

T I M E

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The first notion we consider in the concept of time is that of duration. Duration is predicated of existence and existing beings. Duration is continued existence, or the persistence of an object in its being. It is twofold: uncreated and created. Uncreated duration is eternity, "the simultaneously whole and perfect possession of interminable life,"<sup>1</sup> which is proper to God alone. Created duration is proper to created beings and admits of change; it is of two kinds: aeviternity and time. Aeviternity is the duration of created spiritual beings which are substantially incorruptible, immortal, and without succession; accidentally, however, these beings admit succession, insofar as they "elicit successively the rational acts of knowing and willing"<sup>2</sup>. In other words, aeviternity admits succession of operations, which are accidents, but not succession or change in substantial existence. Time is the duration of that which is strictly speaking, changeable.

There is a logical distinction between duration and existence, for over and above the idea of existence, duration implies persistence. This persistence or permanence in existence may be either successive or permanent. This connotation of persistence as something added to existence applies only to created duration, for uncreated duration, like all infinite qualities ascribed to the Divinity, can add nothing to the divine existence. But the Thomists generally hold that there is no real distinction between the duration and the existence of a thing.

"A thing formally endures by that through which it formally persists in existence; and it persists in existence by that through which it does not cease to exist, or that by means of which it formally excludes the cessation of existence. But that cessation, since it is the lack of formal defect of existence, is formally excluded by existence itself. Therefore duration, taken absolutely, in respect to the thing itself, is identical with existence."<sup>3</sup>

Indeed, although duration connotes or includes some pre-existence, since it means persistence in existence, and persistence must presuppose being; yet really, existence as such does not connote any negation of preceding existence, but prescind from it, and implies absolutely that a thing is in act. Although the hypothetical example of a being which would be created and instantaneously annihilated, is cited as presenting a case of existence without duration, yet considered in reality, both notions are present.

"God does not by one operation bring things into existence and by another preserve them in existence. For the very existence of permanent things is divisible only accidentally, in so far as it underlies some motion; but in itself it is instantaneous. Hence the operation of God ...in making the principle of being is not other than the continuation of being."<sup>4</sup>

In other words, the same divine operation which constitutes the principle of existence in beings, also determines their continuation.

"...in its first instant a thing is said to endure inchoatively, for then its duration begins, but it is consumed in the very continuation of existence, which follows after an instant."<sup>5</sup>

However, this is not the complete Thomistic theory on duration and existence. A distinction must be made between permanent and successive things. Succession, it may be noted, is a type of change in which there exists an identity which includes in the identity of the subject, deter-

minations which cannot exist together. These determinations are thus said to succeed each other and the subject which they qualify is said to endure or to have duration. We have been considering duration and existence in regard to permanent beings. As we have seen, duration does not add anything real and extrinsic to existence; it adds something logical, the connotation of an action continuing it and thus influencing its being. Were this not true, the duration of a permanent being "would constantly require a renewed reproduction." <sup>6</sup> On the other hand, in regard to successive beings, since their existence implies a change of parts or qualities, their duration consists of the addition of existence to previous existence, because successive beings formally endure in virtue of a continuous flow, inasmuch as one part ceases and another begins.

"But yet, as successive parts, they add a new duration and also a new existence to the existence of the preceding parts, and thus the whole successive existence is not distinct from the whole duration but part from part, which does not happen in the indivisible duration of a permanent being."

But this extension of existence does not bring about a new and distinct being with each addition of a part. It merely means that by the addition of new parts the very esse of such a successive being grows and is consummated. Hence duration adds nothing to the esse of such a being, but the being exists in the order of reality in virtue of the flow and addition of its parts.

A real, successive, and continuous duration is the persistence of a being whose parts flow uninterruptedly, so that the mental limitations upon such parts are completely eliminated. Time is considered by all men

as being of this nature.

