

The Concept of Time in Giles of Rome

« What, then, is time? If no one asks me, I know; if I want to explain it to someone who asks, I do not know »¹). Anyone who has puzzled over the problem of time has probably experienced at the outset the odd conjunction of commonsense understanding and analytical ignorance of time forcibly expressed in St. Augustine's often-quoted words. But this first bafflement is succeeded by a second, that arising from the clashing and collision of views in what purports to be analytical knowledge among diverse thinkers spread over some twenty-four hundred years of Western thought. After so long and prodigal an expenditure of concentration on time, the Western mind seems as far away as ever from any common consent on the meaning of time. Though most today would probably want nothing to do with Zeno's exposure of time as mere appearance or illusion, time for our contemporaries is often the victim of a reductionism, usually implicit, in which it is merged or identified with some ontic or psychic affiliate. Thus, for some, time becomes a pure mental construct; for others it is nothing but space considered as passage; for many others, chiefly enamored of process thought, time is one with creative change or process in its novelty. The advance of relativity theory (if it is indeed an advance²) has served rather to becloud rather than clarify the picture, at least in the sense that it has been the occasion for the outcropping of fresh curiosities bearing

¹) *Confessiones*, ed. M. SKUTELLA, in Vol. 14 of *Œuvres de saint Augustin* (Desclée de Brouwer, 1962), XI, 14, 17.

²) In his introduction to Henri BERGSON, *Duration and Simultaneity*, trans. Leon JACOBSON (New York: Bobbs-Merrill, 1965; the French original appeared in 1922), pp. xv-xlii, Herbert DINGLE, an English astrophysicist, searchingly questions the validity of Einstein's celebrated theory. The asymmetrical aging that the twins paradox demands is incompatible, Dingle holds (as Bergson earlier held), with the relativity postulate or principle. In other words, an asymmetrical aging (Peter traveling close to the speed of light grows two years older while Paul ages two hundred years) assumes a privileged frame of reference, whereas the relativity postulate requires that no coordinate system enjoy privileged status. After detecting other anomalies, he stresses that contrary to various claims, no experimental test has yet verified the constant velocity of light independent of its source (whether moving or not).

the appearance of a scientific cachet. In the name of relativity theory the unity and universality of time have been denied; simultaneity has been scouted as scientifically untenable; the irreversibility of time has been dropped by some in favor of an arrowless or directionless time; and time itself has been fused into its continuous correlate in the fiction called space-time³). Thus much contemporary wonderment about time leads not to satisfaction consequent upon understanding but to doubt of the densest sort. The pursuit may look so futile that some may want to rewrite St. Augustine's lines: « What, then is time? If I try to explain it to someone who asks, I do not know. If I try to learn it from the learned, I realize that I can never know ».

But this borders on despair, which is a luxury (since it leads to a dilettante skepticism) no serious thinker can afford. The spectacle of so many failures and so much confusion should elicit more than a depressingly negative reaction. Surely it should evoke a certain intellectual compassion and speculative sympathy (points to which we shall briefly advert later on) for those laboring to track down the meaning of time. Moreover, the current unresolved state of the time-question encourages a more respectful hearing for candidates to which earlier prejudices had denied entrance. More specifically, if we take the whole of modern philosophy as of a piece, if, consequently, we take the present deadlock over time as a sign that modern thinking, having run its course, is now near-sterile, we may be encouraged to go back beyond Hegel, beyond Kant, beyond Leibniz, and beyond Descartes to the general world view of the medievals, especially to their philosophy of nature, for a fresh look at the problem of time. Such a mental journey ushers us into a scientifically simple, less sophisticated noetic universe. But perhaps its way of thinking is more orderly in the technical sense that it is more sensitive to the need to handle problems according to the mind's natural mode of knowing and according to the priority of general to special knowledge. In particular, it posits and probes the question of time in the domain of general physical knowledge prior to any consideration of the special sciences. Thus in addition to trying to contribute a mite toward

³) Instead of citing a good number of works, it seems wiser to send the interested reader to J. T. FRASER (ed.), *The Voices of Time* (New York: Braziller, 1966), a wide ranging set of reflections by mostly philosophers and scientists that report or advocate some of the curious views just mentioned.

possibly an ample grasp of one medieval mind, these few reflections on Giles's theory of time may help throw some light on the meaning of time itself.

Many of the medievals felt able to supply an answer to someone who asks what is time. This reply is conveyed in general in the celebrated definition of Aristotle: time is the number of motion according to the prior and the posterior. But scrutinized in detail, the one answer fans out into many answers. Avicenna, Averroes, Aquinas, Albert the Great, and William of Ockham are in perfect accord on the formulation of the definition of time, but each goes his separate way over the specific import and implications of what they hold in common ⁴). Giles of Rome shares with these thinkers the same physical outlook with its agreed-upon definition of time, but it should come as no surprise that his interpretation is not a direct rehearsal or pale carbon copy of one rigidly received view ⁵).

⁴) For a brief look at some differences among medievals see Augustin MANSION, « La théorie aristotélicienne du temps chez les péripatéticiens médiévaux », *Revue néo-scholastique*, XXXVI (Mélanges de Wulf, 1934), pp. 275-307. Texts dealing with William of OCKHAM are available in Herman SHAPIRO, *Motion, Time and Place according to William of Ockham* (St. Bonaventure, N.Y. : Franciscan Institute Publications, 1957), pp. 91-112.

⁵) To forestall any disbelief or dismay that this compact appraisal may stir in the reader, we should hedge it about with a few qualifying remarks. We are not making the foolish claim that Giles's account of time is purely original. Nor are we trying to convey the impression that he departs radically from his predecessors and colleagues. We are confining ourselves to the much more modest proposal that Giles, in spite of his recognizable dependence on others, presents a subtly thought-through view that bears the stamp of his own first-rate analytical mind. Giles of course makes no bones about the fact that he receives leading ideas from Averroes. The distinction between the formal and material features of time that Giles exploits so consistently comes straight out of a passage in Averroes (though the Commentator does not capitalize on this distinction with the thoroughness of Giles). From time to time in the following notes we shall call attention to places in Averroes that have left their imprint on Giles's thinking. Yet, as the pages ahead will hopefully bear out, Giles's handling of time is far from a slavish reproduction of Averroes. After appropriating and making his own some main lines of Averroes, Giles does break fresh ground on a number of significant points.

St. Thomas, it now seems clear, commented on the *Metaphysics* in the light of and in reaction to the commentaries of Avicenna, Averroes, and Albert the Great (cf. James C. DORR, *Aquinas on Metaphysics* [The Hague : Nijhoff, 1972], p. xi); and, we may reasonably infer, he had weighty commentaries within reach while preparing his exposition of the *Physics*. (Intrinsic evidence, which it is inopportune to adduce here, shows that Aquinas had under his eye Averroes and Albert the Great; for one

Within the relatively short space of these pages, it seems profitable to accord more than passing attention to five points: the dialectic of time, its definition and corollaries, the meaning of the now, the existence or objectivity of time, and the unicity of time ⁶). To these a few critical remarks are appended.

The Dialectic of Time

Excellent things are difficult, the old Greek saying goes, and among the most prized of objects in the human enterprise are propositions in demonstrated knowledge or scientific knowledge in the Greek and medieval sense of *scientia*. As valuable, the scientific what and why of things do not lie ready to hand. They are the outcome of groping, struggle, sweat, stern mental discipline. At the start of inquiry, we have to raise questions, sift what purports to be evidence, and discount misguided solutions. To this indispensable

confrontation with Averroes *nomination* see n. 134 below.) Similarly, it seems probable that while his work was in progress, Giles had close at hand more than one commentary on the *Physics*. Beyond a shadow of a doubt he studied Averroes at every step in his interpretation of Aristotle. What other expositors helped fashion, positively or negatively, Giles's account? At this juncture we cannot hazard an overall guess about the number and names of these expositors, but it seems permissible to surmise that he consulted Aquinas's commentary. In nn. 27, 50, 55, 61, 69, 84, 94, 110, 117, and 148 below, we instance pointers to a probable influence of Thomas: a few somewhat marked ideational resemblances, some items of apparently minor dependence, and a few arresting verbal correspondences. Whereas the evidence for a dependence on Averroes seems abundant and strong, the case for reliance on Aquinas appears far less convincing. Yet it might be wrongheaded to skip over indications of some ideational and verbal parallels to Aquinas in the Aegidian text. Indeed if we put any stock in the considered opinion of Josef KOCH, in his introduction to Giles's *Errores philosophorum*, ed. J. KOCH and tr. J. RIEDL (Milwaukee: Marquette U. Press, 1944), p. lvi, that Giles gained «an extensive knowledge of the writings of Aquinas», we may be disposed to expect, rather than be stubbornly skeptical about, some traces of Aquinas's physical ideas making their presence felt in Giles's outlook.

⁶) I have used a text reprinted in 1968 by Minerva G.M.B.H., Frankfurt, West Germany, with the title, *Aegidii Romani commentaria in octo libros Physicorum Aristotelis*. The text was first printed in Venice on September 26, 1502: Impressum in Venetiis per dominum Andream de Torresanis de Asula. In citing this, I have taken the liberty of designating as a, b, c, and d the four columns of each (for us, double) page. (We shall refer to Giles's commentary as *In phys.*) In the appropriate places we shall cite passages from other works that substantially concur with Giles's treatment of time in his commentary on the *Physics*.

stage of searching, the Greeks and medievals gave the name dialectic. After the merest glance at some features of dialectic, we shall consider the dialectic of the existence of time and the dialectic of the nature of time.

1. *Dialectic*. Taken doctrinally, taken as a branch of logic, dialectic consists of the general rules for approximating truth in every science, for raising questions and contriving tentative answers in every universe of discourse. Insofar as scientific method embraces hypothesis and trial-and-error or experiment, dialectic may be called, without exaggeration, a generalized scientific method. It achieves only extrinsic reasons; that is, its explanations are not exactly proportioned to the intrinsic nature of the object ⁷). Here reasons only common and peripheral always fall short of accounts proper and central to the object. Hence dialectic is disputative, engaging in the give-and-take of sharp discussion. It proposes antinomies, points plausible solutions, prunes away errors in these solutions, and clears the way for a precise explanation of the matter at hand.

The precursive inquiry of dialectic as regards time bears on the existence and nature of time. Since time seems to be immediately known, difficulties about its existence are postponed until we determine its nature and attributes. Aristotelian realism relegates to the last chapter of analysis critical investigation into the veridical existence of givens of nature that seem genuinely interwoven into our common-sense and scientific experience. Time seems to be a massive fact coercively impressing itself on us throughout all of our waking life. Hence dark points concerning its existential character, especially its objective existence, are best tabled for later discussion, with the expectation that accurate determination of its meaning and leading features will provide enough light to dissolve the initial obscurities

⁷) *In phys.*, IV, 1.18, fol. 97 c (under *Consequens autem dictis*). The business of dialectic is «procedere opponendo et procedere per quasdam rationes extraneas et communes, ut Commentator exponit». In his treatise on time this is the first of Giles's references to Averroes, the only medieval whom he mentions in connection with time. We will cite the edition of Averroes entitled *Aristotelis de Physico Auditu libri octo cum Averrois Cordubensis Commentariis* (Venice, 1562-1574; reprinted in Frankfurt, West Germany: Minerva, G.M.B.H., 1962 (henceforth designated Averroes, *In phys.*). The passage to which Giles refers is found in Averroes, *In phys.*, IV, com. 87, fol. 173 I. There does not seem to be an appreciable manifest dependence of Giles on Averroes in the dialectical portion. Averroes's consideration seems generally more compressed, and foregoes any attempt to anticipate later doctrinal solutions.

and antinomies. Questions posed about the nature of time, however, are more directly introductory to attaining a satisfactory definition of time. Prior opinions are weighed and found wanting, but instead of being discarded, are received with appreciation and with gratitude. Even while falling short of the mark or going awry, they offer pregnant suggestions toward an exact definition. Their errors harbor part-truths that can be exploited for further and consummatory light.

2. *Dialectic of the existence of time.* Time, if it is a whole, must consist of factors either divisible or indivisible. It is also usually viewed as dependent upon the existence of the now. One dialectical thrust dissipates the possibility of time by maintaining that time cannot be made up of parts or indivisible units. A second dialectical attack on time's existence focuses on incongruities in the now.

