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What is the Nature of the Distinction between Events and Processes?

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Abstract

A distinction of ontological category is often drawn between events and process, analogous to the distinction between particular spatial things and the matter from which they're made. The traditional arguments for the distinction arise from observations of the aspectual differences of verbs – e.g. 'pushed' and 'pushing' – made by Zeno Vendler and Anthony Kenny and then developed by Alexander Mourelatos. Mourelatos identifies a difference of apparent quantification in the nominalisations of sentences with aspectual differences of their verbs: 'Jones pushed the cart to the top of the hill' transforms to 'there was a pushing of the cart to the top of the hill by Jones' – a count-quantified sentence, whereas 'Jones pushed the cart for hours' transforms to 'there was pushing of the cart for hours by Jones' – a mass-quantified sentence. Mourelatos then takes these apparent differences to be metaphysically perspicuous, revealing a categorical distinction between events and process, where process is understood as the stuff of time. Rowland Stout offers a different articulation of the distinction, arguing that it is a distinction between events and *processes*, i.e. a distinction between two categories of particular.

I argue that both proposals have their merit; Mourelatos is right to treat process as the stuff of time, and Stout is right to recognise individual processes. Drawing on Thomas Crowther's work, who suggests that what is salient to the distinction are matters of form and differences in restrictiveness of boundaries, I go on to present an understanding of individual processes as dynamic, growing entities, and defend the position that recognises events and processes as belonging to distinct metaphysical categories. Kathleen Gill has levelled objections to the recognition of such a distinction, claiming that there are few grounds for regarding the distinction as genuinely metaphysical, and suggested instead that it is better understood as artifactual. I explore the notion of an artefact in relation to events and processes, and show that while the distinction does appear to be artifactual in the restricted realm of agent activity and action, it is not plausible to regard it as artifactual outside of this realm. I articulate the distinction between events and processes as one of a difference between completing and finishing, where completing is understood as coming to exemplify a sortal.

Declaration

I hereby declare that the work presented in this thesis is my own, and that any work done by others is appropriately cited.

Jasper Noel Simon Heaton

A handwritten signature in black ink, appearing to read 'Jasper', located below the printed name.

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Introduction

This is an essay on temporal ontology, not the ontological structure of time but the *occupants* of time – ‘time-fillers’, as they are sometimes referred to in the literature. Insofar as we recognise a temporal dimension to reality we suppose that dimension is occupied; this essay will participate in the debate over what the temporal dimension is occupied by. Contemporary metaphysics recognises three ontological categories of time-filler, the categories of *state*, *event*, and *process*. The nature of states will not be examined in this essay, and the category will be all but ignored in the discussions to come. We are concerned here with changes and with changing; though states, plausibly, depend on change for their existence in the sense of being caused by particular changes – a state of excitement may be the result of a change of location – their relationship to change would take us too far from the topic at hand.¹ In this essay I wish to examine the categories of event and of process, and the nature of the difference between the two.

Contemporary interest in process and processes has been precipitated by reflection on the difficulties associated with Donald Davidson’s analysis of actions as events. Davidson saw that when we speak of actions, of things agents do, the neatest semantic analysis of such sentences analyses them as quantifying over events – butterings, strollings, pushings etc. It is these temporal particulars that are described in the various ways we describe actions, and to which properties such as *slowly*, *deliberately*, *with a knife*, *in the kitchen*, *through the streets of Bologna*, and *at 2am* attach to. That is, a sentence such as ‘Jones buttered a piece of toast slowly, deliberately, with a knife, in the bathroom, at

¹ For an excellent discussion of states, and their relationship to events and processes, see Helen Steward’s *The Ontology of Mind: Events, Processes, and States*, 1997.

midnight' requires for its truth not just the existence of Jones, knives, rooms, and times, but butterings as well.

One interesting difficulty with Davidson's analysis emerges when one looks at how a sentence such as 'Sebastian strolled through the streets of Bologna at 2a.m.' may be true. We want to know what happened at 2a.m. – did Sebastian *start* strolling at 2a.m.? Not necessarily; the sentence supplies us with no information to settle this question, and may be true so long as the stroll that Sebastian took was *going on* at 2am. But then, *2a.m.*, along with being true of the stroll Sebastian actually took – a stroll that went from 1a.m. to 3a.m., say – would also be true of numerous other strolls that Sebastian might have taken that night – strolls that went to 3.30a.m., 4a.m. etc. What these various possible strolls have in common is *strolling*, and they, along with our original sentence, seem not to require the existence of any particular *event* for their truth, but just that Sebastian was doing some strolling (Hornsby, 2012, pp. 233-235). A second interesting difficulty is that certain adverbial modifiers do not fit well with Davidson's analysis. Comparative adverbial modifiers that generate the most pressing difficulties, such as in the sentences 'S *V*-ed more and more vigorously' and 'S *V*-ed with increasing speed', for such sentences denote things that change over time with respect to the degree with which they are F. Events, as changes, do not and cannot themselves change. There is thus an incompatibility between the two claims, that actions can be done more or less F-ly, and that actions are events (see Steward, 2012, pp. 377-380).

These difficulties are taken to show that alongside temporal particulars, events, we are compelled to recognise the existence of temporal stuff, process or activity. Outside of the philosophy of action, the philosophy of physics and the philosophy of biology are two other areas in which it is seen as important to recognise the existence of process. Further pressure for doing so comes simply from reflecting on the structure of time itself. Alongside being both dense and

continuous, time is *dynamic*; it flows and has a direction, and it is reasonable to want our temporal ontology to accommodate this.² This much at least I shall assume, then, that time exhibits what McTaggart coined the A-series features of *past*, *present*, and *future* (McTaggart, 1908, p. 458), and that time is asymmetric about the present in terms of fixity – the past is fixed whilst the future remains open (Diekemper, 2005, pp. 6-11). Stemming from this, then, and relevant for the discussion later on, I shall assume that reality exhibits genuine temporal *becoming*, that the future comes to be (see Dainton, 2001, pp. 68-69, McCall, 1984, pp. 172-173, and Savitt, pp. 6-7); as it's not strictly relevant to what I shall say later on, though, I am silent on what the best model of temporal becoming is.³ What I hope to impress, though, is that temporal becoming affects our understanding of the processual stuff of temporal reality that we'll be exploring.

I should say, finally, that I shall not be participating in the debate over material constitution, over whether a substance is something distinct, something non-identical with the matter from which it is made. I shall confess now to holding a view of by which a substance is identical with its constitutive matter, but nothing I say in the discussion to come should hang on whether one takes one side of this debate or the other. Concerning the distinction between events and process, and, particularly, between events and processes, I shall endeavor to show that what is metaphysically primary is *form* – whether one is convinced by arguments for the non-identity of substances and their constitutive matter that turn on the modal properties and persistence conditions a substance has in virtue of its form is not relevant to what I have to say.

Following a discussion of why we should recognise process as the ongoing stuff of reality, my goal is to assess whether there is a firm metaphysical basis for recognising a distinction between

² For a thorough overview of issues surrounding the direction of time, see Craig Callender's *What is 'The Problem of the Direction of Time?'*, 1996.

³ For some discussion of this point, see Storrs McCall's *A Dynamic Model of Temporal Becoming*, 1984, and James Harrington's *What 'Becomes' in Temporal Becoming?*, 2009.

events and processes, two types of temporal particular. The essay will proceed as follows: chapter one will examine two notable cases for the recognition of a distinction of metaphysical category in the realm of time-fillers, those of Rowland Stout and Alexander Mourelatos, and conclude with a more general discussion of the ontology of stuff; chapter two will assess the claim that processes are homogeneous, and bring in Thomas Crowther's work on boundaries which I shall then add to with considerations concerning temporal becoming, and finishing with a closer look at the relationship between processes and objects; chapter three will consider Kathleen Gill's scepticism towards the putative distinction, assess the idea that events may be artifactual particulars, and explore whether there is a genuine difference between finishing and completing. I hope, ultimately, to conclude that there *is* a genuine difference of metaphysical category between events and processes.

Chapter 1

Matter

1.1. Events & Processes

There is an intuitive difference between what's completed and what's not, between what's bounded and what is unbounded, and between what's stable in time and what is not. This difference is represented in language; we speak of what is, or was, or will be *happening*, and what has or will have *happened*. This observation is the starting point for Rowland Stout's case for recognising a distinction of metaphysical category; that which is/was/will be happening he calls a process, and that which happened/will happen/will have happened he calls an event (Stout, 1997, p. 19). The linguistic distinction marked here is a distinction of what is known as aspect. The aspect of a verb predication encodes interesting and important connotations of the associated goings-on, typically explicated as the expression of the temporal character of the goings-on denoted by the verb phrase, of how those goings-on relate to and are immersed in the *flow of time* – a separate feature from tense, which concerns where goings-on are located on the timeline, i.e. whether the denoted goings-on are past, present, or future. The proposed metaphysical distinction is the distinction between events and processes.

Stout begins by stipulating that processes are associated with the imperfective aspect and events are associated with the perfective aspect. We are then asked to consider a comet hurtling into the sun, and the truth 'a comet is hurtling into the sun'. Here, the verb 'hurtle' occurs with an imperfective aspect – the comet's hurtling into the sun is something ongoing, something that is happening, and so is, according to Stout, a process. Once the comet has impacted into (and been vaporized by) the sun, then a comet has hurtled into the sun (and been vaporized by it); then we have the truth 'a comet has hurtled into the sun'. Here, the verb 'hurtle' occurs with a perfective aspect – the comet has *hurtled* into the sun, it's hurtling into the sun has finished and, moreover, has

been completed. An event has happened – a comet has hurtled into the sun. The event is the completion of the process (Stout, 1997, p. 20). Crucially, Stout thinks this is more than a mere descriptive difference, and what I will call an argument from interruption – essentially an argument from Leibniz’s Law – is deployed to make the claim of a difference of metaphysical category.

Switching the example, Stout asks us to consider the decaying of an apple. The decaying of an apple could be described as a process, as something that is happening and, perhaps, has been happening for a week or so now; or it could be described as an event, as something that happened and, perhaps, caused me to begin to study biochemical reactions (*Ibid*, p. 21). So we have the process of the apple decaying, and we have the event of the apple decaying. The decaying of the apple *qua* process goes through a series of stages, but it is, claims Stout, the very same process going on at each of these stages. Suppose that, after four days of the apple sitting on my windowsill rotting, before it has completely rotted, I put it in the freezer and so interrupt the process of decaying. This does not, according to Stout, affect the identity of the process at the earlier stages of decaying prior to my interruption; in Stout’s words,

“...what was happening before the interference is not affected by whether or not the interference occurred.” (*Ibid*, p. 21)

Though whether or not there is a process of the apple’s decaying isn’t affected by whether or not there is an interruption, whether or not there is an event of the apple’s decaying *is* affected by whether or not there is an interruption; specifically, if I put the apple in the freezer, the event does not happen. How can it? I have put the apple in the freezer. What happened when the interruption occurred is not the same as what would have happened had the interruption not occurred. The salient point is that the process of the apple’s decaying was interrupted, but the event, the event of the apple’s decaying, was not interrupted – *that* event did not happen, it is not, as it were, there to be

interrupted. What was happening before the interruption, the process of the apple's decaying, *is* the same thing that would have been happening if the interruption hadn't occurred – the decaying process would have continued to go on – and so it is perfectly appropriate to say that it, that *that* very process, was interrupted. Given that the process could be interrupted but the event could not, the process of the apple's decaying and the event of the apple's decaying cannot be literally identical (*Ibid*, pp. 21-22).⁴

The argument here, alongside purporting to show that events and processes belong to distinct metaphysical categories, is meant to pose a problem for what is known as the stage-view of processes. According to stage-views of processes, a process just is the series of stages that it goes through. The essence of stage-views of processes is that they treat processes simply as mereological sums of discrete events. Dictionary definitions of processes typically give stage-view definitions; for instance, Simon Blackburn's *Dictionary of Philosophy* defines a process as, 'a sequence of events'. A number of distinct stages can be identified in the process of the apple's decaying– the infection of the apple by bacteria and fungi, the secretion of various enzymes, the break-down of sugars and starches etc; stage-views of processes would treat the apple's decaying as nothing more than this series of events. Though we might, in the absence of a greater capacity for expression, describe processes using event-talk, doing so obscures a chief motivation for recognising the category, the belief that reality flows. Moreover though, Stout thinks the fact that processes such as decaying can be interrupted highlights tensions in stage-views, for, if we are to take talk of interruptions at face value, there is the question of what, exactly, it is that's being interrupted. The later stages of the process are not interrupted if I put the apple in the freezer, for – like the event mentioned above – they do not happen and so are not there to be interrupted. Similarly, the earlier stages of the process

⁴ Stout's argument from interruption is a variant of the initial motivating cases mentioned in the outset of this essay, whereby a person can be engaged in doing something – like crossing the street – but fail to do it because circumstances intervene.

are not interrupted – they happen. It is the process that is interrupted, not its stages. Therefore, the process is not identical to its stages (*Ibid*, pp. 22-23).