"For every being really existing and persisting in its existence, has some real duration proportioned to it...But among all things there are certain successive beings which so exist that necessarily they persist through some delay (moram) in their existence; for this is intrinsically connected with succession. Therefore, in beings of this kind, there is a real duration proportionate to them. Therefore as the existence of a successive being does not so endure that it remains entirely the same in the whole length of its duration, but so that its parts come one after the other; thus the duration of such a being has, not a stable, but a flowing permanence, if it deserves the name of permanence; but broadly speaking, it persists or endures as long as its flow does not cease or is not ended."<sup>8</sup>

This type of duration is intrinsic time, that species of time about which we have hitherto been speaking. In addition to being successive duration, time must also be a flowing continuum, for the successive duration of things flows continually without any break in that flow. Were something to intervene and cause a break, the result would be two times, not one time divided.

Since we have seen time as successive duration and a flowing continuum, the next problem is to discover the relationship between the two kinds of flowing continua, motion and time. Aristotle defined motion as "the fulfillment of what exists potentially insofar as it exists potentially."<sup>9</sup>

The Aristotelian school limits motion in the strict sense to the proper meaning of change - a successive transition from one state to another. There are many divisions of change, but Aristotle (Physics, VIII, 9) limits it in the strictest and most proper sense, to local motion. Local motion is a species of intrinsic, physical change, and is defined as successive presence in different places. There are two end points, or terms, in every motion;

the term a quo, the point from which the motion begins, and the term ad quem, the point at which the motion is aimed and where actualization is complete.

Time is either motion or it is certainly found in motion alone.

"Motion and time either are the same, as certain men have said, or time is some passion of motion, which is the case."<sup>10</sup> This is obvious both philosophically and according to our ordinary mode of conceiving time. We conceive time as composed of past, present, and future. Now the movement of the present into the future, whereby the quondam future becomes in turn the past, is necessarily contained in the conception of time. Thus time is always conceived as indicating constant change, progression, motion. Moreover, the standards of measurement which we apply to time are all taken from movement. There is, of course, a philosophical basis for this agreement of all men that time is necessarily related to movement. As we have seen, time is a successive and continuous duration. Duration as such assumes or presupposes, at least in the order of reason, a being of which the duration is predicated; duration cannot be found outside of this being. But really there is no successive being which can be related to successive duration except motion. "Because nothing is of itself (per se) in continuous succession except insofar as it is in becoming' (in fieri), through which, not all at once, but gradually, it acquires its total existence.<sup>11</sup> Therefore, continuous succession primarily and per se is only in motion."

An a posteriori proof that time is not without motion is found in the fact that "when men do not apprehend any change, it does not seem to them that time has passed."<sup>12</sup> We have a conception and cognizance of time only when

we perceive some motion. If the 'now' does not come from the future and move into the past, to allow of our numbering it, time seems to stand still.

We have said that the concept of time is in that of motion. In the present discussion, it is not necessary to distinguish between motion, movement, and change; we have considered their relation above, but considering only their relationship to the being of time, these terms can be used almost interchangeably. Now the question arises: Is time distinct from motion, and if so, is the distinction real or merely logical? A real distinction is "the absence of sameness between things different in their reality, independent of the mind's consideration."<sup>13</sup> A logical distinction is "the absence of sameness between concepts of the same reality."<sup>14</sup> It may be well here also to mention the distinction between time as a duration - the intrinsic duration of which we have been speaking, and time as a measure, considering that duration as numbered by our mind. Since these are merely two different aspects of one being, the proofs in the following discussion, although taken, now from one aspect, now from the other, need not be divided, for each is valid for the being of time.

It is the common opinion that the concept of time is at least logically distinct from that of motion. Time cannot be strictly speaking the same as motion, for we consider motion as being measured by time and enduring in time. Time as duration cannot be identical with motion, for "we conceive motion precisely as a way to a term, but time as a delay or persistence in existence which it is necessary that such a way or motion should have."<sup>15</sup> Moreover, the change of each thing is only either in the thing which changes (supposit), in the case of the motions of substance,



quality, and quantity; or in the place where the changing supposite is, in the case of local motion. But on the contrary, we consider time as present everywhere and with all things. Furthermore, motion is fast or slow, and this is determined by time; but it would be foolish to say that time or any of its characteristics is defined by time. Finally, both time and motion have direction, but the direction of motion is reversible, while that of time is not. A motion may be so reversed as to subtract what it has added up; but time never subtracts; it is irreversible on its endless forward course.