(i) Dialectical probing first provokes doubts about the existence of time. An initial line of reasoning supposes that time, probably because of its connection with the material universe, is in some sense composite ⁸). But so considered, time turns out to be composed of nonexistent parts; that is to say, time is not composed at all and thus presumably does not exist, or, if it does exist, it eludes clear perception and precise conception. Two arguments establish this conclusion. Think of time, a first argument runs, stretching indefinitely into the past and endlessly into the future. Here the present is taken as a span of time such as this hour or this minute that does not physically exist all at once. The present does not exclude but is itself included in either past or future. If time consists of only past and future parts, it does not exist; for neither the past, which embraces what once was, nor the future, which refers to what will exist, has actual, explicit physical existence. A second argument puts emphasis on a composite time as divisible ⁹). If time is a physical entity, it is divisible into its fundamental unit or factor usually designated the now. The now, however, is literally the atom, the indivisible of time. As is the case with other physical entities, time cannot be composed of or divided into indivisibles. As later analysis will make clear, the now does measure time but not in the fashion that a part measures a whole. Two, e.g., is a multipliable part of six and is therefore a measure of six. In other words, the

⁸) *Ibid.*, fol. 97d (under *Quod quidem igitur*).

⁹) *Ibid.*, fol. 97d-98a (under *Adhuc autem omnis*).

number six is exhaustively divided into three two's (the two is the simplest number into which six is divisible). But the whole that is time cannot be exhaustively divided into nows that are taken to be indivisibles.

Anticipating the determination to follow, Giles briefly digresses here to dogmatically state the case for the existence of time. Time is to be grouped not with permanent things, which enjoy a simultaneity of parts, but with successive things, which have an order of parts. It is misleading to dismiss time because it does not statically contain both past and future. The order of parts making up time is grounded in the now, which is the principle of one part of time and the term of another. Time has existence in the order of parts with a foundation in the now.

(ii) To return to dialectical matters, a second line of reasoning throws doubt on the existence of time by claiming that the now seems absurd. The now, it would appear, has to be one and the same or varied and pluralized; but both options betray internal contradictions in the now. A plurality of nows is judged impossible on two counts¹⁰). Pluralized nows may be related in one of two ways: they may be simultaneous in the sense in which a day contains and is simultaneous with an hour; or apart from simultaneity, new nows may arrive and the old depart by generation and corruption. A now that is indivisible cannot be simultaneous with any part that it embraces for the simple reason that it can have no parts. Self-contradiction is also fatal to the alternative possibility, that of generation and corruption¹¹). Corruption must occur at some instant or now. We need not belabor the point that the prior now is unable to be corrupted in the prior now, for right then, being itself that very now, it exists rather than ceases to exist. The alternative supposition, that the prior now is corrupted in the posterior now, gets us no further. In imagining the corruption of the now and the generation of another now at a terminal, we are implying that the prior now and posterior now are right next to each other, with no third now in between the two. But two nows can come right after one another no more than two points can. We can conceive of an infinite number of points bounding an infinite number of line-segments

¹⁰) *Ibid.*, fol. 98a-b (under *Siquidem autem nunc*).

¹¹) *Ibid.*, fol. 98b-d (under *In eodem quidem*).

into which a line is divisible. Thus the corruption of the prior now in the posterior now amounts to making the prior now simultaneous with the infinity of nows intervening between it and the posterior now. Such a simultaneity is of course absurd.

The other side of the disjunction also does not bear inspection. It is equally impossible to hold that the now remains one and the same throughout time ¹²). The terminal role of the now clashes with an allegedly immutable now. A line cannot have only one term; a one-termed line collapses into a point. On the legitimate assumption that the now is a time-point bounding the prior and posterior of the time-line, each segment of the time-line must have two terms, i.e., two nows. Furthermore, the position that the now perdures unchanged through the whole of time involves the bizarre claim that the proclamation of the U.S.A. Declaration of Independence on July 4, 1776 was exactly simultaneous with its bicentennial celebration in 1976.

Giles sketches in rough strokes the key distinction he will develop later on to save the coherence of the now ¹³). Along with the first set of reasons denying the plurality of nows we should maintain that *secundum rem* there is one and the same now throughout time. But along with the second set of reasons challenging a monolithically one now we have to concede that the now cannot be one in every respect: it is pluralized *secundum rationem*. As time parallels motion, so the now parallels the substance of the mobile thing. In any one motion a mobile thing remains the same *secundum rem* while being diversified *secundum rationem*. So with the now: it is one and the same *secundum rem* but pluralized *secundum rationem*. « Just as the one flowing mobile thing causes motion, so the one flowing now causes time » ¹⁴). But we cannot allow attention to the oneness of the now to suppress its diversity. For, as we have just noticed, if the now were one and the same both *secundum rem* and *secundum rationem*, the whole history of nature and man would be incredibly compressed into one and only one instant.

3. *Dialectic of the nature of time.* Leaving off till later the full

¹²) *Ibid.*, fol. 98d-99a (under *At vero neque* and *Amplius si simul*).

¹³) *Ibid.* (under *De his quidem*). Here Giles anticipates a distinction for which warranty is furnished in the analysis of the now. See nn. 97-101 below and the related matter in our text.

¹⁴) *Ibid.*: « Sicut enim mobile fluens causat motum sic nunc fluens causat tempus ».

resolution of paradoxes dogging the existence of time and the now, we make a second dialectical inquiry, this a brief exposition and refutation of two defective ventures. One defines time as the movement of the heavens, and the second identifies time with the heavenly sphere itself.

(i) The first opinion seems unthinkable on two counts¹⁵). If time is equivalent to the rotation of the heaven, then a part of the circular motion is itself a circular motion; for a part of time is itself time. Since the arc of a circle is only a part and not the whole of a circle, the antecedent falls: time cannot be defined as a circular motion. Furthermore, taking circulation in the broad sense for celestial motion in any mode, we can suppose several heavens to exist. But a plurality of heavens would mean a plurality of circular motions, and, in turn, a plurality of times. A manifold of coexistent times, however, is impossible. Two times exactly simultaneous and uniformly alike in every respect are not two but come down to one time. The only acceptable simultaneity of times is that of two parts of the one time, the smaller segment being included in the larger.

(ii) The second opinion, that time is the heavenly sphere (the outermost in the universe), rests on reasoning of this sort: the sphere of the whole contains all things, because in ancient celestial mechanics the topmost sphere effectively regulates all things; time contains all things in nature; therefore time is the heavenly sphere¹⁶). Two flaws stand out immediately in this «more foolish», i.e., very weak, piece of argumentation. First, the argument violates an elementary rule of syllogistic form. A syllogism of the second figure, where the middle is the predicate in both premises, must have one negative premise. Here both premises are affirmative, terminating in a conclusion no less feeble than the claim that because every Communist is opposed to Fascism and every Catholic is likewise opposed to Fascism, every Catholic is a Communist. When its propositions are positioned in a conditional syllogism, the argument is judged guilty of the fallacy of consequent, that of affirming the consequent to affirm the antecedent. Second, the argument is vitiated by a gross equivocation, the confusion of containment in time, which is that of measure to measured, with containment in place, which is that of place to thing located.

¹⁵) *Ibid.*, fol. 99a-b (under *Quamvis circulationis est* and *Amplius autem si*).

¹⁶) *Ibid.*, fol. 99b (under *Totius autem sphaera*).

Though the elimination of these two false opinions sets us more firmly on the road to the truth about time, this counter-analysis remains in the realm of the dialectical. The clear intent of the counter-arguments is to controvert faulty human views, not to exhibit connections in nature. Their negative dress alone is enough to locate these arguments in the propositional mode. To argue that time is neither the first heaven's motion nor the first heaven itself is not to assert a necessary nexus in nature but a necessary disassociation of the parts of a proposition. This is as it should be: dialectic predisposes the mind to what is right in nature by negating what is wrong in human opinion.

The Definition of Time

The dialectical preliminary sets the stage for the construction of the definition¹⁷). An introductory part establishes that time is co-present with motion. This inseparable association with motion is specified in a second section that deals with the definition as such: deriving continuity from motion, time numbers the prior and posterior in motion. The two last sections here deal with questions consequent upon definition: the attributes of time and the respect in which time measures things other than motion.

1. *Introductory considerations.* Three statements preambulatory to the main elements in the definition initiate the determination of the truth about time. (i) Time is not the same as motion. (ii) Time

¹⁷) At this juncture Giles sees the discussion passing from dialectic to determination of the truth, i.e., to definition and demonstration. «Posteaquam philosophus determinavit de tempore opponendo, in parte ista determinat de eo veritatem determinando»: *ibid.*, fol. 99b (under *Quoniam autem videtur*), l. 19. Averroes is silent at this point about a transition into a scientific mode of discourse. For him, it seems, the proposition, «Time is not motion», still lies within the confines of dialectic. A little later, when dealing with the inseparability of time and motion, he seems to indicate that we are crossing the border into strict determination. «Cum declaravit quod tempus non est motus, incoepit innuere ipsum sequi motum et accidere ei...»; Averroes, *In phys.*, IV, com. 97, p. 177L. For Aquinas both «Time is not motion» and «Time is not without motion» are reached dialectically. We are using P. M. MAGGIOLLO, O.P.'s edition of Aquinas's commentary: *In octo libros Physicorum Aristotelis expositio* (Rome: Marietti, 1954). (This is henceforth referred to as T. A., *In phys.*) Aquinas begins the strict induction of time with reflection upon time as *aliquid motus*. «Postquam philosophus disputative inquisivit de tempore, hic incipit determinavit veritatem»; T. A., *In phys.*, IV, l. 17, n. 1.

does not exist without motion. (iii) Time is *aliquid motus*, something of motion, an entity conjoined to motion.

(i) The nonidentity of time with motion springs, first of all, from incompatibility of attributes¹⁸). Time seems ubiquitous, present everywhere in the universe, subjectively unbounded in nature; it is not circumscribed by any one subject or set of entities. Motion, on the other hand, is subjectified in the recipient, the being that is moved, whether the change is substantial change (*mutatio*) or alteration or growth (here *motus ad formam*); and in the case of local motion, it is subjectified in the place where the mover comes in contact with the thing moved. Secondly, we speak of every motion as fast or slow. The comparative velocity expressed in these qualifiers is determined by reference to some time-scale. Fast and slow betoken the rate of change, i.e., the rate of distance covered to time elapsed. We say a body is fast moving when it travels a great distance in a relatively short span of time. We cannot then predicate fast or slow of spans of time. We cannot rely on time to ascertain time. To hold that time is fast or slow lands us in a vicious circle; after determining fast and slow by time, we have time determined by fast and slow. In modern language, to say fast and slow of time would be to posit a rate of time, i.e., the ratio of the time elapsed to the time elapsed. In other words, numerator and denominator would cancel out to the number one. A measure does not measure itself; it is simply identical with itself. Hence a disparity of attributes pertaining to subject and measure rules out an identification of time and motion.

(ii) Yet this disparity does not bar an indissociable pairing of time with motion¹⁹). The two are two in the sense that time is never found apart from some motion. Awareness of time is never separated from awareness of motion. Without a sense of motion we have no sense of time. When no change registers on our consciousness or when change vitally affecting us slips by our attention, we are unaware of any passage of time. This is illustrated by the fabled Sardinians who slept for a number of years in the presence of mythical Greek heroes revered as gods. Upon awakening from their marvelous dormition these individuals were not aware that time had elapsed while they were wrapped in slumber. The first instant of their sleep was for

¹⁸) *Ibid.*, fol. 99c-d (under *Quonian autem videtur* and *Amplius autem mutatio*).

¹⁹) *Ibid.*, fol. 99a-100a (under *At vero neque*).

them perceptually telescoped with the first moment of their awakening. The two time-points seemed as one because the time-interval in between had left no mark on their consciousness. The classic tale of the monk also seems to belong to this genre. After being transfixed in contemplation occasioned by the song of a nightingale, he returns to his monastery only to find himself unrecognized, his confreres now dead one hundred years²⁰). More moderate echoes and realistic analogues of such fictional occurrence, it may be mentioned, are not uncommon in the lives of charismatic saints. While reciting None on Ascension Thursday, St. Thomas of Villanova was swept up into and stayed in ecstasy for some eleven hours, uncognizant throughout his transport of any lapse of time²¹). Whether the event is fictional or extranaturally factual, the lesson is the same: without a perception of change all seems to exist timelessly, suspended in an indivisible instant. If it is true that no awareness of time follows no awareness of motion, it is also true that we perceive the passage of time only when we sense motion and delimit it in some way; only when we in some way count the disappearing and emerging phases of motion; only when we in some way grasp the now as flowing and variegated in the making of the time-line. Lack of concomitance in awareness serves as an index of lack of concomitance in nature: time does not exist apart from motion.