Helen Steward (*forthcoming*) has shown that Stout's arguments that events and processes belong to distinct metaphysical categories fail. As she points out, Stout's stipulation regarding the linguistic distinction appears to rule out the metaphysical distinction because, as she puts it, the following 'metaphysical-cum-semantic rule' – which I shall call Ongoing Events (ON) – seems to hold:

Ongoing Events; if an event, e , has happened by a time, t , and e was not instantaneous, then e must have *been happening* at some times prior to t (Steward, *Forthcoming*, pp. 4-5)

As for why (ON) rules out the metaphysical distinction Stout wants to argue for, Steward wants to say that it is because membership of metaphysical categories is disjoint, that if a belongs to the category ψ then it cannot also belong to the category φ . However, we do *not* typically think that membership of categories is disjoint; categories are hierarchically structured, where this structure is typically understood in terms of class inclusion (Westerhoff, 2004, p. 597) – the category of abstract objects, say, contains the categories of properties, numbers, sets, and so on. To be fair to Steward, she does say that it is *basic*, which I take to be understood as 'fundamental', categories for which we assume membership is disjoint; but equally, being fair to Stout, it is not evident that his claim is that events and processes belong to different *and fundamental* metaphysical categories. Another rule of thumb that Steward points to is that things belonging to one metaphysical category don't 'turn into' things belonging to another. Of course, one might, and rightly so, point out that some things do do exactly this – a child turns into an adult, a foal into a mare, etc. However, with such cases, the things that may belong at one time to one category and at another time another belong to some more general category that we can identify to which they belong throughout their entire lives – this is

precisely how we make sense of something belonging to one category turning into something belonging to another – riding roughshod over concerns of diachronic identity, it is the same human that turns from a child into an adult, the same horse that turns from a foal into a mare. Yet for events and processes, no such overarching category seems forthcoming (Steward, *forthcoming*, pp. 5-6). What (ON) shows us is that the distinction Stout wants to argue for is, when marked just by aspect, opaque to the understanding. Steward hazards that perhaps the thought is that a process ‘turns into’ an event, but Stout has more recently shown this is not his thought by suggesting that the relationship between processes and events is analogous to the relationship between people and their lives. People don’t ‘turn into’ their lives; a life is extended in time, it has stages, whilst a person endures through time, but the various stages of the life are as they are with regards to what happens to them in virtue of what happened to the person whose life it is (Stout, 2003, pp. 2-5 & 7). However (ON) again causes trouble, for a life is something that can be going on or gone on, can be either perfectly or imperfectly described, and so Stout’s analogy is not as clear as all that. Stout does go on to talk about ‘the event of the process’, which, sticking with the example, is the life there comes to be in the wake of a process of living (*Ibid*, p. 7). Still, this does not overcome the difficulty that (ON) raises for an event-process distinction as Stout would have us understand it. Now, there are, I believe, seeds of truth in what Stout has to say with regards to events being completed processes, and by chapter three, following the advancement of certain claims with regards to process, I hope to be able to say what those seeds of truth are. For now though, we must say that Stout starting point, aspect, obscures the distinction that he wants to make.

Underlying Stout’s argument from interruption against stage-views of processes is his view that processes are *endurants* (Stout uses the term ‘continuant’), things that persist through time, rather than *perdurants*, things extended over time and composed of temporal parts (Stout, 1997, p. 23, see also Steward, 1997, pp. 99-100, Sider, 2001, pp. 68-73, and McCall & Low, 2009, p. 278). Stout’s

claim is that processes can be interrupted but events can't because, when an interruption occurs, the event does not exist to be interrupted – at most, only a part of the event exists – but the process does. This is contentious. Returning to the case of the decomposing apple, there is, at least in terms of sense, nothing that prevents me from saying that the process doesn't exist to be interrupted, and that only *part of* the process exists when I come to put the apple in the freezer. Stout, however, thinks it *would* be absurd of me to say this:

“There is something absurd about saying that at any one time while something is happening only part of what is happening is present.”

Because,

“What is happening at any moment during a process is the whole process, not just part of it.” (Stout, 1997, p. 25)

The trouble is, this last remark is tantamount to saying, simply, that processes are endurants – endurants just are those things that are complete, whole, at any moment during which they exist. But the first remark is patently not *absurd*. When an apple decays it does not decay in a moment; bacteria infect it, enzymes are secreted, sugars and starches break down, and it seems perfectly fine to speak of the decay in terms of these successive stages. Stout does seem to bolster his arguments that processes are endurants in his *The Life of a Process*, in which he cites our abilities to identify and reidentify processes; just as we can keep track of one and the same person throughout the different stages of their life, some of which may be troubled while others may be content, so we can keep track of one and the same process unfolding through its different stages, some of which may be frantic and others lackadaisical (Stout, 2003, pp. 5-7). Unfortunately, Stout's prime defence of his endurantist picture of processes, just as it is for his endurantist picture of persons, seems to be a

firm bang of the fist on the table (*Ibid*, p. 3), and it is completely contestable whether it really is nonsensical to identify these things not as endurants but as perdurants, temporally extended things.

Steward's diagnosis is that Stout has confused the claim that at any one time while something is happening only part of what is happening is present with another claim that admittedly is absurd, namely that at any one time when something is happening only part of what is happening is happening. But this latter remark is absurd not because processes are or are not endurants, but simply because it contradicts itself; the first part of the remark states, at least implicitly, that some *whole* thing is happening, whereas the second part states that only a *part* of this whole thing is happening (Steward, *forthcoming*, pp. 12-13). Thus if I hold a perdurantist view of processes, I can coherently deny Stout's argument that that a process can be interrupted shows us that processes must be endurants, because I can simply say that only a part of that particular process was there, and I can do so because I can coherently say that at any one time while something is happening only part of what is happening is present. Stout wants to insist that the entity referred he refers to when he speaks of the apple's decaying would still have existed even if it had been interrupted; but to say this is to say that processes are endurants, and this is precisely the claim being argued for (*Ibid*, p. 10). In short, I would only accept Stout's argument if I already held his view.

Steward points out that she thinks Stout *is*, ultimately correct insofar as he thinks there is an important distinction between events and processes (*Ibid*, p. 14); his arguments both for the categorial distinction and for the view of processes as endurants are simply unsuccessful. Nevertheless, Stout's case is not without merit. The intuition that there is something different between what is ongoing and what has gone on is, as was shown at the outset of this essay, a venerable one, and it is this that evidently drives his arguments from interruption and his arguments against stage-views of processes. Crucially, Stout's focus on *particular* and *individual* processes stands

him in stark contrast to the case for an event-*process* distinction we shall move to look at next, the case put by Alexander Mourelatos whereby process is envisaged as the stuff, the matter of time. Stout rejects this understanding of process precisely because he thinks we can and frequently do identify and reidentify discrete, individual processes – for example distinct travellings to work – and a stuff view of process, he thinks, rules out this possibility (Stout, 2003, pp. 5-6). His conception of processes as endurants seems to be chiefly motivated by the thought that processes can be said to change, and so – in keeping with the classical view of change as something that happens to an enduring subject – there must be a subject of change (*Ibid*, p. 7). By the end of this chapter, I will hope to have shown that Stout is in a sense absolutely right to treat with individual processes. The mistake I think he makes is simply to do so from the outset, and to think that a stuff view of process rules out doing so; the road to individual processes is a little longer than Stout would have one think. As for a view of processes as continuants, the arguments presented are simply unconvincing and, as we shall have seen by the end of the second chapter, not necessary for securing the claim that processes change.

1.2. Events & Process

A better way to understand the event-process distinction is to understand it via an analogy with the substance-matter distinction found in the spatial realm. It is this analogy, and the distinction between events and process it suggests, that shall henceforth be the main subject of this essay. To begin the discussion, I shall spell out how the analogy is made.

1.2.1. Action and Actuality

In the mid 20th century, contemporary philosophy turned its attention to verbs and, in particular, to how the concept of time factors in to the rules of use for verbs. Of course there are relevant factors in verb usage that concern the past, present, and future, but the new wave of investigation went beyond this to consider how what is denoted by the various verbs fits in to what we might call the flow of time. Discussions here typically start with Anthony Kenny and Zeno Vendler. Kenny and Vendler both were interested in how findings in this area might dictate to our understanding of the various kinds of actions the different verbs are associated with.

Conceptually, much of Kenny's and Vendler's investigations pertain to the notion of completeness, to whether the action denoted by the verb moves towards some specific terminus point or not, or indeed whether the notion of movement is relevant at all. In his article, Vendler proposes a number of tests one can perform to aid placing a verb within his topography (Vendler, 1957, p. 144-147). Does the verb admit the continuous tense? Does a verb admitting the continuous tense necessarily progress towards a 'climax', aka a telic point? Could the verb occur as a part of a sensible answer to the question 'what are you doing?', 'when did you do it?', or 'for how long did you do it'? Depending on the answers to these questions, a verb will be placed in one of the four categories of Vendler's topography, typically rendered as follows:

Activities

Run

Walk

Accomplishments

Run a mile

Paint a picture

| | |
|---------------------|----------------------|
| Swim | Grow up |
| Push | Recover from illness |
| Write | Write a letter |
| <i>Achievements</i> | <i>States</i> |
| Recognise | Desire |
| Find | Want |
| Win | Love |
| Start/Stop/Resume | Hate |
| Be born/Die | Dominate |

Vendler's topography differs from Kenny's in that Vendler distinguishes achievements from accomplishments whereas Kenny amalgamates the two into a single class, *performances*. What unites the two (Vendler-) distinct categories is that they have results, something's being found, say, or something being produced. Nevertheless, Vendler distinguishes between two kinds of performances in virtue of how the two fit into the temporal stream; accomplishments occur *over* time – it takes me half an hour to run a mile, for example – whereas achievements occur *at* a time – I won the race at 3.15pm, Tuesday the 3rd.