While the logical distinction between motion and time is readily admitted, the question of a real distinction is disputed. The opinion denying a real distinction seems to be true. In the first place, duration, as we have seen above, is not really distinct from the existence of the thing enduring. But time is the intrinsic duration of motion. Therefore, time is not really distinct from motion. Secondly, there is in successive motion some delay and persistence in existence essentially inseparable from it. "But time is really nothing else than the delay and duration of motion itself. Therefore, it adds nothing really, or distinct from its nature,<sup>16</sup> to motion."

Finally, according to the Aristotelian definition of time, to be explained and defended below, time is "the number of motion with respect to the before and the after."<sup>17</sup> Hence the very parts of motion, before and after, successively numbered or numerable, constitute time. "The before and the after are in motion; but time is in these, insofar as they are numerable."<sup>18</sup> And again, "But the parts of motion, so flowing and existing in the

succession of before and after, are not distinct from time itself." Therefore, if time is constituted by the parts of before and after, and the same parts also constitute motion, there is no real distinction between time and motion.

There is an objection that the same daily motion, such as the rotation of the earth, can be faster or slower, but time must be uniform, and therefore they are really distinct. We answer this objection by a development and explanation of the nature of intrinsic time. Although a certain space of a given numerical extent can be gone through faster or slower, in reference to some general temporal measure, yet a motion numerically the same cannot do so. In the same way that we have seen that the intrinsic duration of a being is not really distinct from the existence of that being, so the speed or slowness of motion can be considered, not as something distinct from the entity of motion, but rather as intrinsic affections of the motion. This in effect makes the rate of speed a specific difference of each individual motion, and when that speed is changed, the motion is no longer the same, but a different entity. And since the intrinsic time of each entity is distinct and proper to that entity, it is suitable to changing motions, so understood. Thus time's lack of the attributes of motion, that is, of speed and slowness, can be explained by the logical distinction. It is not true, as may be objected, that a difference of properties must constitute a real distinction, for different attributes may be predicated of the same thing, as in the case of animality and rationality being predicated of man.

We may now proceed to a definition of time. The best definition is that of Aristotle: time is "the number of motion with respect to the before and the after."<sup>20</sup> We have next to clarify the terms in the definition. Number may be defined as a multitude compared by means of units. It has a twofold division: active or abstract (numerus numerans), by which other things are numbered; and passive or concrete, which is a reality susceptible of being counted. Concrete number is twofold: calculable, which

"implies a relationship to a subject which numbers it...but not necessarily actually numbering it; and calculated, "which has already been numbered by a mind. It requires a subject to actually number it."<sup>21</sup>

By "number" in the definition is meant concrete number.

"But time is not the number by which we number, (i. e. abstract number) because in that case it would follow that the number of any being would be time; but it is calculated number because the very number of before and after in motion is called time."<sup>22</sup>

Another useful distinction is that "number" in the definition is primarily ordinal number, "which gives a determinate succession, a before and after."<sup>23</sup>

St. Thomas gives a simple and cogent proof that time is number. "That by which we judge something more and less, is its number. But we judge motion more or less by time."<sup>24</sup> Therefore time is number. Some object that time is continuous quantity, but number is discrete, and therefore time is not number. The solution is that concrete number is discrete only if the things numbered are discrete; if the things numbered flow one after the other, joined by some union or continuation, as the parts of motion flow, number is continuous. "Although the number by which we number is

discrete; yet time is continuous; as ten measures of cloth are continuous,  
25  
although the ten numbers are discrete."

An objection posed by Galenus states that the Aristotelian definition is tautological, because time is defined by, and in terms of, before and after, which in turn are explained by time. The solution is that the before and after in the definition are taken from the before and after in motion which in turn are based upon the before and after in magnitude; for motion and time are flowing quanta, and things are subject to time insofar as they are quantitative.