Feeling the pressure of certain *dubitate*s, Giles briefly departs somewhat from the route of the austere ordered commentary. The easily observable fact that time is closely associated with motion provokes insistent queries about the intricacies of their relationship and the precise ontic status of time. These problems will be faced and resolved in their proper places in the full exposition to follow, but Giles opts now for doctrinally vague answers that will immediately still the clamor of questioning. We may wonder, first, whether time is really distinguishable from motion. All that the notion of time contributes to that of motion is a certain intention of the soul. This intentional discrimination does not seem to justify a differentiation in the physical order. If we put the activity of the soul in brackets,

²⁰) Cf. Jean PUCELLE, *Le temps* (Paris: Presses Universitaires de France, 1955), pp. 47-48. Also, Mary STURT, *The Psychology of Time* (London: Kegan Paul, 1925), p. 147.

²¹) « St. Thomas of Villanueva », in E. I. WATKIN, *Neglected Saints* (New York: Sheed and Ward, 1955), p. 171.

we are left with only the thing moved and the motion with which time physically coalesces: time as such has no existence in nature. This difficulty is indeed a crucial and troublesome one. The particular manner of overcoming it significantly shapes the analysis of time in Giles and other medievals who grapple with it. It is especially vexatious because inconveniences seem to lurk along no matter what road the mind tries. Stress on demarcating time from motion may threaten to forfeit the physical residence of time, while a contrary strong accent on time's indissociability from motion may tend to obliterate the lines of time's ontic autonomy. To solve this formidable difficulty Giles, following Averroes, distinguishes between the formal and material facets of time²²). Materially time is identical with motion, but formally it parts company with motion. As observed in the concrete physical domain, motion is never found without its prior and posterior parts, but these pertain to motion only materially. Formally motion is defined as the act of mobile being. We arrive at the *ratio* or formal note in time when the soul numbers the prior and posterior in motion. Materially both motion and time possess prior and posterior parts, but the prior and posterior taken as numbered belong formally only to time. We may summarily put the differences between motion and time under three headings²³). First, as regards subject: whereas the subject of motion is the mobile thing, the subject of time is motion (time, we shall prove later, is nothing other than the prior and posterior in motion insofar as these are numbered by the soul). Second, as regards nature: as we have just seen, motion is

²²) *In phys.*, IV, l. 19, fol. 100a-b (under *At vero neque*). In support of the distinction Giles cites the Commentator, but it is only later on, in considering the attributes of time, that Averroes posits the formal-material distinction — the only place, by the way, in his exposition of time that he expressly sets down this distinction. In response to doubt as to how time can be both continuum and number, Averroes writes: «Dicimus igitur ad hoc quod extra mentem non est nisi motus, et tempus non fit, nisi quando mens dividit motum in prius et posterius: et haec est intentio numeri motus, i.e., motum esse numeratum. Ergo substantia temporis, quae est in eo quasi forma, est numerus, et quod est in eo quasi materia est motus continuus, quoniam non est numerus simpliciter sed numerus motus. Continuatio igitur accidit ei gratia materiae, et discretio, scilicet numerus, gratia formae, et est compositum ex duabus quantitativibus, scilicet discreta et continua»; Averroes, *In phys.*, IV, com. 109, p. 187C. In his solution of the objectivity of time Averroes confines himself to the distinction between time as actualized (by the soul) and as in potency (in motion); *ibid.*, com. 131, p. 202F. We shall return to this latter text in n. 147 below.

²³) *Ibid.*, fol. 100b.

formally *actus mobilis* while time is formally number. Third, as regards properties: as observed earlier, we can predicate fast and slow of motion but not of time. However, when we underline the intentional root of the proper *ratio* of time that is number, we are confronted by a second difficulty: is time merely something of the soul, i.e., is it only a constructural or second-intentional entity? Preferring to postpone a more thorough discussion of this problem, Giles contents himself for the moment with stating that the relationship between time and motion resembles the connection between action and passion²⁴). Action and passion materially merge but formally diverge; but since the *ratio* of neither is embraced by the other, we cannot, in spite of their material identity, predicate the one or the other. So seems to be the case with motion and time: materially the same, formally different, neither can be said of the other. The analogy with action-passion, we may add, appears to imply that the insertion of an intentional component in the *ratio* of time does not (no more than in the instance of the formally distinguished action and passion) sacrifice the physical status of time.

An opposite *dubitaret* contends that time is thinkable apart from motion because a measure is formally superior to what it measures. Real entities are the measure of human knowledge, and in a non-Berkeleyan world what is knowable plainly does not drop out of existence when knowers depart. Hence if motion disappeared, time as measure should continue to exist. Giles's reply disputes the extent of the parallel²⁵). Though formally superior as measure, time is existentially beholden to motion. Time is subjectified in motion, and no *passio* or proper attribute can abide apart from its subject. Again, as materially identical, motion and time are physically intertwined. No more than action and passion can time and motion dwell apart from each other. Furthermore, time is a unique measure: it is a successive measure, essentially dependent upon the motion without which succession is physically inconceivable.

A fourth *dubitaret* is much more slippery than at first appears: do we really perceive time when we perceive or imagine motion? The nub of the difficulty lies in the fact, to be demonstrated later, that time is unique, i.e., it is concretely subjectified only in the

²⁴) *Ibid.*

²⁵) *Ibid.*, fol. 100b-c.

primary motion. The full thrust of the objection now becomes clear: if time subjectively resides only in the primary motion, anyone not aware of or not actually experiencing this primary motion cannot be truly aware of time. The unicity of time seems to nullify its perceptual ubiquity. We seem to experience time when we perceive the flight of a bird or the fall of a leaf. We seem to be aware of time also when we imagine motion, i.e., when, closeted off from external movements, we attend to internal movements of the imagination. Yet this cognition of time may be just that and no more — sheer seeming, for direct acquaintance with exterior or interior movements is a far remove from direct knowledge of the primary motion in which alone time has its concrete residence. Giles replies: «... it is commonly held that by the very fact of imagining motion we perceive that we are in transmutable existence: and because every transmutation has its existence from the primary motion: therefore from this we perceive the time which is the proper attribute of primary motion»²⁶). The terseness of Giles's response need not dismay us. A guiding thread to the implications of his view is furnished by the references, toward the end of his reply to the previous difficulty, to time as the measure of all motions other than the primary motion. We are bid infer, or work out for ourselves the inference, that because the one time measures all other motions, time exists effectively in

²⁶) *Ibid.*, fol. 100c: «... communiter ponitur eo ipso quod imaginamus motum percipimus nos esse in esse transmutabili et quia omnis transmutatio habet esse a primo motu: ideo ex hoc percipimus tempus quod est passio primi motus». Giles's response summarizes in what amounts to a word or two the much more lengthy treatment in the Commentator (Averroes, *In phys.*, IV, com. 98, pp. 178F-179I). To Averroes apparently must go the credit for first clearly perceiving and vigorously posing the problem and for first providing an acute answer that most coming after him generally accepted. According to Mansion, *loc. cit.*, pp. 280, 284, Averroes explicitly makes a claim to originality toward the close of this particular consideration: «Et ista quaestio nunquam potuit dilucidari mihi, nisi post magnum tempus: et quicquid scripsi de tempore secutus sum expositores, sed hic non»; *ibid.*, p. 179G. Aquinas's analysis of the problem seems, in essentials, similar to that of Averroes; T. A., *In phys.*, IV, l. 17, nn. 3-4. In the opinion of MANSION, *loc. cit.*, p. 304, the approach of Albert the Great also broadly agrees with Averroes's position. The general concurrence of Albert and Thomas with Averroes here may be taken as a sign of a wider consensus that obtained when Giles was working on his commentary. Giles's words, «communiter ponitur», apparently denote such a consensus and explain why he gives short shrift to a vexatious question that cost Averroes a great deal of lucubration (light came to him only «post magnum tempus»).

all other motions. In other words, the unicity of time in the primary motion does not thwart but underpins the perceptual ubiquity of time. Because it is a measure *ad extra*, time as subjectified *ad intra*, i.e., as resident in the primary motion, formally causes any time-segment perceived in any other motion. Every motion accessible to ordinary awareness evokes the sense of time because of the proportion between effect and cause. It carries the formal existential imprint of the primary time that is subjectified in the primary motion. Hence time, though subjectively one, is effectively pluralized. As a cause, it exists in all its effects; as the measure in the measured, it exists in every other motion. In the light of formal causality the unity and the perceptual ubiquity of time, rather than being at loggerheads, are wedded to legitimate the testimony of experience that we become aware of time in becoming aware of any and every motion.

(iii) After we have shown that time is not motion and that it does not exist apart from motion, we need take but one simple step to the next insight: time is something of motion²⁷). Whenever we sense motion, we sense time; and the converse is also true. Even in the special case where we are cut off from external sights and sounds, from all external sensible motions, we know time so long as we know the prior and posterior phases of successive images in the soul. Time is not bound to the sort of motion that occurs outside sensory consciousness; its subject in the broad sense is any motion whatever, physical motion first of all, but internal sensory or psychic motion as well.

Time-awareness, ordinarily born of the perception of motion without, is excited by the imaginary flux within. In perceiving any motion whatsoever, we perceive time; and in perceiving time, we are implicitly aware of the motion of which it is the ever-present concomitant. And since motion is obviously not *aliquid temporis*, the indissociable linkage of time and motion can only mean that time is *aliquid motus*.

2. *The definition as such.* The expression «something of motion» is still vague and indeterminate, and what it signifies tells only the close of the preliminary stage. The word «something» must be sharpened to say in what exact sense time goes along with motion.

²⁷) *Ibid.*, fol. 100c (under *Accipiendum autem quoniam*).

A three-step determination yields the definition of time ²⁸). (i) Time is related to motion as motion to magnitude. (ii) Time is related to motion according to the prior and posterior. (iii) The formal note of time emerges when the soul numbers the prior and posterior. Time is a continuum marked by factors prior and posterior; one whose factors are numbered as two nows. (iv) Clarification from the text and certain *dubitarets* round off this section,

(i) The first « particle » or feature of time we inductively achieve is that time, like motion, is continuous ²⁹). Time gets its continuity from motion in virtue of magnitude. Time follows not just any motion indiscriminately but properly local motion. Motion according to place, as the name implies, goes from one place to another, through the intermediate places or parts ordered according to the prior and posterior of position. A magnitude is of course continuous. Insofar as motion follows upon magnitude, it is continuous in virtue of magnitude; and time, following upon motion, is also a continuum.

The continuous is a species of the contiguous, which is itself a species of the consecutive ³⁰). The limits of two factors are adjacent in such a way that the terminals of the two become one and the same. From this perspective, a continuum has not two terms but one: neighboring parts are linked not at their terms but at one term. No part possesses a proper term in relation to its adjacent part. The parts are potentially divisible at this common term, but not actually divided. Next, every magnitude is of its nature continuous. As a continuum, a magnitude has position; its parts are distributed one after the other, with no gap between, the parts, with each part united to its extraposed neighbor by a common term. Motion and time, we have said, participate in the continuity of magnitude. This truth, because directly grasped by induction, needs no demonstration. Dialectically, by indirect demonstration, we can confirm it: the

²⁸) *Ibid.*, I, 20, fol. 100c-d (under *Quoniam autem quod*). It is interesting that in introducing his inquiry into the definition as such, Giles speaks of Aristotle hunting for « *particulas positas in diffinitione temporis* », language that some may find akin to Aquinas's words at the start of the induction of the definition: « *Prima pars dividitur in tres, secundum tres particulas definitionis temporis...* »; T. A., *In phys.*, IV, I, 17, n. 1.

²⁹) *Ibid.*, fol. 100d.

³⁰) *Ibid.*, V, I, 5, fol. 124d (under *Continuum autem quod*).

noncontinuity, i.e., the indivisibility, of magnitude, motion, and time is absurd ³¹).