Figuring centrally in Vendler's analysis of verbs is what is sometimes discussed as the completeness test, the phenomenon that certain verb predications in the progressive tense entail their perfective counterparts. Activities are then said to be those types of action such that if S has been *V*-ing throughout t^1 - t^0 , S has *V*-ed at every moment throughout t^1 - t^0 . This way of getting at the distinction between activities and accomplishments looks to mirror Aristotle's completeness test for his famed distinction between *kinêsis* and *energeia*, movements and actualities, where *energeia* are

classified as those verbs that pass the completeness test. Other actions, *kinêsis*, are *limited*, or have a *limit*, where having a limit is being related to a completion, a terminus or end-point that in some sense causes the action to cease (Bk. Δ, p. 32). Limits are ends – they are the answers to questions of ‘why are you *V*-ing?’ – and limited actions are means to those ends. Contrast seeing with slimming; if I am seeing, then, necessarily, I have seen, whereas if I am slimming I have not necessarily slimmed. Seeing may be achieved and ongoing, whereas once I have slimmed – slimmed down to my desired weight or mass that is – slimming will be at once both completed and ended. Limited actions are movements, *kinêsis*, and unlimited actions, those like seeing, are actualities, *energeia* (Bk. Θ, p. 234). Aristotle gives a number of examples of instances of each category:

Actions

Movements (Kinêsis)

Actualities (Energeia)

| | |
|-----------------|------------|
| Reduce | See |
| Become healthy | Be wise |
| Learn | Understand |
| Walk | Be happy |
| Build (a house) | Live well |
| Move | Be pleased |

Aristotelian limits correspond to what we nowadays call *telic points*. Telicity is a feature of verb-phrases pertaining to the presentation of a phrase’s associated occurrent; a verb-phrase is said to be telic when it presents its occurrence as having reached or else as progressing towards some completion- or end-point, where ‘completion’ means more than just ‘finishing’, and atelic when it

does not. Though telicity is a property of verb-phrases, the end-points it denotes properly attach to the phrases' associated occurrence. Occurrences associated with telic verb-phrases are limited; 'S is walking to the shop' is telic because it presents the associated activity, S's walking, as progressing towards the completion-point of S's reaching the shop. Occurrences associated with *atelic* verb-phrases are not; 'S is walking around' is atelic because S's walking is not progressing towards any telic point. Telicity has some representation at the logical level then, for it manifests in the entailment relations between verb-phrases of certain tenses; telic verb-phrases should fail the completeness test, and atelic ones should pass it.

There are discrepancies between Aristotle's classifications and the Kenny-Vendler classifications. Most perspicuously, 'walking' is, on the Kenny-Vendler analyses, a paradigmatic activity verb, and 'S is walking' a paradigmatic atelic verb-phrase. On the Aristotelian picture though, 'walking' is a *kinêsis* verb. Similarly, 'understand' and other such verbs of intellectual perception, which on the Aristotelian picture are *energeia* verbs, can occur in contexts that make them *kinêsis* verbs, e.g. 'and then I understood', such as I might utter when I had been trying for some time to understand (Ackrill, 1965, Taylor, 1977, Mourelatos, 1978, & Graham, 1980). Either something has gone wrong in either the Kenny-Vendler or the Aristotelian classifications, or else the schemas are not classifying the same things.

Daniel Graham has argued convincingly for the latter conclusion; contrary to received wisdom, Aristotle's completeness test is not identical to the completeness test proposed by Vendler. There are superficial differences between the way the perfect tense functions in English and in Greek, and between the employability criteria for what is known as the perfect of result, that stymie the identification of the two completeness tests. The perfect of result is employed when something that happened in the past resulted in an enduring state still on-going at the present time. English has

the option of deploying an *experiential perfect* to encode certain past occurrences, such as is denoted in utterances like ‘I have already walked today’, that do not produce any actual enduring state and so instead are encoded in an experience of the subject; Greek, Graham points out, lacks the experiential perfect, and so Greek perfects will often express something that the English experiential perfects cannot, a genuine, resulting state, such as the state of being in some place (Graham, 1980, pp. 124-125). There is a deeper, philosophical difference underlying the discrepancies though. In virtue of Aristotle’s teleological picture of reality, verbs denoting certain types of activity, what we might call dynamic activity, activity doesn’t just go on but develops or unfolds – walking as opposed to seeing, say – is always unfolding *towards* something. According to Aristotle, *kinêsis* verbs always have a ‘whence and whither’, the form of the action that is the temporal correspondent of the form of spatial substances. One is never merely walking, for example, but always walking *to* somewhere or *for* some reason, i.e. to *realise* something, and *kinêsis*-verb predications that do not specify a whence and whither are incomplete predications. It is activities that correspond to what we, and Kenny and Vendler, call states that comprise Aristotle’s *energeia*, because they, and not dynamic activity, contain in them their own end. Now, activity, understood in the Kenny-Vendler sense, is atelic, in that one can engage in activity and be directed no end whatsoever; *energeia*, as Aristotle presents them, are autotelic, constituting both ongoing engagement and at the same time fulfillment of the action being done. It is Kenny-Vendler states that behave most like Aristotle’s *energeia*, not Kenny-Vendler activity. Thus we can see that the explanation of the various discrepancies noted above is that the two completion tests test for different things; Kenny and Vendler are interested, in part, in discriminating performances from mere ongoing, undirected activity, whereas Aristotle, not recognising undirected activity, was discriminating between performances and states (see Graham, 1980, pp. 128-129, and Mourelatos, 1993, pp. 386-387).

1.2.2. Alexander Mourelatos

Mourelatos pointed out that whilst Kenny's and Vendler's classifications were made by considering the aspectual behaviour of verbs – even if they themselves did not quite realise that aspect was what they studied (*Ibid*, p. 418) – their focus was overly narrow, for it only considered verbs as lexical types. This resulted in unnecessarily rigid verb classifications that were unable to account for the full range of verb uses. For example, Vendler classifies 'know' as a state verb and so rules out the use of 'know' in the sense of an insight, an achievement, similar to what was pointed out in §1.2.1 with regards to 'understand'. Widening the field of view to encompass the verb predication as a whole, alongside considering the numerous factors that contribute to their sense, results in a more fruitful analysis of verbs that is sensitive to their multivalent uses (*Ibid*, p. 419). Furthermore, once the predication as a whole is in focus, the relevance of aspectual features in particular become much clearer.

The aspect of a verb predication encodes interesting and important connotations of the associated goings-on, typically explicated as the expression of the temporal character of the goings-on denoted by the verb phrase, of how those goings-on relate to and are immersed in the flow of time – a separate feature from tense, which concerns where goings-on are located on the timeline. Thus, as Helen Steward points out, I might present an occurrence as still ongoing even though it may be wholly past, e.g. 'yesterday, my friend was telling me about their current research project (1997, pp. 85-86). Primarily, aspectual differences pertain to whether the goings-on denoted by the verb-phrase are presented as complete wholes and so 'from the outside', so to speak, or whether

they are presented ‘from the inside’, and so as still, in some sense, ongoing;⁵ these two senses are called the perfective and the imperfective aspect respectively. Aspect reaches deeper than just to the mode of presentation though; it is represented at the semantic level. Consider the following:

- i. I was writing my thesis yesterday
- ii. I wrote my thesis yesterday

The two senses represented by (i) and (ii) are called the perfective and the imperfective aspect respectively. Aspectual differences are borne out by differences in entailment relations, adverbial modifications, and the behaviour of the predication in connection with tense. Beginning with entailment, (ii) entails (i) but (i) does not entail (ii), and can only do so with further modification, such as ‘and I finished it’. As for adverbial modification, we can see that the adverb ‘for hours’ attaches properly to (i) but not to (ii), whilst the converse is true with the modification ‘and it took all day’. Finally tense, (i) has a present-tense equivalent – ‘I am writing my thesis’ assigns to the present what ‘I was writing my thesis’ assigns to the past – whereas, and insofar as (ii) has a present-tense equivalent, something like ‘I write my thesis’, we have a subtle shift in meaning; ‘I write my thesis’ seems incomplete without some adverb expresses periodic recurrence, e.g. ‘every three years’, so that we are now talking about a habit, not a single action. The point is that a predication’s aspect is the result of the interplay of a number of factors; the subject or object of the verb, the verb’s inherent meaning, appropriate adverbial modification, and tense-as-phase and tense-as-reference all can contribute to the aspectual character of a verb predication (Mourelatos, 1978, pp. 418-419 & 421, and Steward, 1997, pp. 84-87).

⁵ That a temporal particular picked out by a sentence with perfective aspect can also be picked out by a sentence with imperfective aspect goes some way to explaining why tracking the event-process distinction via aspect, as Stout does, obscures what the distinction between the two categories is meant to amount to.

The aspectual differences of process-activity predications and event-performance predications are taken to manifest categorial differences of the underlying ontology of the predications, differences that are revealed via the use of nominalised transcriptions of the original predications (Mourelatos, 1978, p. 424). When a verb predication is nominalised the governing verb becomes something like a noun, and the predication is transformed into an explicit quantification. To see this in action, consider the transcriptions of two paradigmatic event-performance predications:

- a) Mount Vesuvius erupted ↔ There was an eruption of Mount Vesuvius
- b) Mary won the race ↔ There was a winning of the race by Mary

And now consider the transcriptions of paradigmatic process-activity predications:

- c) Sol converted hydrogen into helium for billions of years ↔ For billions of years there was converting of hydrogen into helium by Sol
- d) John pushed the cart for hours ↔ For hours there was pushing of the cart by John

Mourelatos draws our attention to the fact that the transcriptions of event-performance predications feature what are known as count terms, whereas the transcriptions of process-activity predications feature mass terms (*Ibid*, pp. 425-527). It is the categorial distinction between what mass terms are true of and what count terms are true of that Mourelatos takes aspectual differences to manifest; mass terms are true of stuff, count terms are true of things, of substances. Mourelatos thinks the implications are clear, for if mass and count nouns pick out genuinely different categories of entity in the spatial realm, the thought must be that mass and count verbs pick out genuinely different categories in the temporal realm; event predications and process predications thus commit us to different categories of entity. With this on the table then, Mourelatos makes his analogy between

matter and things in the spatial realm and process and events in the temporal. In order to spell out this analogy, it is first necessary to review distinction between mass-terms and count-terms.

1.2.3. Mass Terms & Count Terms

The ontological distinction between stuff and things is represented in natural language by the linguistic distinction between mass terms – terms that pick out stuff or types of stuff – and count terms – terms that pick out discrete entities. Typical examples of mass terms are those such as ‘water’, ‘wood’, ‘computer software’, and ‘knowledge’, and contrast with terms such as ‘lake’, ‘shack’, ‘computer program’, and ‘belief’, which are count terms.

The distinction appears to manifest both syntactically and semantically. Focusing on its syntactic manifestation, a notable feature of mass nouns is that they cannot be pluralised without shifting the meaning of the term; to shift from talk about wine to talk about wines suggests we are now discussing types of wine. A second notable feature of mass terms is their reluctance to take the indefinite article: if a friend were to tell me they had spilled a wine on my carpet, I would be initially perplexed; indeed, I could only make sense of their utterance by assuming they meant they had spilled some of a *type* of wine on my carpet. If my friend were to say they had spilled *a glass* of wine on my carpet, their utterance would be instantly understandable, because mass terms are, as mentioned, measurable, and ‘a glass’ is such a measurement; unlike count terms, which can take individuating quantifiers such as ‘each’, ‘every’, ‘few’, and ‘several’, mass terms take measurement adjectives such as ‘more’ or ‘less’ (Chappell, 1971, pp. 61-62, Mourelatos, 1978, p. 424, Pelletier, 2009, pp. 2-3).