"Motion" in the definition is understood in the proper sense of physical, and especially of local, motion. We have already seen the relationship between motion and time. Some object to the definition on the grounds that time is not only the measure of motion but also of rest. We answer that time is per se a measure of motion, but per accidens it is a measure of rest also, since rest is the privation of motion. For those things which are per se proper to a condition are applied per accidens to its privation. But that time is per se the measure of motion is obvious from the fact that time measures the being in respect to before and after, and is the transition from one of them to the other. Now the before and after are found in rest when a relation to motion is made, and therefore are found and measured per accidens. For this reason Aristotle defined time by motion, not by rest, for it must be defined in terms of that alone which is per se proper to it. As Pesch points out; "For that which rests is not measured by time by reason of its rest, but insofar as the number of that motion to which it is in potency can be applied to it." 26

In summing up the proof for the Aristotelian definition, St. Thomas' statement is clear:

"The basis for time's following motion is that by which, once it is known in motion, time is recognized. But we know time when we distinguish by determining the before and the after; and we say that time is passing when we sense the before and after in motion. It is evident, then, that time follows motion with respect to the before and the after." <sup>27</sup>

The next consideration is that of the divisions of time. Time is divided into: real time, absolute time, possible time, and imaginary time, according to the aspect under which we view it. Real time is a successive duration really existing. Absolute time is a kind of successive duration which we conceive as existing per se and separate from all bodies, uniform, without a determined beginning or end, and hence "in a certain sense, eternal, infinite, and necessary, containing and including every created duration in itself, in which all things endure, and outside which nothing can endure." <sup>28</sup> Bittle defines absolute time as "the time which is the sum <sup>29</sup> of all real and possible time, considered as one." Possible time is absolute time considered as existing prior to any real time which can be assigned to motions occurring in nature. Imaginary time is the conception of time by the imagination as a receptacle, a flowing stream in which real, absolute, and possible times are included, prescinding from any particular existence or beings enduring in time, and is the result of mentally emptying space of all material and spiritual beings except our own intellect.

Real time is divided into intrinsic or internal, and extrinsic or external, time. Extrinsic time is that duration of some motion which

serves as a measurement of other motions. It is subdivided into general or primary, and particular or secondary, time. General time is "the duration<sup>30</sup> of celestial movement serving as a measurement for all other motions."

Particular time is that which serves as a measurement of some motions; this is the kind perceived by the instrumentality of clocks and watches, and expressed by days, hours, minutes, and so forth. Intrinsic time, as we have seen, is the proper and intrinsic duration of every real motion.

St. Augustine speaks of this kind of time:

"I heard from a certain learned man that the motions of the sun, the moon, and the planets, are the times and years themselves, and I did not assent. But why should not rather the motions of all bodies be times? Indeed, if the celestial lights would cease, and a potter's wheel be turning around, would there not be time by which we might measure those revolutions?.....Therefore let no man tell me that the motions of the celestial bodies are times, because at the prayer of a certain man the sun stood still, that Joshue might achieve his victorious battle, but time went on; by its own space of time that battle was fought and ended."<sup>31</sup>

A final division of time is that into continuous and discrete. We have been treating of continuous time until the present, and further explanation is unnecessary. Discrete time is that which consists of a succession of separated parts.

"There is a discrete time, which is twofold: corporeal, which is nothing else than the interrupted duration of motion; and spiritual, which is nothing else than the plurality of operations, any of which endures indivisibly in itself, because it is not successive, and in this way there is time in the operations of the angels."<sup>32</sup>

The next consideration is the respective reality of these kinds of time. First some terms should be clarified. A 'real being' is one which exists or can exist in the nature of things, independently of man's actual

knowledge. A 'logical being' (conceptual being, ens rationis) is one which has objective being only in the human mind. Logical being can be one of two kinds: without a foundation in reality, such as a 'square circle'; or with a foundation in reality. The latter cannot exist in nature precisely as it is conceived, but there is a reason in the things of nature why the mind conceives it thus.

Real extrinsic time is obviously a real being, for it is the real duration of a standard motion, and as we have seen, duration is really identified with existence. Hence, since these motions exist in reality, so do durations and times which are identical with them. Real intrinsic time is also a real being for the same basic reason.

The addition of mental characteristics to an objectively real basis results in the formation of a conceptual being with a foundation in reality. But some of the notes in the comprehension of the term 'absolute time' are purely mental additions to the objective basis of time, and are really impossible. Therefore, absolute time as a measure is not a strictly real being. The major premise of the proof is obvious from definition; the minor must now be proved. Absolute time is conceived as eternal and infinite. Yet time is a kind of successive duration and is found in motion. But there cannot be succession in eternity, as is proved by the definition of eternity above cited, and from the fact that in eternity there is no potentiality in transition to actuality, which is demanded in the definition of movement. Therefore time is not in eternity. Nor can succession or motion exist without a subject or supposit which moves successively; therefore time cannot be eternity.

