points.

The "now" of time is continuous like the point of a line, being at the same time a potential end of the past and beginning of the future. Only when we designate one "now" as the end of one period of time and the beginning of another is it an actualized point. [Compare the separate frames of a video film with the continuity of actual motion.] The distinction of the "now" is a work of the human mind taking it as a boundary; in reality there is no break into contiguous "nows", but it is continuous.

Thus the "now" is not a part of time, but a boundary of time; in that way it is a number, and is applicable to all things that are moved in time.

Besides its meaning as a point in time, "now" is commonly used for a period of time that includes the present, as we say "He has now come" because he has come today.

Similarly, we say something happened "then", meaning either at a precise moment in the past or at a

more or less broad period of time including that moment.

The words "presently" or "just now" mean "now" in the broad sense of the present time, while "long ago" refers to a period of time in the distant past. Something occurs "suddenly" when the time in which it takes place is imperceptibly small.

"Now" in its strict sense has the double function of being an end of the past and a beginning of the future. Thus, of its nature, time does not necessarily have a beginning or an end. Only were the whole universe and its motion to have a beginning would the first "now" serve only as a beginning and not as an end. And were the whole universe and its motion to have an end, then the last "now" would serve only as an end and not as a beginning.

Explanations about time (Book 4, Lesson 19)

We have seen that *time* is **the number of motion according to before and after**. It is a type of continuum; although it does not have continuity in so far as it is a number, it does by reason of that of which it is the number: for it is the number of a continuum, namely, of motion. For time is not a number absolutely but a number of something numbered.

Does time have a minimum? As a number, the minimum is one: a year, day or second etc., but as a continuum, any given time can be divided into smaller parts, just as a magnitude.

Why is time not said to be slow or fast, but is said to be much or little, and short or long? In so far as time is a continuum it is said to be long or short; in so far as it is a number it is said to be much or little. But it cannot be called fast or slow, because that is said of something that can be counted in a short or long time, whereas time is the number of a constant motion.

In what ways is time the same and different? Time is the same everywhere, but is different by reason of before and after in the basic motion of which it is the number; just as different segments of motion are different, so different segments of time.

How is time everywhere, when motion is not everywhere? The answer is that time accompanies motion, whether motion be actual or potential. For things that are capable of motion, and are not actually being moved, are at rest. But time measures not only motion but rest as well.

How can time be repeated? Since the same motion may be repeated specifically, but not numerically, so time can be duplicated in the same day. Thus each year we have a rainy season, specifically the same but numerically different.

Does time measure motion or motion time? Each is defined in terms of the other. The basic continuum is that of a magnitude (e.g. a road); motion imitates this in quantity, continuity and divisibility, and likewise time imitates motion. Fundamentally, time is the number and measure of motion, but it is not always the most known to us. Sometimes we say a certain town is two hours away, not knowing the exact distance. Other times we say that it is 60 kilometres, not knowing the time it takes to get there.

How things are or are not in time (Book 4, Lesson 20)

Motion is measured by time both in its duration (so many hours, days) and in its being, which is essentially continuous and numerable. Other things, like a stone or a man, are measured by time in their duration (i.e. in so far as they have motion), but not in their being, which merely co-exists with time.

Anything that exists in time tends to waste away with age. Even though it could be argued that some things get better with time, nonetheless one does not necessarily learn with time but one does forget with time. Time is *per se* corruptive, and *per accidens* generative, whereas generation and being is attributed *per se* to the agent and generator. The latter are not required for corruption, but simply old age.

Thus whatever is contained in time is subject to decay and corruption. But whatever is outside time exists forever. Aristotle and Thomas wrongly thought this applies to the heavenly bodies which have only local motion but are subject to no other change. But if heavenly bodies, like the sun, moon and stars, are corruptible like everything else, then only spiritual beings are outside of time and exist forever. Besides, universal truths, such as mathematical axioms, are not subject to time and are forever true, but that is because they are abstracted from the real sensible existence of things.

Problems regarding the existence and unity of time (Book 4, Lesson 23)

1. Can there be time without the soul? An argument for the negative is that without anyone to count nothing is countable, and there is no number. On the other hand, motion is a reality independent of the soul, and so is its "before" and "after", which is numerable. Consequently, just as there can be things perceptible to sense even though no sense exists, and intelligible things even though no intelligence exists, so there can exist both countable things and number, even though no counter exists. It is true that if it is impossible for a counter to exist, then nothing countable could exist, but it does not follow that if there is no one counting that there is nothing countable.

Motion, however, does not have a fixed existence in reality, nor is any par of motion actually found in things but a certain indivisible of motion which divides motion; indeed, the totality of motion comes to be on account of the mind considering and comparing a previous state of the mobile to a subsequent state.

According to this, then, time also has no existence outside the soul except according to its indivisible, while the totality of time is had by an ordering process of the mind enumerating what is prior and subsequent in motion. Therefore, apart from the soul time is "a sort of being", i.e. an imperfect being, just as motion exists imperfectly without a soul knowing it.

2. Of which motion is time the number? Since every motion has a before and an after, it would seem that time is the number of each and every motion. But in this case two simultaneous motions would each have their own time (or calendar) and two equal measures of time would exist simultaneously. The only way to compare them is by some regular constant motion, such as the spinning of the earth, which gives us day and night, and the revolution of the earth around the sun, which gives us a year.