Though the mass-count distinction is typically explicated in terms of nouns – as the preceding examples suggest – the distinction is relevant to the realm of verbs, as Mourelatos' transcriptions reveal. That said, the distinction as it pertains to verbs is perhaps a little more elusive than as it pertains to nouns. Let's once again review our first nominalised transcription of a process predication:

- c) Sol converted hydrogen into helium for billions of years ↔ For billions of years there was converting of hydrogen into helium by Sol

Extracting the nominal 'for billions of years there was converting of hydrogen into helium by Sol' and the purported mass-term 'converting', we can see that in fact we *can* treat 'converting' as a count-term; pluralizing 'converting' to 'convertings' does not shift its meaning to types of converting, and we can perfectly well say there were twelve, thirteen, fourteen convertings and so on. Most notably, if it was said that there was *a* converting of hydrogen into helium that Sol did, such an utterance would be perfectly intelligible. It does not take much work on our part as interpreters to make sense of 'converting' as a count-term; doing so does not lead us to nonsense as attempt to treat certain mass-nouns as count-nouns seems to do, even though it might strike us as initially a little odd to say that for billions of years there was *a* converting of hydrogen into helium by Sol (perhaps this is all Sol did for billions of years). However, with this point noted, that certain terms appear to have a dual nature with regards to the mass/count distinction, I set it aside as a point for the following sections.

What is salient for now is that treating a verb like 'converting' as it appears in (c) as a count-term forces a reading on us that we do not want to accept, that seems to distort the picture we were originally offered, and so alters in our minds the notion of what was going on. Just because we can treat a term as count-like doesn't mean we should. Certainly, doing so transgresses upon the

semantic manifestation of the mass/count distinction, for when we say there was *a* converting, we appear to pick out a discrete, particular thing, and this does not seem to be what (c) was originally getting at.

1.2.4. The Matter of Time

We are now sufficiently well placed to explicate Mourelatos' proposed distinction between events and process. In the light of the distinction between mass-terms and count-terms, and its applications in the realm of verbs as laid bare by the nominalised transcriptions of process-activity predications and event-performance predications, Mourelatos makes the following claim:

“Events thus occupy relatively to other situations a position analogous to the one objects or things or substances occupy relatively to stuffs and properties or qualities.” (1978, p. 430)

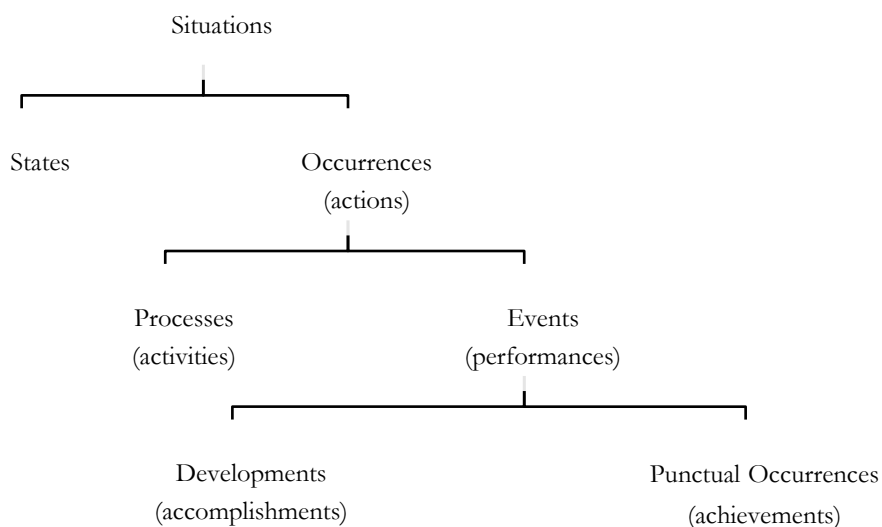
To review, in English we have verb-phrases that denote activity and we have verb-phrases that denote performances (and we have verb-phrases that denote states), and we suppose these linguistic distinctions correspond to genuinely different ontological categories. Moreover, these distinctions are not limited to goings-on in the human realm of agential action; natural goings-on intuitively differ in their natures too. Thus we get verb-phrases denoting natural-activity – i.e. process – and verb-phrases denoting natural-performances – i.e. events. If we examine the nominalised transcription of an ostensible activity-process verb predication and an ostensible performance-event verb predication, the nominals therein differ in a metaphysically significant way; nominalisations of ostensible activity-process predications are mass-quantified, nominalizations of ostensible performance-event predications are count-quantified. The conclusion is irresistible; our thought that

there are different kinds of goings-on, different kinds of time-filler was right; there is a metaphysical distinction between temporal matter and temporal particulars, between process and events.

1.3. A Tension

Mourelatos offers the following topographical representation of the ontology he's concerned with:

Fig. 1.



We can immediately see a tension between this topographical representation of the ontology and his more careful articulation of the process-event distinction via the analogy with matter and substance. The topography includes a category of *processes*, not process, which is subsumed under two domains – situations and occurrences – over which there is *count* quantification. This would suggest, then, going by the edicts of meaning of the topography's categories as given, that 'processes' here does not mean *types* of process, as a pluralised mass term would; instead, the best interpretation would

understand it as meaning particular, individual processes. As Jennifer Hornsby (2012) has pointed out, the understanding of processes that the topography seems to force on us is incommensurate with Mourelatos' claim that process is the temporal analogue of stuff and, in particular, his remarks on the individuation of stuff, whereby he says that,

“...just as we can collect and thus individuate stuffs into such extrinsic containers as bottles or lumps or measures, we can correspondingly collect and individuate activities into stretches, phases, stages and the like.” (Mourelatos, 1978, p. 430)

The trouble is, his topography doesn't make allowances for this. On the interpretation suggested by the topography, if, for example, Sol converted hydrogen into helium for eight billion years, then we would say that there was *an* eight billion year stretch of converting that was *a* process, *a* converting. The topography fails to capture the argued-for category of process, considered as temporal matter, stuff simply going on, and instead represents *processes*, to be considered as events 'broadly understood' (Hornsby, 2012 pp. 239-240).

1.3.1. Portions

The tension may be down to Mourelatos' failure to appreciate the complexities of the mass-count linguistic distinction and the corresponding matter-substance ontological distinction, and to properly distinguish between types and their instances. Though 'stuff' is a catch-all term in natural language, it has something of a precise meaning whereby we would say that water, wood, ash, sand, gold etc., are *types* of stuff. When used in this way, mass terms function as singular terms, naming types of stuff.

This function of mass terms contrasts with their use as general terms, the function at play when we

discuss portions of stuff located in space and time, when we say that things are made of stuff. In this role mass terms function, in a way, predicatively; they are true of things – the gold ring, the silver brocade, etc (Chappell, 1970, pp. 61-62). Failing to distinguish between the two uses can lead to confusion. Consider the following short dialogue:

- 'There's some stuff on your carpet...'
- 'What (type of stuff) is it?'
- 'Gold!'
- 'So there's (some) gold on my carpet?'
- 'Yes!'

Here, the second instance of 'gold' functions to indicate that there is a quantity of gold on my carpet, akin to saying that there's gold in Fort Knox. What's not on my carpet is the type itself; types are not the kinds of things that can be found on one's carpet. Rather, the second use of 'gold' denotes an instance of the type. Jennifer Hornsby has said that to say there is stuff of some type at a place is not to say there is any particular at that place (Hornsby, 2012, p. 237), but this does not seem to me to be right. With types come instances; when we say that there's stuff at a place and time, i.e. when we (can) *point to* stuff, we *are* saying that there's *some* stuff at a place and time – the 'some' is always implicit.⁶ For sure, to say that there's stuff of some type at a place is not to say that there's any particular *substance* at that place, but it *is* to say that there's some *thing* comprised of that type of stuff at that place. What's crucial is to be clear on what this thing is.

⁶ One must hedge this claim a little. There have been discoveries in atomic theory of numerous extremely short lived isotopes; an isotope of copernicium, for example, has a lifespan of approximately 34 seconds, and as copernicium is not a naturally occurring isotope, there will be spans of time – billions and trillions of years in length – during which there are no instances of copernicium to be found. But this, to my mind at least, demonstrates the importance of distinguishing types from instances – to say 'there are types' is not necessarily to say 'there are instances of those types'.

That mass terms may function either as singular terms or as general terms obfuscates the general point introduced in §1.2.3, that mass terms can't be used for counting and so do not denote particulars. It is true that a mass term like 'gold' does not provide criteria for individuation, nor pick out an individual thing in the way that a count term like 'cat' does, that sentences like 'one gold' and 'a gold' are ungrammatical and, indeed, that there is no such thing as one gold.⁷ These points hold simply in virtue of the grammar of mass terms. But, conversely, and as the above dialogue appears to imply, the grammar and surrounding informational context of a mass term may be such that, rather than indicating *types* of stuff, use of the terms indicate quantities, measures, or portions of stuff (Cartwright, 1970, p. 27). As Vere Chappell puts it, from the grammatical rules that prevent mass terms from behaving like count terms,

“...it does not follow that what 'gold' is used for or applied to, either as a singular or as a general term, is not one single thing, as individual and capable of being counted as any cat.” (*Ibid*, p. 64)

That is, mass terms are true of particulars just as count terms are. Crucially for what's to follow, if the things mass terms denote or else apply to are one, the question 'one what?' must be answered; it is here that the ontologist really enters the fray, for to ask the 'one what?' question is to effectively ask the question of what a mass term *qua* singular term names, and what a mass term *qua* general term is true of. Now, a 'one what?' question can only be legitimately answered by providing a count term, and when mass terms are functioning as singular terms, the required count terms needed for answering the question are easy to supply. Gold, to continue with the example, is a metal. Of course, 'metal' has a perfectly natural mass sense – we can happily say things like 'we need more metal for the building' or 'I'm angry, so I'm going to listen to a little metal'. But 'metal' also has a perfectly good count sense; in our answer to the 'one what?' question, it, like 'gold', functions as a singular

⁷ And if sense can be made of these expressions, it is only because we understand them as talking about types, e.g. one type of gold.

term – it is used, broadly, to name a type of stuff. Thus we might say that metal is a genus, of which gold is a species, in the domain of stuff (*Ibid*, pp. 63-64). So ‘gold’, when functioning as a singular term, names to a type of type.

Though ‘gold is gold’, interpreted as ‘gold is a gold’ or ‘gold is one gold’ – i.e. where both occurrences of ‘gold’ function as singular terms – is nonsense, Chappell’s further claim that ‘gold is gold’ – where the second ‘gold’ functions this time as a general term and the ‘is’ a copula, i.e. ‘gold is golden’ – is nonsense is not so straightforwardly true. Its truth depends on whether the thing named by ‘gold’ is a totality entity or not. If ‘gold’ named a totality entity, an entity that was the mereological sum of everything ‘gold’ *qua* general term was true of then ‘gold’ *qua* general term *would* be true of that entity, for the entity would be a giant, scattered lump of gold. That is, to say that ‘gold is gold’ is out and out nonsense is to say that totality-entity views of types are false. Quine affirmed, for a time, such a view (see his *Word and Object*, 1960, pp. 120-121). Few philosophers nowadays think the totality view right, or even tenable, and instead opt for treating types as (something like) universals, something along the lines of the view espoused by P. F. Strawson (see his *Particular and General*, 1953).⁸ I do not wish here and now to get embroiled in a discussion of the ontological nature of types, but will simply proceed as though, at any rate, I do not hold a view of them as totality entities.