Moreover, absolute time is supposed to be a really existing duration in which things move and happen; this duration must be either created or uncreated. Now there is nothing uncreated except God and His attributes, such as eternity. We have seen that time is not eternal, and it is foolish to think of God as time. Hence it must be created. When was it created? Not from eternity, for creation is not eternal, but took place in time. If it was not created from eternity, it must have been created in some previous duration. But there can be no prior duration if the concept of absolute time is to be maintained. Even if the previous duration in which absolute time was created is called eternity, and this time is maintained as something real, considering that all other things are created in it, the only thing which would have existed before creation is that which we now call eternity. Therefore the characteristics of eternity and of exceeding all created durations are really impossible.

These first proofs against the total reality of absolute time are given specifically in refutation of the theories of Pierre Gassendi, and of Clarke, respectively. Gassendi held that time is an absolute incorporeal being, abstracted from the things enduring and which would be conceived as having flowed per se before anything was created, and to continue to flow, even if God would annihilate all things. Clarke held that absolute time is the very eternity of God.

Nys gives a proof that time is not a real being from the standpoint of the partly real, (partly ideal (i. e., mental) character of its parts.



"We cannot invest brief temporal duration with complete unity because, if this unity is not a part of time, but a real time (the assumption in absolute time), it is the result of a synthesis effected by the mind, when the latter unites into one and the same whole, the past which is no longer present, the 33 present which is passing, the future which is still to come."

In this way time must be at least partially a conceptual being, for it is continuous, and the motion numbered is continuous. But the number with which we calculate motion is in itself discrete and is invested with the continuity proper to time only by a mental process. Moreover, the unity of time is achieved only by the intellect comparing the relationship of the parts: the part which is past, the moment passing, and the part which has not yet come into being. Therefore time is, in its formal aspect, a conceptual being.

On the other hand, entitatively, or in its material aspect, time has a real basis in the nature of things. St. Thomas gives a cogent proof that time is a conceptual being with a foundation in reality:

"Time is in a way a being independent of the mind, for as motion is posited, so must time be; because the before and the after are in motion, and this very before and after of motion, insofar as they are calculable, are time itself.... The existence of numbered beings does not depend upon the intellect,.... the number of beings does not depend upon the human intellect, but only the enumeration itself. Therefore, as there can be sensible things even if sense would not exist, so there can be numerable things and number even if the numbering agent does not exist. Even if no (human) intellect were existing, the number of motion, which is time, would exist.... Yet the very totality of time is received by an operation of the mind numbering the before and the after in motion.... therefore time without the existence of a mind is an imperfect being."<sup>34</sup>

It is well to answer here the objections offered to the thesis that time is a conceptual being with a foundation in reality. The opponents can be divided into two general groups. The first err by defect, in holding that time is merely a subjective, ideal, purely conceptual, or logical form of the mind. The main opponent here is Immanuel Kant, whose objections will be treated somewhat in detail, although briefly, because the main objections to the Thomistic viewpoint arise from this quarter. Kant has three principal tenets concerning time. He holds that the concept of time: is a priori in origin; is represented by the faculty, not of the intellect, but of the internal sense; lacks all objective validity.

The first assertion Kant argues thus: The internal sense perceives one affection after another and hence in time. This shows that the representation of time is merely a condition for, an occasion for, the primary perception of succession. Therefore, he concludes, the representation of time was in the mind a priori, before the first sensation. The error here lies in the major premise, for the sense perceives affections which are specifically successive, i. e., of which succession can be predicated, but it does not perceive things reduplicatively successive, i. e., precisely as successive, for the senses do not reflect. Hence, the perception of successive affections is not merely an occasion; it is the first step of intellection.

A second argument adduced by Kant is somewhat as follows. If we imagine all successive beings in time to have been destroyed, we still necessarily consider time as existing. But if the concept of time proceeded

from objective reality, and not a priori from the sense, we would not consider time as existing after objective succession had been destroyed. Therefore... We answer by a distinction of the major premise. Imagining objective succession as destroyed, we do not imagine real time to exist, and we consider the continuation of possible time only because it is founded on the possibility of succession which we have experienced.