A word may be said also about the observation that the parts, the prior and posterior, are found proportionally in motion and time. Proportion in Aristotelian philosophy is primitively a mathematical term signifying a fixed relation of one quantity to another ³²). The double and the quadruple are proportions; eight is the double of four and the quadruple of two. We may extend proportion to take in features beyond quantity. Two entities are tied together in a proportional community insofar as they share in or manifest a common factor. One entity possesses the common factor primarily and principally while the other entity holds it in derivative fashion. The common feature is said to belong to the second entity in a proportional manner, i.e., not fully but only in a certain diluted way. We say being is primarily and principally of substance and only proportionally and secondarily of accidents ³³). Correspondingly, we say continuity is primarily and principally of magnitude and only secondarily and proportionally of motion and time ³⁴). Inductive observation

³¹) *Ibid.*, VI, l. 2, fol. 137d-138a (under *Et motum esse*).

³²) Cf. Hippocrates George APOSTLE, *Aristotle's Philosophy of Mathematics* (Chicago: University of Chicago Press, 1952), pp. 64-65, for texts from Aristotle on this point. (Apostle's work consists entirely of skilfully rearranged texts of Aristotle on all branches of mathematics.) Here Apostle gives 1131a29-b3 (*Nicomachean Ethics*, Bk. V, ch. 3) and 248a10-b22 (*Physics*, Bk. VIII, chs. 3-4).

³³) In his *Quaestiones metaphysicales*, Bk. IV, Questions 3 and 4, Giles sets forth the essentials of a theory of analogy, about which we have more to say in n. 34 below. Here we need only remark that according to Giles being is said of substance, then of accidents, by analogy of attribution. «... dicuntur aliqua analogia per attributionem ad unam materiam. Sicut omnia dicuntur esse entia per attributionem ad substantiam quae est subjectum et materiam omnium accidentium». We are using a reproduction of a text (first issued in 1501 in Venice by Andreas Torrenus de Asula) that was published by Minerva, G.M.B.H., Frankfurt, West Germany, 1966. The passage just quoted appears in Bk. IV, q. 4, fol. 23c.

³⁴) In *phys.*, IV, l. 20, fol. 100d (under *Quoniam autem quod*). Giles speaks of the proportional resemblance between magnitude, motion, and time: «Nam secundum illam proportionem secundum quam reperitur prius et posterius in motu: at vero si in motu est prius et posterius: et in tempore est prius et posterius propter id quod semper alterum ipsorum sequitur alterum: semper enim tempus sequitur motum». A few lines later Giles makes the point that the prior and posterior are said to be «principaliter» in magnitude not because magnitude is not «per aliud» (i.e., not because it is a substance), for its parts are placed outside its parts «per situm». It is in relation to motion and time that magnitude is principal: «... prius et posterius in motu et tempore derivatur a prioritate et posterioritate in magnitudine».

of process attests that motion and time really are continuous, but analysis ascertains that they are continuous in an analogous sense: their continuity is proportionally borrowed from that of magnitude. Continuity that exists fully and properly in magnitude is realized only partitively and derivatively in motion and time. As suggested a few lines back, it seems permissible to admit the parallel of magnitude-motion-time to substance-accident. As accidents possess being through substance, its primary recipient, so motion and time share in continuity through magnitude, its primary recipient ³⁵).

(ii) A continuum is formally unified and materially partitive; it is one in its term, many in its interior parts. The parts exist side by side, one next to the other, one posterior to the other. The task at hand is to see how time is clothed in the prior and the posterior; to show, in other words, that time follows motion according to the

³⁵) This is obviously not the place to launch a sustained investigation into Giles's theory of analogy, but two additional references may help supply further backing for the claims in our text. In *Quaestiones metaphysicales*, IV, qu. 4, fol. 23c, Giles sketches the fundamentals of a theory of analogy through attribution to a numerically one entity. The analogical relationship occurs in the line of the efficient cause (medication), the final cause (health) and the subject (the being of substance vis-à-vis accidents). Diverse substances can be related to one another: body is said analogously of celestial and terrestrial bodies; substance is said analogously of spirit and thing of nature; and being is said by participation of created things in reference to their Creator. *I Sent.*, d. 2, q. 1, fol. 17B distinguishes three modes of analogy: according to matter, according to subject, and according to participation. First, body is said not generically but analogously of celestial and sublunary entities, because these are respectively incorruptible and corruptible. Second, we say substance analogously of pure intelligence and body. Third, good and being are said analogously of Creator, in which they exist *per essentiam*, and creature, in which they exist *per participationem*. In the same volume (*I Sent.*, d. 48, q. 1, ad 1, fol. 239Q) Giles states: «... est... analogia quaedam inter creatorem et creaturam in quantum unum imitatur aliud...». Moreover, because of the infinite gap, the proportion between God and finite things is not one of commensuration but of order.

Even this quick look at some revealing passages seems sufficient to lend credence to ascribing the following views on analogy to Giles. (i) Analogy is a fundamentally a linguistic-logical device whereby we extend a term from its original reference to cover diverse but related objects. (ii) Though basically logical, analogy reflects the way things are in the universe. An analogical relationship among things means that one thing imitates another. (iii) In other words, analogically seen, certain things proportionally resemble one another, by a proportion of commensuration among finites and by a proportion of order between God and finites. (iv) This commensurate proportionality is evinced in the analogous derivation of being by accidents from substance and the analogous sharing in the continuity of magnitude by motion and time.

prior and posterior ³⁶). As just remarked, we reach the parts of magnitude inductively, by ostensive designation or simple pointing. When we run a finger over a table top, we say, « Here » and « There », distinguishing the parts according to the prior and posterior. But the prior and posterior in motion, though derived from magnitude, betray one signal difference: they are not just lying out there before us, not just inertly extended, but exist successively. Indeed the prior and posterior parts in motion, we may say, make up its succession. Succession in nature implies motion and, conversely, motion is unthinkable without succession. Though they co-imply one another in the concrete, continuous succession and motion do not formally or definitionally imply one another. The prior-and-posterior existentially exhibited in motion, which we recognize as the succession in motion, is formally distinct from motion; its notion does not essentially include motion. In its formal meaning motion, in turn, is the act of a mobile thing. The fact that motion is marked by the prior and posterior flows not from motion as such but from the order of parts in magnitude. Thus motion is subjectively identical with but formally distinct from succession in nature ³⁷). Motion borrows the prior and posterior from a magnitude that it can be definitionally thought without but concretely cannot exist without.

These nuances prepare us to settle the question: in which way does time pertain to motion — to motion as such or to motion marked by a local prior and posterior? Even routine observation of motions in nature and human society suffices to evidence that knowledge of time follows not motion formally taken but motion subjectified in a continuum; not motion according to its pure *ratio* but motion imprinted with formally extrinsic factors of dimensive quantity ³⁸). Recognition or estimation of time clearly springs from the diversification of motion into prior and posterior, as in the rising and setting

³⁶) *In phys.*, IV, l. 20, fol. 100d-101a (under *Est autem prius*).

³⁷) *Ibid.* Motion is « formaliter » and « secundum esse diffinitivum » distinct from the prior and posterior. However, according to the « esse quod habent in materia », these are identified with motion itself. Giles departs somewhat from the language of Averroes, who speaks of the prior and posterior as the same as motion « in subjecto » but as distinct « secundum definitionem et quidditatem » (*In phys.*, IV, com. 98, fol. 180D-E). Interestingly, Aquinas's formulation seems closely akin to Averroes's: « ... prius et posterius sunt idem subjecto cum motu, sed differunt ratione » (*In phys.*, IV, l. 17, n. 8).

³⁸) *Ibid.*, fol. 101a.

of the sun and the coming and going of a full moon and as in the movement of the hands across the dial of the clock. « ... between any two points there cannot be any intermediary except a line; so when we grasp two nows, one of which is prior and the other posterior, and when we grasp that between the two nows there is something serving as an intermediary, at that moment we grasp time »³⁹). The concept of time emerges as soon as the mind lays hold of a prior now and the posterior now delimiting the continuum of motion: the time-line consists of motion bounded by two nows. We conceive time in seeing motion stamped and determined by the prior and posterior.

(iii) This brings us to the third « particle », the consummatory determination in the general definition: time is formally the number of motion⁴⁰). In the Aristotelian school, it may be noted, number is defined as a plurality measured by unity or the arithmetical one⁴¹). The parts of a number are separate and discrete; properly counted, these parts constitute a number. A number is a collection but not simply a collection. It requires the specifying act of a common denominator or one to formalize a plurality into number. To choose an unsophisticated example, we cannot include in one number two cats, three dogs, and five snakes precisely as cats and dogs and snakes, but we can number them under a more common factor that is ten animals. Furthermore, it is the last unit that sets the parts of a number in order and formally makes a specific number. The last unit seals and closes off the collection of units in the species of two, three, or five.

Time taken as a special case of number reflects these general features of number. Motion marked by the prior and posterior is motion in some way pluralized, for the prior and posterior are parts, and parts bespeak plurality. Time is grasped as number proper when the mind goes on to detach the prior and posterior limits from their matrix — the motion with which they are materially identified — and to see these not as prior and posterior, not as parts, but as nows.

³⁹) *Ibid.*: « ... quia inter duo puncta non potest aliquid medium nisi linea sit, intelligendo duo nunc quorum unum sit prius, aliud posterius, et intelligendo inter ipsa nunc esse aliquid in medio, statim intelligimus tempus ».

⁴⁰) *Ibid.*, fol. 101a-b (under *Quando quidem igitur*).

⁴¹) *Quaestiones metaphysicales*, X, q. 1, fol. 36a-b: « ... in quantitate discreta per se et primo reperitur cumulus partium quas per unitatem mensurantur ».

The inward eye sees the nows as diverse ⁴²). We arrive at the notion of time when the soul thinks one now, then another. The determinations are subsumed under a common type, that of the now. We achieve the *ratio* of time only when we view the prior and posterior in the common light of the now and number them as two nows. To lay hold of two similars abstracted from continuity, as precisely two of these, whether hands, brothers, or nows, is to number them. Time, moreover, is not simply a succession of discontinuous nows; it is not just number but number of motion materially imbedded in magnitude. The nows are the terminals that bound a motion-continuum. Time is, in short, a time-line numbered by its terminal nows; prior and posterior nows delimit each time-segment. It is the second now, the posterior now, that formally closes off the number that is time. As last, it formally specifies a multitude as number ⁴³).

Though time is formally constituted as number by the now and cannot occur without the now, we cannot be aware of time in the awareness of a single now ⁴⁴). Occasionally, individuals pay no attention to the transition from prior to posterior and seem conscious of only one now held in a presentness in the concrete sense that amounts to consciousness of only one now. Not infrequently, it is reliably reported, Therese Neumann, a twentieth-century stigmatist and mystic, soared into a transport that blotted out all sense of the passage or the differentiation of prior and posterior in time ⁴⁵). In a looser fashion, prior and posterior seem to melt into an infinitesimal presentness or now in a quasi-instantaneous event like the suspension of an electrical network by a flash of lightning or like a sudden shooting pain in the chest. Expressions such as «Time seemed to stand still», «At that instant the phone went dead», «In that moment I thought I was going to die» intuitively, imprecisely, but unmistakably communicate a sense of the atemporal, and witness that cognizance of immediate presentness or what is tantamount to one now spells an eclipse of time-awareness. The events themselves

⁴²) *In phys.*, IV, l. 20, fol. 101b (under *Quando quidem igitur*): «... oportebit imaginari diversa nunc si volumus imaginari tempus...».

⁴³) *Ibid.*: «... oportet quod in habitudine quam habet tempus ad motum sit aliqua ratio numeri».

⁴⁴) *Ibid.*, fol. 101a-b.

⁴⁵) See Johannes STEINER, *Therese Neumann*, trans. Pauline FATHERS (Staten Island, N.Y.: Alba House, 1966), pp. 35-42. By the way, all the evidence in this volume seems very carefully weighed and documented.

appear stripped of the diverse boundaries in motion that characterize time. Without the one now measuring the plurality that is prior and posterior, the number that is time is impossible. But with only one now the number that is time is equally impossible. It takes two nows to constitute time.