With types come instances, the things – to stick with our example – ‘gold’ is true of. Importantly, not all the things ‘gold’ is true of are substances; ‘gold’ is also true of things like mere lumps or heaps, entities that the general literature describes as ‘less stable’ or ‘more fragile’ than substances. The relationship between these differing entities is an interesting one; a gold ring may be melted down into a mere pool of gold, and then reformed into a gold brooch (by a particularly

⁸ Part of the reason why philosophers do not think Quine’s view, or one like it, can be right is precisely because of examples such as the example of copernicium above – it seems true to say that there could be an isotope of the type ‘copernicium’, and that there could be more or less of it than there actually is, and totality views are unable to accommodate such truths (see Chappell, 1970, pp. 67-69). Of course, modal objections such as these would be unlikely to move Quine, but that’s beside the point here.

efficient foundry that doesn't lose a single drop of gold during reformations) – however the exact nature of the relationship between a substance and the lump of matter from which it is made is not here and now our concern. What we're interested in is the provision of an overarching term applicable to all the entities – fragile or durable – 'gold' is true of, to facilitate tracking the gold through such changes as it might go through; indeed, that a lump of gold may be at one time a ring, another time a pool, and another still a broach, show that terms like 'lump' and 'pool' are insufficient for such a purpose (Chappell, 1970, p. 65). Whatever catch-all term we settle on, it will have to be a term that is true of anything lump, nugget, ring, broach etc. are true of too – it must apply to any and every instance of gold. Chappell follows Locke, and Geach, in using 'parcel', differing from Cartwright and Russell, who both use 'quantity'. I will use neither, sticking instead with the term 'portion' which I have hitherto been casually using.⁹

As the need for such a catch-all term as 'portion' implicitly suggests, portions of stuff are not *just* portions of stuff – they are also lumps, or pools, piles, puddles, stretches, sacks, and so on.

Chappell puts the point this way:

“...in many cases – and it is true, I think, that in all cases – a parcel of stuff will also be something more specific than that, a ____ of the same kind of stuff, where the blank is filled with some count noun more specific than '[portion]'.” (Chappell, 1970, p. 74)

I agree with Chappell; I think that no portion of stuff is ever *just* a portion of stuff. However it is important to be clear on precisely what we mean by this. We are familiar with arguments for the non-identity of substances and their constitutive matter, such as the infamous case of the statue and the clay. If read carelessly, Chappell's points about portions seem to advocate the same kind of

⁹ Shieva Kleinschmidt has voiced not so much the objection but the claim that 'portions are never things', her reason being that she uses 'portion' just to mean 'stuff in a region' (Kleinschmidt, 2007, p. 409). It seems to me though that this can't be right. At least, to say 'there's stuff in a region' just *is* to say that there's a portion of stuff, at least as I understand the term 'portion'.

thing, that we must recognise a *third* thing, the portion, alongside the lump and the statue, say. This is not at all what Chappell had in mind, and it is certainly much too pluralistic for me. Hints can be found at the close of Chappell's piece, and in his arguments concerning matter and constitution, and his discussion of the Aristotelian view of this topic (see *Ibid*, p. 75, and 1973, pp. 685-692 and p. 695).¹⁰ The point of 'portion' (or of Chappell's 'parcel') is that it is a manufactured, catch-all *term*, not that it is in any way meant to introduce some further worldly *thing*, alongside lumps and substances. Chappell's use of the phrase 'will also be' is a little unfortunate – perhaps 'could also be called' or 'will also count as' would have been better choices of phrase. Following this clarification though, another worry can be raised. Helen Cartwright asks us to consider, on the one hand a brass ring that, following incremental *replacements*, becomes a gold ring, and on the other hand a brass ring that, following a touch from King Midas, becomes a gold ring. What distinguishes the two cases is that in the latter, but not the former, the brass of the ring *itself* changed. But because 'portion' is meant to cover *any* thing 'gold' – or any mass term *qua* general term – is true of, Cartwright thinks the use of 'portion' collapses the distinction between the two cases; using 'portion' in this way appears to entail that the ring and the lump of brass it was originally made from are *the same* portion of brass, that they are identical. That is, the proposal put forward by Chappell (and I) cannot distinguish between a substance that *alters* its material parts, and the matter from which a substance is made being *transformed* into another type of matter (Cartwright, 1972, pp. 173-174).

The point Cartwright makes here is indicative of what seems to be a deeper concern of hers, that the proposal on offer collapses the long-favoured distinction between a substance and the stuff from which it is made – such as is explicated with the traditional example of the statue and the lump of clay – a distinction she thinks is 'obvious' (*Ibid*, p. 373). If this is raised as a *worry*, then that is fine, for it seems that an advocate of this proposal must find something to say about the two cases

¹⁰ The success and accuracy of which I make no comment on here.

Cartwright cites. If, however, it is raised as an *objection* to the proposal, then, contrary to what Cartwright claims (*Ibid*, p. 374), it is question-begging. An upshot of Cartwright's discussion is precisely that it focuses our attention on how the various portions of matter are distinguished and categorised and, in particular, what distinguishes substances from 'mere portions', lumps, pools, wedges and so on.¹¹ After all, though every substance is a portion or a collection of portions of (various types of) stuff, not every portion of stuff is a substance. The trouble is that this remark now seems to beg the question in the opposite direction. The situation we're presented with is that of two camps firing shots at each other but not actually meeting in the field, and where one pitches one's tent will be more due to where one's intuitions lie than it will be due to any decisive arguments either way. And indeed, none of the preceding discussion suggests outright that the distinction between portions of stuff and other particulars is merely conceptual, that it depends *solely* on how we single out the various entities in thought; deflating the supposed distinction between matter and substance requires much more than simply observing that stuff comes in portions located at places and times.¹² Equally though, if one wishes to maintain a categorial difference between matter and substance, it is important to get clear on what differentiates portions of stuff *qua* pools, puddles, piles etc. and portions of stuff *qua* substances, parts of substances, and parts of parts of substances. It is this discussion that will occupy much of the remaining essay; for now, we can just say that what distinguishes substances from mere portions is that there's something intrinsically special about substances in virtue of which they can be counted, whereas mere portions are countable simply in

¹¹ Chappell seems to vacillate between considering mere portions of stuff as piles, puddles, bits, wedges etc. or as something less even than these – single grains, crystals, droplets etc. If I use the term at all, it will be as a catch-all for any portion that's not a substance.

¹² In noting this we can neutralise a criticism put by Kathleen Gill to Mourelatos' points on measuring process. Her worry is that when we measure process by means of extrinsic containers – as 'around the block' is to 'walking' – then, given that we now have something countable, the process has 'become' an event (Gill, 1993, pp. 22-23). But a measured portion of process need not be an event, any more than a measured portion of matter need be a substance. In both cases, something more is needed than *just* the fact that stuff has been measured to yield and event or a substance.

virtue of the (not entirely uninteresting) fact that stuff comes in instances and that those instances have a form, never minding what that form is.

To try and be clear, then, on what I'm trying to say here, I do not think it false to say that there is matter; I think it is ambiguous. Precisely, I think it is ambiguous between saying that there is a type/are types of matter and between saying that there is a portion/are portions of a type of matter. In natural language we often and easily slip between using mass terms as singular terms and as general terms, though it is typically made clear by the wider context of the conversation what use is being employed. In philosophy we aim, among other things, for exactness. The preceding discussion then can be seen as an explanation of why I think it is true that there is matter – it is true because there are types of matter and because there are portions of those types of matter. And the same goes, I think, for process – there *is* process, because there are types of process and portions of those types. Certainly, it seems that if we want to say, as proponents of the analogy between space and time do, that process is the stuff from which events are made, then we must recognise that if there is an event then there is a portion of process, an individual and particular lump of temporal stuff from which the event is made. I should note at this point, too, that I do not think this way of thinking about stuff in the context of process leaves no room for its progressive character, however the full answer as to why will have to wait until the second chapter.

To return, finally, the point that precipitated this discussion of stuff, the term 'processes' has an applicability, beyond types of processes, in denoting portions of (types of) process. Perhaps this was the use Mourelatos had in mind after all, but given the absence of a discussion of these various ontological issues surrounding stuff and things, I may just be being unduly charitable. Certainly, his topographical representation of the ontology as given is not commensurate with such a use of the term; 'processes' as it appears on his topography can only be taken to mean something akin to

'golds' or 'bronzes', as Hornsby points out. Worse than this confusion though, Mourelatos' topography does not at all represent the key idea behind the categorial difference of events and process, that process is the stuff of time and, more importantly, the stuff of events. Process is meant simply to be the ongoing stuff we seem happy to recognise, such as we do when we say someone is walking aimlessly, whereas events are meant to be more robust particulars formed out of that ongoing process. Though I think it the case that when we talk about there being stuff we typically talk about there being portions of it, particulars, there is some intimate relation between portions of process and events; Mourelatos' topography presents us simply with two categories of non-related particular.

Chapter 2

Process

2.1. Worries about Language

We now have a notion of process on the table as the stuff of time, the matter of events. Moreover, we have seen the need to recognise individual portions of process, and in so doing we have highlighted the need for a more detailed explication of what distinguishes what we can at this stage call mere portions of process from events, where events are the temporal analogue to substances. To facilitate such an explication and exploration, we first need to enrich our notion of process and of portions of process – this chapter will provide such an enriching. As the case for recognising a distinction between events and process draws heavily on mass and count terms, we shall begin with a closer look at this linguistic distinction and, in particular, its associated problems.

In the first chapter we surveyed the grammatical manifestation of the mass-count distinction found in natural language, identifying several points of grammar that essentially function as mass term detectors. To review, mass term can't be pluralised without shifting meaning, they do not take the indefinite article, and they take adverbs like 'more', 'less', 'much', 'little' etc. Now, many nouns have both a mass and a count sense. 'Chocolate' and 'paper' are two such obvious examples – I may have eaten twelve chocolates this morning, and spilled a lot of chocolate down my front, and I may have written a paper which used more paper than the last paper I wrote (Pelletier, 2009, p. 4). Further examples are 'brick', 'groceries', 'lamb', 'duck', and 'chicken', where whether the noun is to be given a count or a mass sense can only be settled by the surrounding context – there may be one duck in the pond, but only more or less duck in my pancake. Another interesting case is Pelletier's 'universal grinder', a device so large and powerful it can take any object – say a table – with the result

being that there is table all over the floor (Pelletier, 2009, p. 5).¹³ That the surrounding linguistic and informational context in which a term is used impacts on the term's sense is unsurprising, and such observations are only troubling to those who wish to give a wholly syntactic characterisation of the mass-count distinction. However, we can cite observations that should trouble ontologists too. If semantics is, broadly and roughly, the study of the intersection between language and the world, then a semantic difference should surely have some manifestation at the level of reality, and yet we can point to mass-count term pairs for which no such manifestation seems forthcoming. 'Baklava' and 'brownies' are classified as a mass term and a count term respectively, and yet there is no difference in what these two terms pick out that would seem so significant as to explain why the terms are classified as they are; baklava and brownies are both cooked as slabs which are then divided up into individual portions (*Ibid*, p. 7). 'Garlic' and 'onions' is another such pair of terms.