Consider a third Kantian objection: Limited succession, being a part of the whole, cannot be conceived before absolute time. But if the concept of time originated in real experience, particular time would come first. Therefore... We answer that particular time cannot be conceived before absolute time precisely as parts of it (i. e. re-duplicatively), but they can be conceived in themselves (specificatively). For example, one can think of a spring in a watch, just as a spring alone, and in this specificative sense, no knowledge of the watch is needed; but for the conception of the spring as a part (reduplicatively), the watch must be known.

A final objection states: The concept of time is contained in the principle of contradiction, i. e., that nothing can be and not be at the same time. But this principle is contained in every judgment. Therefore we have an idea of time already before judgment; hence this idea must be a priori. The objection is answered as follows: The concept of time is not contained in the principle of contradiction taken as a generality. Even in its application to successive or temporal beings, the idea of absolute time is not contained in the principle; the idea of simul-

taneity and succession, however, is. To clarify this answer it is best to consider the principle of contradiction. The term 'simul' which is here translated as "at the same time", precisely means rather "taken as a unit", or "in the same respect". This is obvious when we consider God, Who is immutable and eternal, hence not "in time", but surely in accord with the principle of contradiction. The 'simul' signifies that the contradictory predicates cannot be applied in the same respect to the same subject, and it is only when the subject is successive that time enters into the judgment.

We seem to have refuted the first Kantian assertion - that time is an a priori concept. The refutation of the second assertion - that absolute time is a sense intuition now follows. The assertion is argued somewhat as follows: Time is not a universal concept formed by the intellect; for one can conceive of only a single time, whose various limited durations or movements are parts contained in it and drawn from it. Therefore they are merely intuitions of the sense faculties. We offer two refutations of this assertion. First, the concept of time is not universal if time is considered as infinite, but it is universal if the very notion of undertermined time is abstractly conceived. Furthermore, the intellect can know singulars by reflection upon the phantasm. Therefore, if the first part of the proof were given, not conceded, still the conclusion of the objected argument would not necessarily follow. A second refutation of the Kantian argument is in this, that absolute time contains in its comprehension notes which are entirely outside the scope of sense facul-

ties. Infinity, for instance, can in no way be grasped or represented by the senses.

The third Kantian assertion is that the concept of time lacks all objective reality. The main basis for this assertion has been destroyed by the above refutations and by the proofs adduced above in support of the Thomistic opinion. There remain few objections worthy of note. One states: Time is a form which gives order to the matter of sensations. But the form of knowledge is on the part of the knowing subject, the matter, on the part of the object known. Therefore the concept of time is purely subjective. The major premise is correct only in a limited sense. Corporeal things are, as it were, endowed with this form by means of an abstract consideration of time, while the form of time is itself based upon sensible matter. The minor premise is, in turn, true only in cases where it is obvious from the real object itself that the form is derived solely from the conception of the knowing subject, which is not the case in beings which we see as actually successive in the nature of things, in the order of reality.

The final Kantian objection to the reality of time adduces antinomies supposedly inherent in the concept of time. The first is that time, if real, had to have a beginning; yet it could not have begun, for there is no reason why the world should have been made now rather than in some other time. We answer that there is no reason on the part of the created world, but on the part of the Creator, from His free will. The second alleged antimony is that God would be subject to time, thus destroying

His eternity. We answer that the concept of time contains no such inference; as shown at the beginning of this paper, God is eternal and infinite, and all created things, time included, are contained by Him, and not He by them. The third antimony is posed thus: A continuum is divisible without limit, and at the same time God could actually dissolve all parts; but this involves a contradiction. We answer that the parts cannot be dissolved by God and the continuum still remain.

Thus the objections of subjectivism are overcome. We stated above that the subjectivists erred by defect. The second group of error is that by excess, which is the case with ultra-realism. Most of the objections of the ultra-realists have been confuted in the main body of the proof that time is a conceptual being with a foundation in reality. In this group may be numbered Gassendi and Clarck, whose theories, as typical of the Newtonian school, were refuted above. Only two objections more will be here listed as worthy of note.