(iv) Certain specifications in the text and shades of meaning provoked by *dubitarets* assign a more precise meaning to the number that is time. A first textual specification confirms the formal nature of time by the customary estimation of motion by time. In virtue of number we judge things in terms of more or less; similarly, in virtue of time we judge the more or less of motion ⁴⁶). When we deem one motion twice as fast as another, we are quantifying it in terms of the number that is time. A second, more important specification concerns a crucial distinction between two sorts of number: the number by which we number and the number that is numbered ⁴⁷). The first, which we may name abstract or mathematical number, means any number applicable to a range of physical objects; three, e.g., may be referred to dogs, trees, flashes of light, or meters. Number in the second sense, which we may name concrete or physical number, means the number as actually inhabiting some physical entity. A normal human adult is initially blessed with two hands, ten fingers and thirty-two teeth. The two as in the hands, the ten as in the fingers, and the thirty-two as in the teeth are numbered numbers physically resident in a certain expanse of sensible matter. (Giles further nuances the meaning of time as numbered number in the fourth of the *dubitarets* discussed just below.)

The first difficulty concerns a point touched on earlier: are the prior and posterior formally present in motion? Giles's reply distinguishes between motion in itself and motion in its existential situation or concretion in magnitude ⁴⁸). *Secundum esse*, existentially, motion always exhibits prior and posterior phases, but definitionally, according to its *ratio*, motion does not include the prior and posterior. Ingredients only potentially in a definiendum never enter into a definition, and the prior and posterior are only potentially present in motion. If the prior and posterior were actually present in motion, motion would not be continuous but discrete. Giles's elliptical state-

⁴⁶ *In phys.*, IV, l. 20, fol. 101b (under *Signum et autem*).

⁴⁷ *Ibid.* (under *Quoniam autem numerus*).

⁴⁸ *Ibid.*, fol. 101b-c.

ment leaves obscure why we are bade to adjudge a definitional inclusion of the prior and posterior in motion selfstultifying. Consider, Giles seems to be saying, motion as we observe it, i.e., motion as this successive continuum that just began at a prior point and is terminating at a posterior point. The successive continuum is the result of the flow of the *actus mobilis*, the *ratio* or definitional character of motion, across a magnitude. Let us suppose that the prior and posterior are not potentially but actually contained in the *ratio* of motion, i.e., motion taken as *actus mobilis*. Now motion in itself, in its *ratio*, is simply this indivisible *actus*; it has no continuity at all. If the prior and posterior are actually in this *actus*, then they too would be discrete or occur discretely. Perhaps we may put it more simply: if they actually belong to the *ratio* of motion, then motion no longer shares in the continuity of magnitude and has to be discrete — a conclusion of course negated by ordinary experience. As we shall see later, the soul contributes nothing to the making of the *esse* of motion but is active in fashioning in some respect the *esse* of time. The prior and posterior that are only potentially present in motion are actualized «through the designation of the soul» ⁴⁹⁾, a designation that rounds out the *ratio* of time. Yet these precisions should not cause us to forget the other side of the coin, which is the truth that because motion is successive act, it is existentially joined to the prior and posterior. Or to state this perhaps more exactly, the prior and posterior are existentially ineliminable from *esse actuale*, the actual being, of the motion that greets us on every side.

A related question poses itself: are the derivative prior and posterior in motion distinct from the prior and posterior in time? Unquestionably, replies Giles; otherwise we run the risk of falling into the absurdity of positing a cause causing itself ⁵⁰⁾. If, as in solving the previous *dubitaret*, we are bound to draw a formal line between the prior and posterior in magnitude and those in motion, then we are bound also to see a formal difference between the prior and posterior in motion and those in time. The prior and posterior demarcating the continuum are subjectively identical but formally distinct in magnitude, motion and time. Yet this leaves unresolved the question: do the words «the prior and posterior» in the definition

⁴⁹⁾ *Ibid.*, fol. 101c.

⁵⁰⁾ *Ibid.*

of time refer to the prior and posterior in time or to those in motion? If «the prior and posterior» refer to those in time, we invite the charge of a vicious circularity: we would be determining time by time. The definitional prior and posterior are those in motion that are numbered through the designation of the soul. Time, in other words, is not the number of itself but the number of motion taken concretely, i.e., motion taken as spread out and terminated by the prior and posterior. Insistence on the co-subjectivity of time with motion and magnitude elicits the question: is time truly number, i.e., is time number in any strict sense? Undoubtedly, Giles answers, time is continuous through and along with motion⁵¹). Time is grounded in motion as a proper attribute in its subject; the subject is the material cause of its attribute. As subjectively one with and concretely indistinguishable from motion, time is said to be materially continuous. But since it properly numbers motion, time is undoubtedly also formally number.

A concluding question here seeks to shed more light on the status of a time that is number: in what sense is time numbered number? There are two ways, neither analytically sufficient of itself, to make the point that time is numbered number⁵²). First, numbered number is number as applied to things, and time is number as applied to motion. Application in ordinary usage seems to mean an operation in the line of efficient causality. A writer is said to apply his pen to paper, an artist his brush to the canvas, and so forth. In this case, since the context is definitional and since time is formally number or the formal cause of the numbering of motion, application may be extended to signify something in the line of formal causality: the

⁵¹) *Ibid.*, fol. 101c-d. In his *Quodlibeta*, V, q. 20, pp. 325-326, Giles also discusses the continuous and discrete features of time. (We are using the edition edited by Petrus Damasus DE CONINCK, O.S.A., published at Louvain by Hieronymus Nempeus in 1646; republished by Minerva G.M.B.H., Frankfurt, West Germany, 1966.) Time exists «tamquam in subjecto» in what is continuous, and, though formally number, is therefore materially continuous. For example, a stick that is ten units long is both continuous and discrete. As ten units, it is formally number, but as ten unseparated units in the one continuous stick, it is continuous. This comparison strikingly recalls an illustration in Aquinas: «... licet numerus sit quantitas discreta, tempus tamen est quantitas continua, propter rem numeratam; sicut decem mensurae panni quoddam continuum est, quamvis denarius numerus sit quantitas discreta» (*In phys.*, IV, l. 17, n. 11).

⁵²) *Ibid.*, fol. 101d.

form that is number (which is the *ratio* of time) is said of motion. If time were nothing but absolute number, the number by which we number, any and every number — 2, 10, 100, 1,000,000 — would be the same as time. Secondly, it is necessary to see time in a specific fashion, i.e., as resident in its unique subject, the movement of the first heaven ⁵³). Here time is applied to just this movement, the primary motion in nature. It is not the measure of the first movement but its *passio*. It is actually imbedded in it, actually seated in it: it is its indissociable proper quantitative attribute. Time is, however, the measure of all other motions in nature. In this special fashion it may be said to possess *quodammodo*, in a certain respect, the *ratio* of numbering number. Concretized in the primary motion, it is numbered number. But quasi-abstracted and physically separated from motions other than the primary, it may be called absolute number, a number whereby we number — one that numbers — sub-primary motions.

A brief backward glance assures us that the analysis of time dissolves the first set of doubts, raised in the dialectical introduction, concerning the existence of time ⁵⁴). The undeniable fact of the non-existence of fixed parts of time cannot be used to deny the existence of time, for time is not a fixed but a successive continuum. It has «its being not in the simultaneity but in the order of its parts» ⁵⁵). As with motion, so with time: one part follows after another. Yet once again we must be careful not to let the close affinity between motion and time blur into an absolute identity. For one thing, as we have seen, the unicity of time in contrast with a plurality of motions underscores the formal distance between an existentially inseparable time and motion. The analysis of the now, moreover, also supplies rational support for the oneness and manyness of a now that, dialectic tried to suggest, can be neither one nor many ⁵⁶). But Giles's justi-

⁵³) *Ibid.*

⁵⁴) *Ibid.*, l. 21, fol. 101d-102a (under *Et sicut motus*). This interpretation of Aristotle's discursive strategy stems from Averroes (*In phys.*, IV, com. 103, fol. 182F), who writes: «Et intendebat per hoc dissolvere quaestionem praedictam in esse temporis dicentem quod si tempus est, necesse est ut omnes partes eius aut quaedam sint insimul».

⁵⁵) *Ibid.*, fol. 101d: «... esse eius non est in simultaneitate partium sed in ordine partium».

⁵⁶) *Ibid.*, fol. 102a (under *Ipsium autem nunc*).

fication of the now will have to wait till after our treatment of the attributes of time and the things measured by time.

3. *Attributes of time.* Insofar as it belongs to quantity, we may consider time a bearer of attributes and a subject of predication⁵⁷). As a successive continuum whose formal *ratio* is number, as number applied to motion, time reveals common and proper attributes. It is said (i) to have or not to have a minimum; (ii) to be great or small, short or long; (iii) not to be fast or slow; (iv) to be the same or not the same; and (v) to be the measure of motion.

(i) There is no number qua number smaller than two. The arithmetical one is not a number but the principle of number; and in the latter respect it is the absolute minimum⁵⁸). But in a number involved in a continuum, the ascription of minimal elements depends on whether we take the numbered continuum as a multiplicity or a magnitude. We may designate either one or two lines as minimal in a plurality of lines, according as we view one or two as minimal. From the standpoint of magnitude, on the other hand, we cannot point to a minimal stretch of a line, for any given line is always divisible into smaller parts, and these smaller indefinitely into still smaller. Perspective decides whether time does or does not possess a minimum. From the angle of plurality, we may express time as minimal, as one or two, as consisting e.g., of one day or two hours, and the like. In the light of magnitude, however, we cannot attain a minimum of time that is not further divisible.

(ii) Long and short are said of time insofar as it is a continuum, whereas many and few are predicated of time precisely as number⁵⁹). We accent the material side of time in the observation, « A man of

⁵⁷) *Ibid.*, l. 23, fol. 104a-b (under *Minimus autem numerus*).

⁵⁸) *Ibid.*, fol. 104b. Giles's third *notandum* distinguishes the minimal-numerical features of one and two: « Duo enim est quid minimum non absolute sed est minimus numerus. Non est enim minor numerus quam dualitas. Sed unum secundum quod huiusmodi dicit quid minimum simpliciter et absolute ». (After « Duo enim » above I have substituted « est » for « sunt », which seems to be a copyist's error.) The character and the phrasing of this distinction, which we do not find in this particular place in Averroes, shows some affinity to Aquinas's comment here (*In phys.*, IV, l. 19, n. 2): « Sicut in multis lineis secundum multitudinem quidem est minimum, ut una linea vel duae lineae; una quidem si accipiat id quod est minimum simpliciter in numero; duae autem si accipiat id quod est minimum in genere numeri, habens rationem numeri ».

⁵⁹) *Ibid.*, fol. 104b-c (under *Manifestum est autem*).

eighty has lived a long life», and its formal side in a different expression of the same import, «An eighty-year-old has lived many years».

(iii) As we established in our introductory considerations, fast and slow, though said of motion, are not predicable of time⁶⁰). Clearly number taken absolutely can have neither attribute, for motion, be it fast or slow, is alien to abstract quantity. Again, fast and slow signify what is measured by number, but time cannot be measured by number, since it is the very number whereby the motion numbered is measured.

(iv) Seen in its simultaneous existence, time, at any given juncture in its course, is in one sense everywhere the same, i.e., with respect to mobile things throughout nature⁶¹). In other words, as regards its unicity (a point to be explored later on) time is the same. It is subjectively one; it resides primarily only in the primary motion. But taken as a successive continuum, taken according to its diverse parts, time is plainly not one and the same. Time, if it were absolute number, would remain one and the same; abstract number shows a lordly indifference to change of past or future. One hundred is not affected by being applied to horses, men, or what not; differences among concretes have not the slightest impact on its abstract specificity. Numbered number, however, does vary with the entities to which it is applied; one hundred horses concretely differ from one hundred men. Therefore time is materially affected by its residence in motion; it does not exist all at once but successively. The phases of the numerically one motion in which time is seated are many, one phase prior and the other posterior. Since prior and posterior are themselves diversely related as what has already elapsed and what is yet to be, time is further differentiated into past and future times.

Still, from another angle time indubitably remains the same. Time repeats itself (but, by the way, never reverses itself) in the recurrence of one and the same motion. Its reiteration is not numerically but only specifically one. The sun that reaches the vernal equinox, in the constellation symbolized by the Ram, will swing

⁶⁰) *Ibid.*

⁶¹) *Ibid.*, fol. 104c-d (under *Et idem autem*). We render as «abstract number» what Gilles calls «numerus mathematicus».

back to reach it again and again ⁶²). Winter, spring, summer, and autumn depart and come back once more. But the recurring identity of sun and season is a specific identity. The sun in its apparent wheeling and the seasons it governs are never, can never be, numerically one and the same with what was or will be.