Alongside their grammatical manifestation, mass terms have semantic properties, properties that point to interesting metaphysical differences between the categories of stuff and things. Three key properties are identified that mass terms have and count terms lack (*Ibid*, pp. 3-4).¹⁴ They are as follows:

Mass terms are *divisive* in their referents: the mere portion of stuff that a mass term is true of may be arbitrarily sub-divided, and that mass term will be true of the resulting portions.

Mass terms are *cumulative* in their referents: when one has *n* mere portions of stuff that a mass term is true of, those portions can be agglomerated and the mass term will be true of the resulting agglomerate.

¹³ Of course it may be argued that it would not be literally true that there would be table all over the floor were a table to be fed into this device, for we do not typically think that tables are made of 'table matter', chairs made of 'chair matter', and so on. But I should think it an incontestable point that we would find it perfectly appropriate to say there was table all over the floor, and it is natural language locutions, not literal truth, that the present point is concerned with.

¹⁴ These are semantic properties of mass terms functioning as general terms.

It should be clear that count terms are not, except in very exceptional cases, divisive or cumulative in their referents; the things that ‘cat’ is true of cannot be sub-divided, arbitrarily or otherwise, in such a way that ‘cat’ is true of the resulting parts, nor can the things ‘cat’ is true of be agglomerated in such a way that ‘cat’ will be true of the resulting agglomerate. Mere portions of gold can be sub-divided and agglomerated to yield portions that ‘gold’ is true of. The *divisive in reference* and *cumulative in reference* conditions come together to give what many philosophers typically focus on when discussing stuff and the way stuff differs from things.

Mass terms are *homogeneous* in their referents: the mere portions of stuff that mass terms are true of are undifferentiated with respect to the mass term true of them.

The *homogeneity in reference* condition is taken to connote interesting and important features of the nature, and the individuation, of stuffs, and, as we shall see below, some philosophers think it helps to explain the imperfective-perfective ‘paradox’ that is a feature of activity-process predications. As we shall go on to see, homogeneity quickly becomes difficult to apply, however the difficulties associated with it throw up some interesting questions concerning process. Homogeneity and atomisation present a problem for many mass terms. Some semanticists characterise mass terms via a semi-lattice theory, according to which the stuffs mass terms are true of have no lowest, atomic elements; anything a mass term is true of has sub-parts of which that mass term is also true. However the terms ‘fruit’, ‘furniture’, ‘cutlery’, ‘clothing’, ‘equipment’, ‘jewellery’, ‘crochery’, and ‘bedding’ are classed as mass terms, and these terms do not behave as a semi-lattice theory would have them do. A mass of furniture has lowest elements – individual tables and chairs, say – the parts of which the mass term does not truly apply to; a table-leg is not a piece of furniture, nor is the stem of a banana a piece of fruit, except insofar as it is a piece of a piece of fruit (Pelletier, 2009, p. 6).

Reflecting on such observations, some philosophers reach the conclusion that if whether a term has a mass sense or a count sense depends on the informational context – as with Pelletier’s grinder – or on what appears to be little more than convention – as with the ‘baklava’ and ‘brownies’ case – rather than on the nature of the denoted, the mass-count linguistic distinction has no corresponding ontological backing. To my mind this is a rather heavy-handed conclusion – language is one thing and ontology another. This point cuts both ways; it is often made to caution against drawing substantive ontological claims from linguistic and semantic data, but we might also say that the fact that a distinction found in language is troubled does not mean that ontological distinctions the linguistic distinction pointed us towards are themselves utterly discredited. We need not throw the baby out with the bathwater. Certainly though, problems in the linguistic and semantic evidence occasion a closer examination of the supposed ontology. I have already argued that the stuff-things distinction, the distinction that is the ontological correspondent of the mass-count distinction, is not quite as people initially explicate it; stuffs are apt for counting just as much as things are, and what’s salient to the distinction, so I claim, is what differentiates substances from what I am calling mere portions of stuff, lumps, pools, puddles etc.. Rather than implying that the mass-count distinction has *no* ontological underpinning, it seems to me that what things like the universal grinder and the mass-count term pairs begin to suggest is that what matters to the underlying ontological underpinning is organisation, arrangement, and form. However with this point made I shall leave it hanging to be picked up again later in the chapter; for now I wish to press the point on homogeneity.

2.2. Homogeneity

Though analyses of the mass-count distinction that focused on the *homogeneity in reference* condition turned out to be problematic, one proposal with regards to the stuff-substance distinction has nevertheless been that mere portions of stuff are homogeneous, whereas substances are not. Homogeneity has turned out to be an inadequate feature for discriminating events from process, however its inadequacy is instructive; the following sections will report how the homogeneity of process is typically characterised and why it fails as a discriminating feature, and will tease out where truth there is behind the thought that homogeneity is such a discriminating feature.

We sometimes speak of something's being homogeneous in colour, or perhaps of the rooms of a house or the art of a gallery being homogeneous in style. According to dictionary definitions, something is homogeneous iff it is a) 'alike in kind', b) if it 'consists of parts all of the same kind', or c) if it is 'uniform in structure or composition throughout'. In fact, definition (b) is a definition of *homoeomereity*, the property of being like-parted, which is not quite the same as homogeneity; for one, as we shall see below, it is not altogether clear that talk of parts is appropriate for the things to which homogeneity is typically ascribed.¹⁵

A portion of stuff, so the thought goes, is homogeneous – any (arbitrary) three-dimensional sub-region of a region where there is a portion of gold, say, will be a region where there is gold. A substance is not homogeneous – any (arbitrary) three-dimensional sub-region of a region where there is a cat will not itself be a region where there is a cat, only a region where there is a part of a cat. Very basically, something is homogeneous if, whatever it is, it is it through and through – it has no lowest element. As a first pass characterisation of homogeneity, let's say that *a* is homogeneous if, given a three-dimensional region of space, *r*, where there is *a*, any (arbitrary) three-dimensional sub-region of *r* is a region where there is *a*. As we have come to learn following increases in the power of

¹⁵ Mourelatos makes reference to *homoeomereity*, not homogeneity (see his 1978, p. 430), which can be taken as further evidence of his confusion surrounding the category of process.

microscopes and advances in molecular and atomic theory, though, few stuffs if any are really homogeneous. Even elemental stuffs – paradigmatic types of spatial stuff such as hydrogen, gold, and potassium – have lowest elements, individual atoms; once one reaches a sufficiently fine-grained view, one sees that the atoms of an element are made up of electrons, protons, neutrons, or quarks even, all of which are parts of the element but none of which are themselves elements. Not all philosophers feel the press of such empirical discoveries; some think our concepts are not infiltrated by the findings of science, and thus maintain that elemental stuffs like gold are homogeneous. On this point I disagree – I think empirical discoveries *do* infiltrate our concepts; I think it *is* part of our folk-scientific understanding of the world that elements aren't atomic, in the philosophical sense of the term, and, moreover, that they can be appropriately analysed with a finer grain than one that catches individual atoms. Consequently, a considered application of the property of *homogeneity* to portions of stuff should be sensitive to such empirical discoveries. However this is neither the time nor the place to settle such a question, and even if one is inclined to ignore the findings of molecular and atomic theory, stuffs like fruitcake and gravel present just the same problem – they are types of stuff whose portions have lowest elements.

Process is said to be homogeneous in that a portion of a type of process is undifferentiated with respect to that type, so for any interval of time filled by some portion of a type of process, every sub-interval of that interval will be an interval filled by some process of that type; pushing, dancing, falling, converting etc. are pushing, dancing, falling, and converting through and through – any sub-portion of a portion of process is of the same nature as the whole (Vendler, 1957, p. 146, Mourelatos, 1978, p. 430, Taylor, 1985, pp. 68-70). Events, like their spatial analogues are not homogeneous; a penalty kick or a fouled tackle that happens during the World Cup Final is a part, or sub-event, of the event that is the final, not the event itself, just as a cat's tail is not a cat.

Quite how to characterise temporal homogeneity is not, perhaps, immediately clear. One way it has been done brings in the so called imperfective paradox, the phenomenon that process predications entail their perfective counterparts, whereas event predications do not; if there was walking by S from t^1 to t^{10} , there had been a walk by S at any time, t' such that $t^1 < t' < t^{10}$, whereas if there was a walk to the shop by S that took from t^1 to t^{10} , there had not been a walk to the shop by S at any time, t' such that $t^1 < t' < t^{10}$. This is the original explication of homogeneity present in Vendler's analysis of the difference between activity, the agent-centric counterpart of process, and accomplishments, the agent-centric counterpart of events – activities can have happened even while they are happening, but accomplishments cannot (Vendler, 1957, p. 146). Applying the idea to the wider context, the thought is that this perfective entailment is distinctive of portions of process. Barry Taylor (1985, pp. 58-68) offers an analysis of such entailments that would yield the following schematisation for the homogeneity of process:¹⁶

- P. V -ing is homogeneous iff if S is V -ing during the interval t^1 - t^{10} , then for any time t such that $t^1 < t < t^{10}$ S (had) V -ed at t

Thomas Crowther (2011, pp. 6-7) characterises homogeneity for portions of process as follows:

- H. V -ing is homogeneous iff if S V -ed from t^1 - t^{10} , then for any time t during t^1 - t^{10} S (had) V -ed at t .

So, for example, a portion of strolling would fulfil (P) and (H) – if Sebastian had strolled or was strolling between 1am and 2am, then Sebastian strolled at any time between 1am and 2am; a stroll to the shop would not – if Sebastian strolled or was strolling to the shop in the interval 1am-2am, Sebastian had not strolled to the shop at any time during that interval.

¹⁶ Taylor's discussion focuses on *energeia* verbs, which he interprets as process verbs. I have already expressed scepticism as to whether this is the correct interpretation of Aristotle's *energeia* verbs in §2.1, but his characterization nevertheless holds if we simply interpret him *just* as talking about process verbs.

As in the spatial case though, there are worries about characterising portions of process as homogeneous. Though falling plausibly *is* homogenous, other paradigmatic types of process do not seem to yield homogeneous portions; two notorious examples are waltzing and chuckling – does a leg-rising or a throat-rumbling, stuff that is found within intervals filled with waltzing and chuckling respectively, really count as periods of waltzing and chuckling? On the face of it they do not – waltzing and chuckling have lowest elements, minimal intervals that must have elapsed for waltzing or walking to have gone on, and there will be times when the perfective entailments thought to be distinctive of process predications will fail to go through. After the very first moment during an interval of time filled by someone’s waltzing, during which they have just raised their left leg an inch off the ground, it does not seem at all right to say that that person has waltzed. Perfective entailments, as described by (P) and (H), do not go through in all cases where ‘*V-ing*’ is process.

When one is examining portions of process as things in the world, one must take heed of granularity. Observing the difficulties of finding homogeneous portions of stuff, spatial and temporal, philosophers adjusted their conception of stuff to discriminate between types of stuff that come in homogeneous portions, and types of stuff that come in heterogeneous portions. Heterogeneous stuff has atomic elements; there are minimum areas that must be filled for there to be some of it. This was Taylor’s proposal (Taylor, 1985, pp. 70-71). Adjusting ones conception of process so as to cover heterogeneous as well as homogeneous process, though, not only impedes utilising homogeneity as a diagnostic feature of mere portions of process as opposed to events; it impedes the use of other such diagnostic features as well. As Crowther points out, the recognition of heterogeneous types of process opens the door for various diagnostic criteria supposedly indicative of events to be relevant to such types of process. The question ‘how long did it take?’, a question which, according to Vendler’s original analysis is germane only to accomplishments, now appears germane to portions of heterogeneous process types too – ‘how long did it take him to foxtrot?’

seems a perfectly fine question to ask of some foxtrotting that was going on, and indeed of anything that was going on but requires a minimum interval to have elapsed in order for it to have gone on (Crowther, 2011, p. 9).