The ancient atomists held that time was a real physical being in perpetual and uniform flow. Besides the arguments given in the body of our proof, we might direct a specific proof against this opinion. Time cannot be a body distinct from others, for a body, by the very fact that it is something changeable, cannot be absolutely necessary and indestructible.

Leibniz held that time is the relationship of successive bodies. This approaches the moderate realism of the Thomists, but is not exactly correct. Time cannot be a relationship between two successive beings, for first there must be successive beings, and only afterwards does the

relation of succession arise among them; whereas time is present from the very moment in which successive beings are present.

Thus we see time vindicated as a conceptual being with a foundation in reality, the objections to this solution having been taken, point by point, and found groundless.

We have spoken of general, real time as the duration of some motion which serves as a measure for all other motions. But can we find such a motion and such a duration? First of all, any measurement of time is necessarily conventual and arbitrary. There is only a logical distinction between real time and continuous motion. But the number and kinds of motion are legion.

"As soon as we leave the ideal world and return to the world of concrete realities.... we are confronted, not with pure movement, but with a bewildering multitude of movements.... Because these movements are continuous and successive, they have an equal claim to concrete the idea of time, and to act as accepted measurements of temporal durations."<sup>35</sup>

As Poincare, the eminent French scientist said: "There is no one measurement of time which is more valid than another. The one generally accepted is merely the most convenient."<sup>36</sup>

As stated above, Aristotle considered local movement as the most proper kind of movement, and hence as the basis of time. How is this movement fitted to express the duration of other motions?

"If we take a definite part of this motion as a unit of time, we may predicate the same temporal magnitude of all parts of other movements, irrespective of speed, provided they begin and end with this same unit of time. The corresponding parts of the motion serving as a measure and those of the motion being measured will thus be identical from the standpoint of duration."<sup>37</sup>

This will provide a direct measure of the quantity of time.

7 The next test of local motion and its fitness to be general time, is its uniformity. Uniformity is a necessary quality of the standard measure of time, and can be found in local motion, whose extent is indicated by space, a permanent quantity. Another requisite of uniformity in motion, that two equal spaces, successively traversed by the motion, always express two equal times, is fulfilled in local motion, provided it maintain a uniform speed. Now, can we determine a uniform movement? The difficulty lies in this, that

"Any attempt to determine the existence of such a movement presupposes the knowledge of a definite, concrete temporal unit, always identical with itself. But since this concrete temporal unit must coincide with movement, it is impossible to point to a uniform movement unless we already know of one."

The answer to the problem lies in the mind gaining a precise idea of continuous succession, measuring this succession from internal phenomena, and with this as a basis, determining what external measure of time is the complement of this internal measure. Since the internal measure is subjective, individual, and variable, it will not itself serve as a uniform measure. The most certain, uniform, equal, and sensible movement we can observe is that of the planets; this, then, is taken as real, extrinsic, general time, or, commonly speaking, the only real time.

Since time as a duration is essentially successive, it must consist of parts; these are the present and the future, which are united and continued by indivisible moments or instants called nunc. The nunc can be taken in several senses. Broadly speaking, it is any small interval of



time. Strictly and philosophically speaking, it is an indivisible of time conceived as a boundary between past and future. Since time, in the absolute sense in which we consider it as a measure, has no definite beginning or end, the terminating indivisibles of the ordinary continuum are absent, but the copulative or continuing indivisibles are the nunc. "

"For as all assignable parts of an extended being are necessarily extended and further divisible, so also time and each of its assignable parts are composed of other smaller parts, so that it is impossible ever to arrive at the smallest, simple, and further indivisible parts; in a word, the single parts of time are time." <sup>39</sup>

The dispute which arises is whether time is present, or exists, by reason of itself, or only by reason of the nunc joining the parts of time. St. Thomas and most of the scholastics hold that time is actually present only by reason of the existence of the instant, and that the passing parts are succession itself, or fieri according to a past and a future part which are united by the instant which renders each present successively.