Thus time is ineradicably alternable and incessantly varying; it is never the same at any two junctures. Viewed as resident in its subject, primary motion, time is *unum numero* or *idem numero* ⁶³). In contrast to the plurality of motions, there is one and only one time throughout the natural universe. But viewed according to the diverse phases of the one motion, time is not numerically one and the same. The prior part is simply not the same as the posterior part. We may, however, speak of these diverse parts as *in eodem numero*, i.e., as parts of the subjectively one continuum that is time. In addition, time may be considered identical in the limited purview of specific recurrence.

(v) When we speak of time as the measure of motion, we are dealing with the main property of time. This claim forms, in this context, a part of a larger claim, that time and motion are reciprocal measures. Two arguments warrant this larger conclusion, the first based on the nature of number and numbered, the second on the likeness of time and motion to motion and magnitude.

Time measures motion *quoad se* ⁶⁴). Time as number determines, i.e., measures, motion per se. Time itself, on the other hand, is measured through motion *quoad nos*. Numerables are objectively known by number; and it is in this wise that time measures motion. Conversely, number itself becomes known through things numerable, and it is in this reverse fashion that motion is said to measure time. A *dubitaret* protests that to hold that we measure number through

⁶²) *Ibid.*, fol. 104d (under *Amplius sicut contingit*). While Averroes makes no mention of any point of the zodiac, Giles writes: « Si enim sol moveatur sub ariete et iterum postea moveatur sub illo signo redit idem motus non numero sed specie ». This language appears to resemble Aquinas's observation (*In phys.*, IV, l. 19, n. 5): « Reiteratur enim unus et idem motus specie, sed non numero: quia ad eodem signo arietis, a quo primo movebatur sol, et postea movebitur... ». Evidently we have to look for something more than mere coincidence to account for the striking, though contracted, similarity of Giles's « sub ariete » and « non numero sed specie » to expressions in Aquinas glossing the same lines in Aristotle.

⁶³) *Ibid.*

⁶⁴) *Ibid.*, fol. 105a (under *Non solum autem*).

things numbered puts the state of affairs back end to, for we evidently count numerables by number. In reply Giles offers two examples of a determination of number by numerables ⁶⁵). First, suppose that a person who cannot count ticks off on his ten fingers the number of horses in a group. It is in virtue of the one finger, a numerable, that he comes to know that there are ten horses. Again, because we know what a horse is and what a centimeter amounts to, we can determine the number of horses in a collection and the number of centimeters in a line.

The reciprocal measurement of time and motion is evidenced by the likeness of time vis-à-vis motion and of motion vis-à-vis magnitude ⁶⁶). Time imitates motion as motion imitates magnitude. The common factors in the parallel imitations are a like continuity and a dependence upon the subject in which it shares. Time images motion as motion images magnitude: the secondary continuant derives its continuity from the prior continuant on which it obviously depends. In virtue of a quantitative likeness, motion is *quoad se* measured by magnitude and, conversely, *quoad nos*, magnitude by motion. We can call the road long because of the amount of motion required in the trip; conversely, in view of the length of the road, we can determine that the motion involved will be much or little. The time-motion relation imitates this reciprocal measurement: time measures motion and, conversely, motion measures time.

Three *dubitarets* serve to further clarify the relation between time and motion. First, time per se measures motion, because we per se measure a continuum only insofar as we number it ⁶⁷). Second, we must distinguish the senses in which we can speak of the prior and posterior in motion as parts of time ⁶⁸). Because indivisible, the *mutata esse* or moments cannot be parts of time; and as moments, indivisibles of motion, they belong properly to motion rather than to time. The *ipsa moveri* or quantitative segments of motion are plainly parts of motion, but when our intentional acts apply number to these parts, they become formally parts of time. Third, the correspondence

⁶⁵) *Ibid.*, fol. 105a-b.

⁶⁶) *Ibid.*, fol. 105b (under *Et hoc rationabiliter*).

⁶⁷) *Ibid.*, fol. 105b-c. See *Quaestiones metaphysicales*, X, q. 1, fol. 36a: «... mensura primo et per se reperitur in quantitate et maxime in quantitate discreta. Et a quantitate discreta transfertur ad alia».

⁶⁸) *Ibid.*, fol. 105c.

between time and motion initially inclines us to grant that the prior and posterior in time may be taken according to their *esse divisibile* as well as their *esse indivisibile*. When we think of motion as a line whose midpoint is a *mutatum esse* between prior and posterior segments, we look upon motion according to its *esse divisibile*; that is to say, the prior and posterior are regarded as divisible parts. Motion viewed according to its *esse indivisibile* is a continuum delimited by two *mutata esse* or indivisible moments. Loosely speaking, we may define time as the number of motion according to *esse indivisibile* or *esse divisibile*. But strictly speaking, time is a time-line enclosed by two *nows* rather than one *now* punctuating two time-lines⁶⁹). For one thing, from the side of time as numbered, if we define time according to its *esse divisibile*, we are defining it through its quantitative parts — which runs counter to sound rules for defining. The parts of the species, not the parts of the matter, are embraced by a definition; we do not include a semi-circle in the definition of a circle. Time, moreover, is more *numerus motus* than *motus numeratus*; it is formally number and only materially one with motion. Hence in the statement of the definition we put number in the nominative case and motion in the genitive case. In short, time is something numbered through two *nows*, one prior, the other posterior. The prior and posterior in this sense are not parts of or divisible entities within time. They are nothing but «the very *nows* numbering time»⁷⁰). Again, from the side of the soul numbering, we cannot (as has already been proved) number time with any fewer than two *nows*, the *nows* that bound and enclose the time-line.

4. *Time in relation to things in time.* The ubiquity of time suggests that time bears in some way on all things in nature or that all beings of nature are in time. After endeavoring to add precision to the phrase, «in time», we propose to show how motion is in time; how rest, the opposite of motion, may also be in time; in what sense time touches on mobile things; why incompatible beings are excepted from

⁶⁹) *Ibid.*, fol. 105c-d.

⁷⁰) *Ibid.*, fol. 105d: «... prius et posterius quae ponuntur in diffinitione tempus non accipienda sunt secundum esse divisibile nec sunt partes tempus, sed sunt ipsa nunc numerantia tempus». The very last part of this sentence may recall, to some, language in Aquinas dealing with an earlier passage in Aristotle (*In phys.*, IV, l. 17, n. 11): «... tempus est numerus numeratus, quia ipse numerus prioris et posterioris in motu tempus dicitur; vel etiam ipsa quae sunt prius et posterius numerata».

measurement by time; why certain nonentities are also time-free; and lastly, how corruption is in time, i.e., in what sense time causes corruption.

(i) The phrase «in time» may be assigned at least three senses ⁷¹). In the broadest and improper sense it may mean that a thing exists when time exists. Again, to be in time may mean being *aliquid temporis*, a part or a feature of time. In the most restricted sense a thing that is in time is contained in time, i.e., measured or numbered by time. Things in time in this third sense are within time as the measured within the measure. The phrase in the first or most ample sense cannot be made equivalent to its third or proper sense; otherwise, the heavens would be, in fact, in a grain of sand, and God Himself would be encased in time. No doubt past and future, long and short, and the now are in time in the second sense but not in a per se and proper fashion. These are, respectively, the parts, the attributes, and the principle of time to which time is related as whole, subject, and principled ⁷²). One *dubitaret* presses the objection that the now is in time as in number since time numbers motion through the nows themselves. Indeed, Giles answers, time numbers things temporal through the now. But the now is in time as its principle and term ⁷³). In addition, rather than being numbered by time, the now may be said to number time. If the nows number time, it seems more proper to speak of time as in the now instead of maintaining that the now is in time.

Time is triply related to the *temporalia* under its sway ⁷⁴). First, precisely as tied to time, temporal things are essentially dependent on time ⁷⁵). Second, as indicated in the previous paragraph, *temporalia* are contained in time as numbered things in number and localized entities in space, with the implication that time is ontically greater than all that falls within it ⁷⁶). Third, temporal things are in some way affected by time ⁷⁷). The *Tempus fugit* of common parlance is often associated with aging and the decline of vital powers. The

⁷¹) *Ibid.*, l. 24, fol. 106c-d (*In tempore enim*).

⁷²) *Ibid.*, fol. 106d-107a (under *Si autem hoc*).

⁷³) *Ibid.*, fol. 107a.

⁷⁴) *Ibid.*, fol. 107a (under *Sed hoc quidem*).

⁷⁵) *Ibid.*, fol. 107a-b.

⁷⁶) *Ibid.*, fol. 107b (under *Quoniam autem est*).

⁷⁷) *Ibid.*, fol. 107b (under *Et pati iam*).

passage of the years may bring wisdom but inexorably, without maybe's or but's, signals breakdown and deterioration. We will presently deal more extensively with the causal linkage of time to corruption.

(ii) The homogeneity of time with motion implies that time is the *per se* measure of motion ⁷⁸). Indeed all other entities are in time only insofar as they are related in any way to motion. Time determines the rate of motion; and the speed of a motion can be determined only by another motion. Time measures a whole motion in virtue of a part of the motion (once a part is measured, replication of the part comes to match the whole). The measurement here is not circular: we do not apply a part-motion to a whole motion and call this a time-measurement. The part-time is first temporalized, i.e., numbered at its terminals; thus number makes the segment of motion an interval of time. Only after the part-motion is time-determined can it serve as a temporal yardstick for ascertaining the time of the whole motion ⁷⁹). More particularly, time measures the primary motion part by part (this is of course a loose sort of measuring, for, as remarked earlier, time is strictly the *passio* of the primary motion), and it measures other motions that are taken as quasi-partial with respect to the primary motion.

Time-motion homogeneity implies also that time measures motion both in its act and its *esse* or duration ⁸⁰). In measuring things we are ordinarily constrained to use two measures, one for the *actus* and the other for the thing possessing the act. In the case of separated substances, the *aevum* measures an intellectual operation, and the now of the *aevum* measures the separated substance itself. Analogously, in nature time measures the act, in this case the *actus mobilis* that is motion, while the temporal now measures the very mobile substance itself. But in these two instances a thing is plainly distinguishable from its *actus*, and in relation to its measure it does not have the character (*ratio*) of *actus*. It is quite otherwise with motion. It is not distinct from *actus* but is the very *actus mobilis*, and bears the character of *actus* with respect to its measure. Hence the rule of the twofold measure does not apply to motion: we are bound to appoint one measure to motion as *actus* and another to its *esse*. The homo-

⁷⁸) *Ibid.*, fol. 105d-106a (under *Quoniam autem tempus*).

⁷⁹) *Ibid.*, fol. 106a-b (under *Et est motui*).

⁸⁰) *Ibid.*, fol. 106b.

generality of measure with measured reinforces the point. Time measures motion in both respects, taken in itself and according to its *esse*. Motion in itself and in its *esse* is constantly varying. The successiveness makes for the quantitative differential of prior and posterior and for the *esse* or duration of motion; and the one measure, time, measures both the quantity and *esse* of motion.

(iii) Time measures not only motion but its opposite, rest ⁸¹). It does not measure rest in itself (for in this respect it is the lack of motion) but in relation to motion: a privation is measured by the same measure as that of the *habitus* or possession it negates ⁸²). In other words, rest is incidentally measured by time. In fact, we do measure states of rest or mobile things at rest. The ill dog slept or the patient was comatose, we say, for twenty-four hours straight. The length of a state of rest is measured by time; it falls under time insofar as it has quantity or perdures. But the rest as such is not measured. An interval of rest is measured by time as if it were an interval of motion. As deprived of motion, the resting being of nature remains *aptum natum moveri*, stamped with a built-in tendency to be moved. The nonmoving mobile entity is taken as if it were in motion, and in this respect its rest comes under time ⁸³).

(iv) Mobile things are measured accidentally by time. They fall under time not according to their substantial being but according to the *esse* of the motion subjectified in them ⁸⁴). If a mobile thing were contained in time according to its substantial *esse*, it would forfeit its substantial sameness. With its *esse* varying according to the prior and posterior, it would be turned into motion and cease to be itself. As a fixed thing or substance, a mobile thing is not measured by time; but as mobile, insofar as its mobility is actualized in the *esse* of motion, a mobile thing is measured by time ⁸⁵).