Kathleen Gill has put a more forceful criticism to Taylor's refinement. She interprets Taylor as employing two distinct notions of homogeneity and heterogeneity, semantic and empirical, and affirming a correspondence between them – wherever homogeneity or heterogeneity is empirically observed, corresponding semantic restrictions should apply (Gill, 1993, p. 371). The criticism she levels is then in essence to say that the distinction made between homogeneous and heterogeneous process is made not so much in virtue of facts about various portions of process as in virtue of facts about our own sensory capabilities, and our macroscopic view of the world. Though a full taxonomy of homogeneous and heterogeneous process is of course not forthcoming, the thought of those who wish to affirm such a distinction is evidently that we have *some* conceptual grasp on whether some process will be homogeneous or heterogeneous. Supposedly clear-cut examples are, on the homogeneous side of the divide, spinning, falling, growing, crystallising, and charging, and on the heterogeneous side of the divide, walking, dancing, painting, and even dying. As Gill points out though, this way of carving up the category of process seems to depend very much on how *we* see the world, for though falling is arguably a type of process whose portions will be homogeneous, growing perhaps is not. Suppose we make a time-lapse observation a leaf growing, that is, a leaf enacting the process-type growing, under a microscope; rather than seeing the kind of smooth progression those of us who enjoy the documentaries of David Attenborough will be familiar with, we will instead see a heterogeneous cluster of burgeoning cell structures alongside, plausibly, areas of atrophy. Further problem cases would be evolving or revolting, for with such cases Gill thinks our semantic intuitions would yield the result that if *a* is evolving/revolting then *a* has evolved/revolted, and yet these processes are incredibly complex and heterogeneous (*Ibid*, p. 372-373). It seems

evident that we are in fact rarely, if ever, inclined to adjust our semantic intuitions as to whether ‘S is *V*-ing’ entails ‘S has *V*-ed’ in the light of empirical observations resulting from a sufficiently fine-grained view of the world.

2.2.1. Crowther’s Rejoinder

Though Crowther admits, as Gill wants to say, that homogeneity, as characterised in (P) and (H) via perfective entailment, cannot be constitutive of process as opposed to events because of the existence of types of heterogeneous process, he highlights a different but related principle that holds for types of homogeneous and heterogeneous process alike (Crowther, 2011, p. 8):

O. If S *V*-ed from t^1 to t^{10} then at any time t during t^1 - t^{10} S *was V-ing* at t .

Though we might not be able to say of all process that went on during some interval that it had gone on at any moment during that interval, we can say that it was going on at any moment of the interval. Crowther remarks that (O) will hold for accomplishments, our anthropocentric counterpart of (non-instantaneous) events. Now, there is something about (O) as stated that would generate a tension were ‘*V*’ to denote an event, simply because we don’t think events fill time in the way the expression ‘from t^1 to t^{10} ’ suggests – a mile run doesn’t go on, but takes time.¹⁷ That said, the thought that (O) will hold where ‘*V*’ denotes an event is venerable for just the same reason that Steward gave for arguing that Stout’s stipulation regarding aspect cannot be a criterion for distinguishing events from process; just as if a comet hurtled through space from t^1 - t^{10} then it was hurtling through space at any time during t^1 - t^{10} , if a comet hurtled into the sun from t^1 - t^{10} then it was hurtling into the sun at

¹⁷ We could also say that there was a *V* by S that went on from t^1 to t^{10} , denoting a complete particular.

any time during t^1-t^{10} . The point is that the event-process distinction runs deeper than aspectual distinctions, and so, quite simply, though (O) appears to be true, it does not discriminate between events and mere portions of process.

One might try to deny the truth of (O) on the following grounds. First, consider a case where S raised her leg from t^1-t^2 and then stopped what she was doing and so did not go on to do what was necessary in order to have walked. Next, consider a case where S raised her leg from t^1-t^2 and then went on to do, from t^2-t^{10} , what was necessary in order to have walked. In this second case, it cannot be true that S was walking throughout t^1-t^{10} , because throughout t^1-t^2 there was nothing going on in the case where S did walk that was not going on in the case where S didn't walk (*Ibid*, p. 9). Whether Gill herself had this view of the homogeneity problem is not completely settled by the arguments she raises. However, she is interpretable as attempting to engender some scepticism towards the claim that events and process form two distinct metaphysical categories in part owing to concerns arising from differences of granularity levels, and she raises the question of why we privilege some levels of categorisation by calling them metaphysical (Gill, 1993, p. 384). If such an objection to (O) is part of her criticism though, it is mistaken, for the objection rests on faulty, or at least objectionable grounds; it assumes that there is nothing that was not happening in the case where S took a step but did not go on to walk and the case where S took a step and did go on to walk. The defender of (O) will retort that there is something that distinguishes the two cases; in the second case, S was *walking* in taking a step – that is, the step that S took in the second case is embedded in a wider portion of walking. The objection to (O) might imbibe some force from the precise worry that was the downfall of (P) and (H); if the interval t^1-t^2 is the first interval of the walk S goes on to take, then it is not true to say that S had walked. Walking is a heterogeneous process. But the defender of (O) does not have to make the claim that in the second case it was true that S had walked in order to defend (O); all she must show is that there is *something* different about the two

cases. The most appropriate response for the defender of (O) to give is that what's different about the two cases is that the interval t^1-t^2 is embedded in, or is a non-detached part of, the greater interval t^1-t^{10} which is filled by some portion of walking.

This defence of (O) plays on Crowther's principle concerning the presence of some process at some particular moment (Crowther, 2011, pp. 2-3):

U. If S is V -ing at t , S is V -ing throughout a period of time, t^1-t^2 , such that $t^1 \leq t \leq t^2$

What the above objection to (O) forgets is that where process is concerned we are dealing with stuff that goes on or unfolds in time; portions of process *exist by* developing, unfolding, or otherwise just going on in time (*Ibid*, p. 2). In fact, (U) is taken to hold for all types of stuff, spatial and temporal; just as the smallest amounts of matter take up *some* space, so even the smallest amounts of process must take up *some* time (*Ibid*, p. 12). Crowther evidently holds a position on stuffs akin to that as I advanced in §1.3.1, indicated when he says, for example, that where there is stuff there is some mass of stuff filling a region of space (*Ibid*, p. 12), or throughout the main body of his discussion where he speaks of the differences of spatial and temporal *particulars* (see, primarily, *Ibid*, pp. 14-18 & 23-25). Salient to the present discussion is that when one thinks of stuff in this way, one *must* think of stuff as always occupying some non-zero area of space or time. Portions of stuff necessarily fill some region of space or time, and stuff is only found at points and instants because there is stuff of that type filling the surrounding spatial or temporal region. The point bears particular relevance to portions of process; they are not to be found at mere moments of time, and it betrays a misunderstanding of the category to try and look for them there. For any process found at a moment, it is only there to be found because that moment falls within a greater interval of time filled by some portion of process of that same type. Even if the moment picked out is located at the beginning of the interval, and so the stuff there on the 'back edge' of the greater portion, that stuff

will be process of the same type as the greater portion filling the interval. What's going on at a single moment is in part a matter of what's going on in the vicinity of that moment.¹⁸

Gill's criticism of homogeneity raises important points concerning levels of granularity germane to the question of whether we can understand the difference between events and process in part in terms of homogeneity; it turns out that we cannot do so, at least not when homogeneity is understood in terms of perfective entailment. Some processes are heterogeneous, homogeneous only down to some minimal interval which must elapse if the perfective is to be true. However, we must guard against the tendency to think that it is not true that process of that type is going on at any moment within an interval filled by a portion of process of that type, even if that moment marks the beginning of a portion of heterogeneous process and is smaller than the minimal interval required for the truth of the perfective. What emerges is a view by which what's going on at any time is determined in part by what is going on in the surrounding times, by how moments fit into their wider temporal neighbourhoods. Perhaps some philosophers are tempted away from affirming anything like (U) due to an overactive propensity towards reductivism to smallest or simplest parts, but the kind of atomised view of reality a denier of (U) must, presumably, be inclined towards is simply not appropriate when dealing with process, or indeed anything in time. Portions of process are patterns or structures of changing, spread out in time, something like currents in a stream, and

¹⁸ One can further claim that there is some qualitative difference between a leg raising as part of walking and a leg raising that does not go on to be walking (or any other process). Mourelatos points out that there is a qualitative difference between running a marathon and running a hundred-meter sprint (Mourelatos, 1978, p. 420), and we might equally suppose that there is something qualitatively different and intrinsic to what's going on at a moment when what's going on is going on as part of a longer stretch of process from when it's not. The thought is not so alien, and has something of a venerable history in discussions of motion and change. Caroline Cleland, for example, has argued that what she terms the at-at theory of motion – that motion can be analysed entirely as the successive occupancy of places by objects – is not correct; genuine motion consists in real *transition* from place to place, a genuine dynamicism operating in virtue of what she calls the 'operative tendencies' of objects in motion, dispositions to be someplace else. These dispositions can explain certain observable phenomena, such as the taughtness of a length of string connecting two globes rotating about a common axis (Cleland, 1990, 265-268). Similar proposals have been mooted with regards to qualitative change, that it is (more or less) smooth, transitional *changing*, not a series of staccato-like changes.

their essential temporal dimension must be factored in to their identification.¹⁹ That portions of process are immersed in time also brings to the fore the prevailing feature of time itself; simply put, an atomistic picture of time can't be right because time can't but pass.

2.2.2. Boundaries

The upshot of Crowther's analysis of homogeneity, that homogeneity cannot be a factor in differentiating between events or process because (O) can be true in cases where *V*-ing is an event and in cases where *V*-ing is process, is that it reinforces a key point of the analogy between things and stuff in the spatial realm and things and stuff in the temporal realm; time is filled by portions of ongoing process and by events that are formed or otherwise carved out of that ongoing, processual stuff. What becomes of paramount importance for assessing the nature of the distinction is how the formation of an event is achieved; along what joints are events carved from the flow of process.

Though homogeneity cannot be a feature constitutive of mere portions of process as opposed to events, something of the thought behind homogeneity and the way it is explicated points us in the direction of a more fruitful analysis of the difference between mere portions of process and those portions of process that comprise events. Defenders of homogeneity wanted to say that stuff is homogeneous in the sense that any sub-region of a region filled by a portion of stuff is itself filled

¹⁹ A defender of (U) might also point out that singling out moments is hampered by the continuity and density of time. Insofar as we are inclined to think that a continuum has elements, those elements must themselves be continuum-like, i.e. they must be infinitely divisible themselves. Thus 'moments' of time cannot be durationless, as we would perhaps like them to be; any 'moment' we point to has some duration such that we can point to the earlier 'moment' of the 'moment' and the later 'moment' of the 'moment', and we can then point to further 'moments' between the two. Time is not structured of individual, discrete moments; the individual moments we often feel inclined to point to do not exist as *independent* moments absent of our pointing to them.

by a portion of stuff, whereas sub-regions of regions of space occupied by substances are not themselves occupied by substances. Crowther points out that this is not quite right; in *actual* cases, what there is in sub-regions of a region filled by some portion of stuff is a non-detached part of that portion, not another portion altogether, as the original statement seems to suggest. What is right though, according to him, is that the boundaries of mere portions of stuff are ‘promiscuous’ in a way that the boundaries of substances are not (Crowther, 2011, p. 16).