"It must be understood that the existence of successive things consists in this, that they exist according to some indivisible of theirs, which can be shown, because each and every part of any successive being is divisible into different parts. Therefore if any successive being would exist, not only according to its indivisible but according to some part, it would follow that many parts of some successive being would be present simultaneously, which is against the notion of successive beings." <sup>40</sup>

And again, "But time, as not being permanent, was created in its beginning; nor is time, in its actuality, ours, except as regards the nunc." <sup>41</sup>

He furthers the same opinion in another place, part of which was

quoted above concerning absolute time:

".... no motion is actually found in things except a certain indivisible of motion which is a division of motion, but the totality of motion is received by a mental consideration comparing the prior disposition of the whole being to the after. Therefore time also does not have existence outside the mind, except according to its indivisible." <sup>42</sup>

Finally: "But nothing exists of time except nunc. Hence time cannot become except according to some nunc; not because in the first nunc is time, but because from it time begins." <sup>43</sup>

The basis of the argument, that the nature of a continuum demands that not all parts coexist, is summed up by John of St. Thomas:

"For the nature of a successive being demands that no part exists at the same time as another. Therefore it demands such an existence that one part is not, and has passed, and another is about to be; therefore it demands that they do not exist by reason of themselves, but only by reason of the instant, and this is to have fluent and not permanent existence. For to have fluent existence and to so exist that one part does not coexist with another, but that one part has flowed, and another is about to flow; but if the parts do not coexist with each other, therefore the whole divisible being, which is nothing else than those parts by which it is composed, does not have divisible existence, since those things into which it is divisible do not co-exist." <sup>44</sup>

Time thus consists of many parts divisible indefinitely. Hence there are in it, not a single nunc, but many of them.

"The nunc of time is the same as regards its subject in the whole course of time, but it differs in aspect; for inasmuch as time corresponds to motion, its nunc corresponds to what is mobile and the mobile thing has the one same subject in all time, but differs in aspect as being here and there and such alteration as number. Likewise the flow of the nunc, as naturally alternating, is time." <sup>45</sup>

This does not mean that one nunc immediately succeeds another, for in that case time would be composed merely of indivisible moments, which is contrary to the nature of a continuum. The real meaning is that "after single moments some divisible parts of time, continued and joined by moments, almost as one generally speaks of the points and parts of a <sup>46</sup>continuum."

We have now completed the discussion of time; its preliminary notions, definition, divisions, reality, bases, and parts.

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\*\*\* FOOTNOTES \*\*\*  
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1. Boethius, "De Consolatione Philosophiae", Lib. V, pr. 6, Migne, Pat. Lat., Vol. 63, p. 858.
2. James Moran, S.J., Cosmologia, p. 175.
3. John Joseph Urraburu, S.J., Ontologia, p. 1049.
4. St. Thomas Aquinas, O.P., Quaestiones Disputatae, V. I, q. V, art. 1 ad2.
5. John of St. Thomas, O.P., Philosophia Naturalis, Tom.II, P. I, p. 322.
6. id., p. 323.
7. id., loc. cit.
8. Franciscus Suarez, S.J., Disputationes Metaphysicae, Disp.50, s. 8, n. 3.
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10. St. Thomas Aquinas, O.P., In Metaph., XII, Lect. V.
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18. Aristotle, Nat. Auscul., Lib. IV, c. 14.
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22. St. Thomas Aquinas, O.P., In Phys., IV, Lect. 17.
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30. John of St. Thomas, op. cit., p. 333.
31. St. Augustine, Confessions, XI, 23.
32. John of St. Thomas, op. cit., p. 321.
33. D. Nys, Cosmology, Vol. II, p. 277.
34. St. Thomas Aquinas, In Phys., IV, Lect. 23.
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38. id., p. 285.
39. John Joseph Urraburu, S.J., Cosmologia, p. 1086.
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41. St. Thomas Aquinas, Summa Theologica, Ia Iae, Q. 66, art. 4, ad 3.
42. St. Thomas Aquinas, In Phys., IV, Lect. 3.
43. St. Thomas Aquinas, Summa Theologica, Ia Iae, Q. 46, art. 3, ad 3.
44. John of St. Thomas, op. cit., p. 328.
45. St. Thomas Aquinas, Summa Theologica, Ia Iae, Q. 10, art. 4, ad 2.
46. John Joseph Urraburu, S.J., Cosmologia, p. 1086.

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