⁸¹) *Ibid.*, l. 25, fol. 107c (under *Quoniam autem est*).

⁸²) *Ibid.*, fol. 107c-d (under *Non enim sunt*).

⁸³) According to Averroes (*In phys.*, IV, com. 118, fol. 193D), time « mensurat... motum primo et essentialiter et quietem secundo et per accidens ». For Aquinas (*In phys.*, IV, l. 20, n. 10) « ... tempus proprie est mensura motus et quietis: sed motus per se, quietis autem per accidens ». Also: « ... quiescens... mensuratur tempore, non inquantum est quiescens, sed inquantum est mobile » (n. 9). In *In phys.*, IV, l. 25, fol. 107d (under *Mensurabit autem tempus*) Giles says: « Tempus enim est mensuratio motus per se et quietis per accidens ».

⁸⁴) *In phys.*, IV, l. 25, fol. 107d (under *Mensurabit autem tempus*).

⁸⁵) The mobile and its quantity in a particular motion, Giles adds, are measured not by time but by the now. « Mobile non ratione sui nec ratione quantitatis suae sed

A *dubitaret* asks whether the substantial being of mobile things is measured by some measure superior to time, and elicits a short comparison of eternal and temporal measures. Only one measure, eternity, Giles holds, lies over and beyond time. Eternity, however, is twofold. God alone, because He is infinite, is measured by absolute eternity. Participated eternity, on the other hand, is the proper measure of pure intelligences and the human soul. The now of eternity measures either absolutely or participatively what Proclus lists as the three grades of eternal being: God, the intelligences, and the intellectual soul⁸⁶). God alone is said to be, in the language of

ratione quantitatis motus dicitur tempore mensurari» (*ibid.*, fol. 108a). Giles's wording is notably reminiscent of the formulation of Aquinas at this place: «Ex mensuratione autem temporis cognoscitur quantus sit motus, et quanta sit quies; non autem quantum sit id quod movetur. Unde quod movetur non simpliciter mensuratur tempore secundum propriam quantitatem, sed secundum quantitatem sui motus» (*In phys.*, I, 20, n. 10). Averroes's comment (*In phys.*, IV, com. 119, fol. 193H) reads: «...[tempus] non mensuravit rem motam, secundum quod est mota simpliciter, sed secundum quantitatem accidentium sui motus...».

⁸⁶) *Ibid.*, fol. 108a-b. This triad has its origin in the excerpts from PROCLUS's *The Elements of Theology* that the medievals popularly knew as *Liber de causis*. See *Fundatissimi Aegidi Romani opus Authorem de causis Alfarabium* (Venice 1550, apud Jacobum Zoppinum), prop. 2c, fol. 6 (we shall henceforth refer to this as *In lib. de caus.*). In his *Le opere di Egidio Romano* (Firenze: Olschki, 1936), p. 36, Gerardo BRUNI lists this edition but, strangely, omits mention of its arresting title, which hardly seems to be common among the manuscripts and incunabula. The suspicion that this provocative title was formulated not by Giles but by the publisher or some editorial consultant of his is confirmed by a cursory glance through the *proemium* (H; no foliation is given for the *proemium*). Though we are unable to specify the author, Giles says, the *Liber de causis* is generally believed to have been written by some Arabian thinker, since the work is unknown among the Greeks. Giles ventures an educated guess about the author: «... creditur a multis [Authorem] fuisse Alfarabium». But, he adds, it was from Proclus that the propositions in *Liber de causis* emanated («emanaverunt»), and so it is clear to the savants of his day («apparet scientibus») that its key ideas substantially stem from the mind of Proclus. Hence *In lib. de caus.*, prop. 12H, fol. 7 (our following note adds some details on this) sees a distinction between the thought of Proclus and the author of the *Liber de causis*: «Verumtamen aliter exponit hanc propositionem Proclus et aliter Author iste, quia Author iste non simpliciter Platoniorum opinionem sequitur: quam omnimode sequitur Proclus». To these rather hesitant considerations of Giles some might prefer the flatly stated conclusion of St. Thomas that the work «videtur ab aliquo Philosophorum arabum ex praedicto libro Procli excerptus»; *In Librum De causis expositio*, ed. Ceslaus PERA, O.P. (Rome: Marietti, 1955), I, 1, n. 9. (Since William OF MOERBEKE finished his translation of Proclus's *Elements*, as the colophon informs us, on May 18, 1268, and since Aquinas composed his exposition on its extracts between 1269 and 1272, it seems

Proclus, antecedently eternal, i.e., eternal prior to creation, while the other two levels, the outcome of creation, are said to be, respectively, with and after eternity and therefore to be in, or to share in, eternity⁸⁷). Man, because both spiritual and material, has one

certain that he reached this scholarly conclusion on the authority of his confrere William; cf. the *Introductio historica* of Pietro CAMELLO in the Pera edition, pp. xxii-xxiii). Though Aquinas's appraisal is undoubtedly sound, recent scholarship tends to lend support on two counts to the more measured estimate of Giles. In the opinion of a number of authorities it seems probable that Alfarabi was indeed the Arabic translator and compiler of the extracts from Proclus (cf. Pietro Caramello in the Pera edition, pp. x-xi). Moreover, Giles's detection of variances between the author of *Liber de causis* and Proclus seems substantiated by E. R. DODDS, *Proclus: The Elements of Theology*, 2nd ed. (Oxford: Clarendon Press, 1963), p. xliii: «The *Liber de causis*... is not a translation, a paraphrase, or even a systematic abridgement of Proclus's work, and much even of the substance has been modified to suit the requirements of a different theology; hence it has little or no value as a *subsidiū* to the Greek text». Subtle shifts in philosophical vocabulary no doubt must be expected in a Latin translation of an Arabic adaptation of a Greek text. In addition, in Dodds's view, the translator and compiler has deliberately altered the thrust of Proclus's language. Even if we water down somewhat the robust assertion that «much even of the substance has been modified», Dodds's expert judgment testifies to the validity of Giles's recognition of internal-evidential discrepancies between the Latin translation and Proclus's original. (Giles used not the Greek text but the austere literal Latin version of Proclus by William of Moerbeke; our following note has a bit more on this.)

⁸⁷) *Ibid.*, fol. 108b. Here Giles distinguishes between Proclus and the author of *Liber de causis*. «Hoc est ergo quod ait Proclus in octagesima septima propositione libri sui. Quod omne enter ens aut est ante aeternitatem aut est in aeternitate aut participans aeternitate. Et in secunda propositione de causis scribitur omne esse superior, i.e., omne esse excellens sive esse enter aut est superior aeternitate et ante ipsam aut est cum aeternitate aut est post aeternitatem, i.e., attingens aeternitatem et supra tempus. Et ut patet in commento in primo gradu est Deus, in secundo est intelligentia, in tertio est anima». In *In Lib. de causis*, prop. 2H, fol. 7, he puts his finger on a like difference: what the unknown author calls *esse superius* and its three degrees Proclus in proposition 87 calls *esse enter*. It seems certain that Giles had available William of Moerbeke's translation of Proclus. The identical expressions employed by Giles are referred to by Aquinas as he deals with the second proposition of *Liber de causis* («Omne esse superius aut est superius aeternitati...»): «... sciendum est quod haec propositio in libro Procli LXXXVIII congrua invenitur sub his verbis: *Omne enter ens aut ante aeternitatem est aut in aeternitate aut participans aeternitate*»; l. 2, n. 51. Incidentally, Giles's numbering of this proposition as 87 rather than 88 disagrees with the numbering in Aquinas and in Dodds's critical text (*op. cit.*, p. 80). This variant numbering is probably due to a copyist of Giles's original manuscript; or it is not impossible that Giles may have used a copy of Moerbeke with incorrect enumeration (two manuscripts of Moerbeke dating even from around 1300 contain numerous errors: DODDS, *ibid.*, p. xlii).

To return to doctrinal concerns: In *In lib. de causis*, Prop. 2E-F, fol. 7, Giles

foot planted in eternity and the other in time. Insofar as his intellectual soul is able to subsist on its own, unaffected by the breakdown of matter, it enjoys an eternal *esse*. The bodily side of man controlled by the laws of nature is measured by physical time. Because of its union with the body, even the human soul is in some way related to time⁸⁸). These preliminary distinctions set down the direction

says that God is above eternity and above time; souls are after eternity and above time; and corporal entities are neither above eternity nor above time. Both intelligences and souls generally participate in eternity, but only souls specifically participate in eternity. Intelligences «*parificantur aeternitati*» (Prop. 2C, fol. 6) whereas souls merely participate in it, i.e., their occupancy and sharing in eternity is of the minimal and lowest order. So also *In phys.*, IV, l. 25, fol. 108b: «...*intelligentia parificatur aeternitati, est in aeternitate. Anima vero participat aeternitatem et attingit ipsam*».

Whereas *In phys.* deals with the human soul as the third rung of the eternal, *In lib. de causis* (prop. 2C, fol. 6), we may note also, concerns itself with the souls that are «*motores orbium*». These «*animae caelorum*» are not really souls in the natural-philosophical sense but lower-order pure intelligences or angels commissioned to administer bodies. Their number is not limited to the spheres to be governed; there are myriads and myriads of intelligences (prop. 3M-O, fol. 11). Each of these «*animae orbium*» intuitively knows its own essence with its innate species, influences human souls by leaving its causal stamp on their bodies, and operates more stably than human souls. A «soul» of this sort impresses motion on a particular sphere, but the human soul gives *esse* to its body by informing it. Cf. prop. 4D, fol. 14; prop. 5R, fol. 21-22; prop. 11B, fol. 39; prop. 15B-C, fol. 48-49; prop. 15H-I, fol. 50; prop. 19G-I, fol. 64.

⁸⁸) *Ibid.* The consideration in *I Sent.*, where the problem of eternity is treated *ex professo*, is somewhat more nuanced. (i) What is eternal has three notes in its *ratio*: it is interminable, invariable, and simultaneous (d. 8, q. 2, a. 2, fol. 49H-I). (ii) Only God is most truly and maximally eternal. Other beings, insofar as they share in invariability and immobility, share in His absolute eternity; *ibid.*, fol. 49L. (iii) From the standpoint of what is signified, eternity belongs «*potissime*» to God. But from the standpoint of the mode of signifying, which implies participation, God must be said to be super-eternal and ante-eternal (*ibid.*, a. 3, fol. 49O-Q). Participated eternity and time differ on three scores. (a) Eternity measures permanent beings while time bears on successive beings. (b) Succession bespeaks the prior and posterior, which yield the number of nows in time, but eternity is nonquantitative. (c) The soul is necessary to actualize or make the formal being of time, whereas the soul has nothing to do with making the *esse* of eternity (*ibid.*, d. 19, q. 2, a. 1, fol. 106B-E). A propos of this last point *In lib. de caus.*, prop. 30X, fol. 104, also lists three differences between eternity and time. (a) Eternity is a standing duration and time a fluent duration. (b) Eternity is *tota simul* while in time there is «*hoc ante hoc*» or spreadoutness and succession. (c) Eternity is simple but time has parts prior and posterior. These differences match those listed in *I Sent.* but pass over in silence the actualizing role of the soul in time. See the edition (reprinted by Minerva G.M.B.H., Frankfurt, 1968), *Primus Aegidii Romani Sententiarum*, Venice 1521).

that an answer to the *dubitaret* has to follow. Because materially composed, the substantial *esse* of mobile things cannot lay claim to a measure transcending time. Because its identity is marked by permanence, the substantial *esse* is measured not by time but by the now of time. In contrast to the *nunc stans* of eternity that makes absolute or participated eternity, the *nunc fluens* that makes time is always linked to transmutability and motion. In addition, as we remarked a few lines back, mobile things, though permanent, are measured by time accidentally, i.e., in virtue of being associated with the main natural feature that is successive — motion ⁸⁹).

The lack of proper scientific instruments such as the telescope kept the medievals from thinking beyond and sloughing off theories of the heavens, mainly Eudoxian and Ptolemaic, whose central tenet maintained that the heavenly spheres and bodies were incorruptible. Thus Giles concurs with Aristotle in the opinion that perpetual beings, things that go on always, cannot be contained in time ⁹⁰). What is in time is caught within the net of a finite time, but what is naturally perpetual has an infinite duration that puts it outside the mensurational meshes of time. The autonomy of the heavenly bodies with regard to time is indicated by the fact that to all appearances they are unscarred by the wear and tear that time inflicts upon ordinary beings of nature. As observed for century after century, the heavenly bodies have been wheeling in their courses with unbroken constancy, with not the slightest evident sign of a diminution of their matter or alteration that might herald their decline and disaggregation.

(v) Things that are necessarily nonexistent, i.e., beings that are impossible, are also outside the jurisdiction of time ⁹¹). What we know as an impossibility is not measurable by time, for time can encompass only beings of a limited duration. Generables and corruptibles, in virtue of their linkage to motion, are included within time. They rise, flourish, decline, pass away. Before, they were not; afterwards they will cease to be; but their limited actuality between two nonexistences falls under time. But whatever cannot be is not, never

⁸⁹) Giles's view in *In lib. de caus.* (prop. 32C, fol. 109) confirms his earlier stand: «... nunc temporis mensurat substantiam subjectam motui... nunc autem aeternitatis mensurat substantiam subjectam illi [i.e., permanenti] esse sive illi operationi».

⁹⁰) *In phys.*, IV, l. 24, fol. 107b-c (under *Quare manifestum est*).

⁹¹) *Ibid.*, l. 25, fol. 108c (under *Manifestum igitur quoniam*).

was, and never will be : it lies outside the scope of time. Because, e.g., the diagonal commensurate with the side can never exist, it cannot be subject to time. The impossible diagonal is viewed as necessary and timeless because its opposite, the diagonal incommensurable with the side, necessarily and always exists and is therefore timeless ⁹²).

(vi) Because it is the proper measure of motion, time is in some sense a per se cause of corruption ⁹³). To guard against any philosophical fantasizing that might strictly hypostatize time as Chronos devouring her children, we must stress at once that time is a cause of corruption precisely and only insofar as it is a measure of motion. Rhetoric or literature gain permissible power and pungency in speaking of time as gnawing into the vitals of things and in holding the mirror up to the sad ravages wrought by time. But sober philosophical language must be satisfied with establishing that time as a measure is not a cause actively breaking down things but an extrinsic formal cause within which the destruction to which motion is naturally oriented unceasingly occurs.

One expression of the ancients goes : « Time is the wisest of all things ». The point is well taken in the sense that instant wisdom and instant science are the children of dreams. No matter what the science, art, or pursuit, a minimum amount of time is indispensable before anyone can be seriously recognized as among the « wisest » in a metier, i.e., as an accomplished worker or expert. Yet time is not a cause of learning but only a genetic factor, a material precondition, for enriching the mind. On the other hand, as connected with motion, time is more directly linked to oblivion and obliteration of knowledge through aging. Again, the novel and progressive, while occurring in time, arrive more in spite of time, for the longer a thing lives, the more it is hobbled by age. In short, because of its tie-in with motion, time is involved in the unmaking and destroying of sound and finished entities. We may take, in addition, as one solid sign of the disintegrative role of time the fact that while we are content to say that a dog died of old age, we are not comfortable with anything less than ascribing generation to some positive cause ⁹⁴).

The very meaning of time accounts for its linkage to corruption.

⁹² *Ibid.*, fol. 108c-d (under *Quaecumque quidem igitur*).

⁹³ *Ibid.*, l. 27, fol. 110b-c (under *Mutatio autem omnis*).

⁹⁴ *Ibid.*, fol. 110c (under *Signum autem sufficiens*).

Time is the number of motion, and it is proper to motion to put a distance or gap between the thing moved and its previous formality or disposition. In itself, motion is rather motion away from rather than motion toward; it is a decline from the prior form rather than a dispositive formation of the new. Yet the puzzlement expressed in a *dubitaret* is understandable: a motion that gets its name and species from the terminus *ad quem* that is generation would seem to be properly generative. Concretely, Giles answers, motion can and does achieve the finished form, yet the new determination does not spring from motion as such but from the efficient cause⁹⁵). Motion is doubly viewed: in itself and in association with an agent. Taken in itself or absolutely, motion inevitably tends to put distance between a thing and its previous formality and therefore leads to corruption. Considered with regard to an agent, it serves as a sort of instrument or organ of the active cause that impresses the new form. Motion de-specifies the old determination whereas the agent specifies the new determination. The recession from the old form flows from motion, while the accession to the new form flows from the agent. Hence motion does receive its specific impetus and impress from a per se efficient cause. A second *dubitaret* raises fresh doubt about a matter apparently settled earlier. If time is the number and measure of motion, if time is only the quantitative milieu, so to speak, within which change occurs, we seem to lapse into poetic license even when we guardedly call time a per se cause of corruption. Besides receiving the completion of its *ratio* from the soul, time is neither physically active nor passive — it has nothing to do with the making or un-making of things. Feeling the sting of this objection, Giles takes pains to further narrow the scope of time in corruption. From another point of view, he says, time plays a per accidens role in both corruption and generation⁹⁶). But there are various levels of incidental

⁹⁵) *Ibid.*, fol. 110c-111a (under *Quod quidem igitur*). Giles writes: « Quod autem [motus] faciat appropinquare et quod generet hoc non competit ei ut motus est [sed] ut specificatur per aliquod agens et est organum alicuius agentis ». Though there is no word-for-word resemblance, Giles's handling of this difficulty seems to reflect a conceptual dependence on Aquinas's answer to a like problem (albeit not explicitly posed): « Sed quod perveniat ad aliquam dispositionem hoc non importatur in ratione motus in quantum est motus, sed in quantum est finitus et perfectus: quam quidem perfectionem habet motus ex intentione agentis, quod movetur ad determinatum finem » (*In phys.*, IV, l. 22, n. 2).

⁹⁶) *Ibid.*, fol. 111a. The stringent limitations that Averroes imposes on the per

connection. The influence of time on generation is totally accidental: neither in itself nor in virtue of its linkage with motion does it have any proper connection with generation. But the accidental connection with corruption is only partial. In itself, time is accidentally corruptive, but in virtue of its concomitance with motion it is not accidentally corruptive. As joined to motion, time is per se corruptive *quodammodo*, in the precise respect that it numbers and measures motion. In brief, as mentioned earlier, time as measure of motion is no more than a formal cause of corruption. Inasmuch as it is not enmeshed in process and is unshakably uniform, time, we may add, seems to be no more than (but still no less than) an extrinsic formal cause of corruption ⁹⁷).

(To be continued)

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se corruptive role of time probably inclines Giles to reduce its per se function here. See *In phys.*, com. 117, fol. 191L: « Ex motu igitur invenitur generatio per accidens et corruptio per se. Et ex tempore invenitur utrumque per accidens: sed generatio per accidens accidentis. Tempus nam accidit ei cui accidit generatio ex motu ».

⁹⁷) Almost inevitably there also arises, at least marginally, the question: does time itself come to be and pass away? If the now must be in every case the term of a prior part and the principle of a posterior part, then time never passes away: there must always be a time prior to any one now and a time to follow upon any one now. Arguing for an eternal world apparently *ad litteram Aristotelis*, Averroes adds that if time passed away, it would be corrupted in time (i.e., time would exist after its supposed corruption); and that if time came to be, it would begin in time (i.e., there would be time prior to time). Furthermore, *a parte ante* every fresh generation demands a prior subject, no matter how far back we go in time. According to Giles, however, if we posit a mode of production outside of and superior to natural generation, we can conceive of a now that is only a principle of time and of a now that is only a term of time. In contrast to finite things composed of potency and act, God is pure and absolute act. Beings below the divine level properly cause motion and becoming, but God properly effects the existence (*esse*) of things outside Him. Whereas the line of secondary agents presupposes a prior subject and motion, divine causation operates without preceding motion or becoming. In immediately communicating *esse*, God produces things apart from the conditions of natural generation. God's immediate production of *esse* does not necessarily require a prior motion nor is it necessarily identified with a term of motion. Hence time can have a beginning; hence the world need not be eternal. For Averroes's account see *In phys.*, IV, com. 124, 198A-G; VIII, com. 6-7, fol. 342C-343D. In *In phys.*, IV, l. 26, fol. 109d-110b (under *Quoniam autem ipsum*) Giles raises doubts about a necessary endlessness of time and in *ibid.*, VIII, l. 2, fol. 180a-d (under *Si igitur factum*) claims that the divine communication of *esse* transcends natural causal conditions and makes a noneternal world conceivable.

In *ibid.*, VIII, l. 6, fol. 186d-188c, Giles picks up the thread again in a lengthy critique of three remaining attacks of Averroes against the tenability of a temporal

creation *ex nihilo*. First, Averroes contends that per se making supposes a mobile thing, since a thing comes to be from privation (which is absolutely nonbeing only in a per accidens manner). In reply Giles makes three points. (i) While a particular production requires a prior something or subject, in a universal production (in which the whole being is produced) something can arise *ex nihilo*. (ii) Nothing is not a subject in creation: something receives existence *after* nothingness. (iii) Through *esse*, the immediately produced effect of God, the becoming and motion of things are causally mediated. The converse obtains in other agents: their proper effect, becoming, causes *esse* through the mediation of motion. Secondly, Averroes maintains that creation in time ineluctably demands a God that is in potency, changeable, and conjoined to another thing (its effect) in act. Insofar as God's action is transient, Giles responds, it is not He but the things effected that betray potentiality. Insofar as His action is immanent, He is always « conjoined to His own interior act... ». God undergoes no change of mind because His eternally unchanging understanding and will decree that His creatures be produced in time. Thirdly, Averroes adduces eight reasons why a temporal creation cannot flow from a voluntary agent, which boil down to a single claim: we cannot conceive of an effect in time proceeding from an unchanged eternal will. As regards the immutability of the divine will, Giles answers: God's creative decree made in eternity remains unchanged; its effects are willed to occur in time, when and as God wills. As regards the intervening time supposedly required: this is not a real but an imaginary time since God makes real time along with the making of the universe. (Because the question of the eternity of the world bears only peripherally on the problem of physical time, we have merely skimmed the surface of Averroes's objections — some of which are searching and formidable — and Giles's extended rebuttal.)

A more mature and more assured Giles returns to this problem in all its nuance and knotty variety in *II Sent.*, d. 1, q. 13-14. The mind can travel along one of three possible roads. 1) The philosophers insist that a world run by natural causes has to be eternal. 2) Certain great theologians of the day marshal arguments purporting to demonstrate the diametrically opposite, i.e., a creation in time. 3) Faith informs us that the world began in time, Giles holds, but neither this proposition nor its contradictory seems demonstrable. 1) Twenty-two arguments (thirteen from Aristotle, seven from Averroes, two from Avicenna) are summarily presented in behalf of an eternal world, but in spite of their apparent power and sharpness all are corrupted by the false assumption that the divine agent operates along the same lines as natural agents. In short, these arguments miss the possibility of a truly creative cause. Giles details seven essential differences between divine and natural causation, which reduce to these propositions: as supremely independent, God causes *ex nihilo*, without need of a subject; He wills *ab aeterno* to produce certain effects in time — a time that begins only with the making of the cosmos. 2) Giles canvasses and counters seventeen arguments (more thorny than those of the philosophers) of the theologians, some of them of the stature of Bonaventure and Henry of Ghent. 3) Though the problem remains an insoluble *pons asinorum*, Giles leans more to the provable status of a temporal creation: « Non quod in hoc intendamus favere philosophis, sed ut appareat utrum rationes adductae contra hoc sint solubiles, vel sint demonstrationes, licet enim multo fortiores et validiores sint rationes aliquorum doctorum ostendentes impossibile esse mundum ab aeterno fuisse... quam ampulosae rationes philosophorum... neutrae tamen nobis videntur esse demonstrationes » (q. 14). We are using an incubulum minus foliation,

Opus super secundum librum sententiarum, Luca di Domenica, Venice, 1482. For a careful treatment of both analytical and historical features of *II Sent.*, see Placidus VOLLMER, O.S.A., *Die Schöpfungslehre des Aegidius Romanus* (Würzburg: St. Rita-Verlag, 1931), pp. 34-71.

It might be remiss not to mention here that in *Errores philosophorum*, one of his earliest writings (according to Koch, p. lxi, probably composed around 1270), Giles says a vigorous but less sophisticated nay to Averroes on questions bearing on the production of the universe. For his rejection of certain claims of Aristotle and corresponding positions in Averroes, see pp. 2-25 of this work edited by Koch (cited in n. 4 above).