We think of the boundaries of spatial objects as the points of space where the object ‘stops’, but boundaries can’t *be* spatial points, because the boundaries of objects move as those objects move, whereas spatial points remain fixed. Instead, Crowther proposes that we can think of a boundary as consisting in a certain kind of *change*, the change from their being some stuff of a certain type to there being no stuff of that type. The boundary of an object consists in there being spatial stuff composing a complete object throughout the region $p^1, p^2 \dots p^n$ and there being a region around $p^1, p^2 \dots p^n$ such that there is none of the stuff forming that object located throughout that region (*Ibid*, pp. 13-14). Simply, boundaries are where there goes from being stuff to there being no stuff. Understanding boundaries in this way could help us to keep track of the distinction between arbitrary and proper parts. The proper parts of a thing are apt for consideration as things in their own right, and we could show this by pointing to their boundaries, as arbitrary non-detached parts may turn out to have no proper boundaries in the sense just described. The boundaries of non-detached parts may be determined either by facts about the whole object itself – such as is the case with the boundary between the roots and stem of a flower, or the neck and torso of a human – or they may be determined simply in virtue of changes in the constitutive stuff of the object (Crowther, 2011, p. 14). Arbitrary non-detached parts are rather like imagined shapes in a roll of pastry; if nothing is actually cut from the pastry roll, then no entities – no shapes – are actually delimited; there is no real boundary of an arbitrary, non-detached part, just like there is no real boundary to an

imagined shape in a roll of pastry. A thought such as this seems to be precisely what underlies Crowther's claim that any sub-region of a region filled by a portion of stuff is not filled by a portion of stuff but a non-detached part of that portion, because in actual cases there is not a change of the relevant kind for there to be a boundary delimiting an individual portion. If there is a boundary, there is a change of the kind described above.

Temporal boundaries are changes in what's going on, changes in the occupation of time by time filling stuff, the beginnings and ends where process starts and stops. If I am given the temporal boundary of some *V*-ing, I am given something that at the very least delimits a portion of *V*-ing. What's not guaranteed is that I am necessarily given something that delimits a portion of *V*-ing that constitutes an event. If I am given a boundary delimiting a stretch of walking, then I am given a boundary that delimits a particular portion of walking; if what the boundary delimits is a walk to the shop, however, it must be richer than simply containing where the walking stops and starts (*Ibid*, p. 18). The temporal boundaries of mere portions of process are promiscuous in the sense that any boundary such to delimit a stretch of *V*-ing delimits a mere portion of *V*-ing; the boundaries of events are not promiscuous in that not every boundary delimiting a portion of process delimits a portion of process that constitutes an event.

Though homogeneity is not a feature constitutive of process as opposed to events then, it has brought us to a more fruitful model for understanding the event-process; it is to be understood in terms of facts about the *form* of the portions of processual stuff. We are used to discriminating between mere portions of stuff – lumps, pools, or wedges of stuff – and portions of stuff that constitute substances in the spatial realm – statues, rings, and organisms – and we can easily think in terms of spatial form, of spatial structure and organisation, because we can *see* it. For there to be a statue as opposed to a mere portion, a lump, of clay is for that portion of clay to be organised in

such a way as to satisfy the completion conditions of the sortal ‘statue’ – it is for the portion of clay to have a specific boundary, not just any old boundary; generally, for there to be substances, there must be portions of stuff organised and distributed in specific kinds of ways (Crowther, 2011, pp. 16-17). The modal properties and persistence conditions that Leibniz’s Law arguments trade on will be present in virtue of this organization and form (see, for example, Steward, *forthcoming*, pp. 25-31). The thought on offer then is that the same kind of story is to be told with regards to temporal stuff and temporal substances; for a portion of stuff to be such as to comprise a temporal substance, an event, a walk to the shop as opposed to merely some walking, say, is for that portion to be bounded in a specific way (Crowther, 2011, p. 18). A walk can go on and on indefinitely, finishing wherever it will, and there will be a stretch, a portion, of walking; a walk to the shop however, a successful one at least, must start and stop in the right places. Thus the notion of completion conditions, as were mentioned in reference to sortally governed spatial substances, can again do work in helping us discriminate between events and mere portions of process, and as a first pass at what to say here, we could say that mere portions of process simply finish, whereas portions of process that constitute events are *completed*.

This of course goes no way to telling us what it is about a completion in virtue of which it is different in nature from a mere finishing, and it may look from the outset that we won’t be able to tell a story that does not give too heavy a part to ourselves. Just as some think that there isn’t any real difference between, say, a statue and a lump of clay, that a statue just *is* a lump of clay, but a lump with a shape *we* find interesting, so we might think a similar claim can be made of the difference between walking and walking to the shop. Indeed, though Gill’s worries concerning homogeneity are not sufficient to engender scepticism over the event-process distinction, the most pressing concerns she raises are concerns to the effect that events are distinguished from process in virtue of how *we* carve up and segment the ‘ongoing, causal flow’ of reality. In the second half of her

paper, Gill argues to the effect that the distinction between events and mere portions of process tracks facts about human experience, human needs, and human interests (Gill, 1993, pp. 382-283). Such concerns are not easily dismissed, and we shall come to a full discussion of completion conditions in chapter three.

We have on hand a view by which what distinguishes events from mere portions of process is something like their form. However we have not, in all this, said very much about portions of process themselves, beyond discussing whether they are homogeneous or not. Our discussion of that point has thrown up some interesting questions concerning the nature portions of process, and it would be good to pause and address them. Doing so will not only further our understanding of what being ongoing temporal stuff amounts to, but will give us a better idea of what finishing amounts to so that we might go on to analyse how, if at all, it differs from completing.

2.3. Growth

Though there are many structural similarities between space and time, there is a crucial dissimilarity – time, but not space, has a direction. Most theories of time give it an arrow, a direction in which it flows; time is dynamic in a way that space is not, and the starkest way the direction and flow of time manifests is in the phenomenon of *temporal becoming*. Temporal flow, and in particular temporal becoming, must be factored into our understanding of process if we are to have a sufficiently rich conception of the category, and they impact most notably on our understanding of the boundaries of temporal particulars.

Though aspect does not make the event-process distinction, we nevertheless are inclined to say that process – portions of it that is – is the stuff that was, is, or will be going on. Setting aside the cases where we talk about future process, let us focus our attention on some *V*-ing that *was* going on and some *V*-ing that *is* going on, and allow for these to be distinct portions of *V*-ing. When we say of some portion of process that *was* happening, I take it that, in the absence of further clarification, we are talking about a portion that *is no longer* going on – having said ‘S was *V*-ing this morning’, I might then enrich the context in which this utterance is to be understood by adding ‘and she’s *still V*-ing now, can you believe?’, but without such contextual modification, I take it that my utterance would imply that the (portion of) *V*-ing that was going on this morning is not going on any longer – it has *stopped*. In this case, what we pick out is a completed portion of *V*-ing, a temporal particular made of *V*-ing and delimited by S’s starting and stopping *V*-ing. Moreover, what we pick out, the portion of *V*-ing delimited by a start and a stop, is a temporal particular that resides in the past – the point may seem obvious, but it bears emphasising, that portions of process delimited by starts and stops are over and done with. When we say of some process that it *is* going on, we pick out an entity that, though delimited by a start, is not delimited by a stop – if S is *V*-ing, S has started *V*-ing and S has not (yet) stopped *V*-ing (in this instance of S’s *V*-ing).

A principle of cumulativity is said to apply to portions of stuff in that one can agglomerate various portions of a type of stuff to yield a portion of that type of stuff – piles of sand can be heaped together to yield a pile of sand, amounts of water can be amalgamated to yield a quantity of water, lumps of (wet) clay can be stuck together to yield a lump of clay etc. This much is enabled by the fact that portions of stuff have promiscuous boundaries. However, cumulativity differs in the way it applies to portions of temporal stuff from the way it applies to spatial stuff. With portions of matter, we can amalgamate portions with whole boundaries, but we cannot amalgamate portions of process with whole boundaries, for a whole portion of process, i.e. an entity delimited by a start *and*

a stop is an entity that resides in the past – a literal sense of cumulativeness cannot be applied to whole portions of process, as it can with portions of matter, simply in virtue of the fact that the past is fixed. There is, though, a literal sense of cumulativeness that is applicable to portions of process, but only those portions of process that are going on *now*. On the one hand, cumulativeness applies to process in that if there is enough *V*-ing from t^1 - t^{10} for a complete *V*, it does not follow that there is a complete *V* from t^1 - t^{10} simply because this *V*-ing that went on may be a non-detached part of a *V* that went on from t^1 - t^{20} . On the other, more interesting hand, cumulativeness applies to process in that if there is enough *V*-ing from t^1 - t^{10} for a complete *V*, if there is more *V*-ing after t^{10} , it does not follow that there is another, *separate V* from t^{10} - t^n , for this further *V*-ing could be a *continuation* of the same portion of process filling the interval t^1 - t^{10} (Crowther, 2011, pp. 24-25). Some *V*-ing filling t^{11} - t^{20} can be a continuation of some *V*-ing filling t^1 - t^{10} because portions of process *grow*; however, growing is something that only those portions of process going on now *actually* do. A present portion of process is like a lump of wet clay on the potter's wheel, malleable, capable of taking on new forms, and of increasing (but not decreasing) in quantity. A portion of process that is no longer going on, that is delimited by a start and a stop, can no longer grow; it is off the wheel and in the firing oven – it has, in a word, set.

What I want to point out is that present portions of process are not bounded in the way that past portions are. Present portions of process have what I will call open boundaries; they are delimited not by a start and a stop, but by a start and an 'ontological precipice', an edge marked by the present moment of time. This edge is like a boundary in Crowther's sense insofar as it is a change from there being stuff of a type to no stuff of a type, but differs in that it is imposed by the asymmetric structure of time itself. An open boundary, imagined here as a kind of ontological precipice imposed by the asymmetric structure of time, differs from the kind of boundary imposed by stops, by genuine cessations of activity, in that these latter boundaries are closed.

Open Process: a portion of process has a boundary, $[t^1, t^0)$, such that the upper bound, t^0 , is the present time and does not mark a time at which the process stopped.

Closed Process: a portion of process has a boundary, $[t^1, t^0]$, such that the upper bound, t^0 , is in the past and marks a time at which the process stopped.

Where a portion of process is delimited by a start and a stop, i.e. a closed boundary, any later engagement in process of that type will yield another, numerically distinct portion, not a continuation of the first; if there is V -ing by S from t^1 - t^0 such that S started V -ing at t^1 and ceased V -ing at t^0 , and if there is also V -ing by S from t^1 - t^2 such that S started V -ing at t^1 and ceased V -ing at t^2 , then the portion of V -ing filling the interval t^1 - t^0 and the portion of V -ing filling the interval t^1 - t^2 are numerically distinct portions of V -ing – the edge of the first portion found at t^0 is not such that it allows for continuation.²⁰ Contrastingly, an open boundary, as I am thinking of it, is ‘adhesive’ in that it is such as to allow more process of the same type to be ‘stuck on’ to the amount there already is, continuing the process and yielding a larger, but not numerically different, portion – open boundaries *do* allow for continuation, for cumulativeness.

Understood in this way, present portions of process are somewhat analogous to growing blocks; cumulativeness applies in a literal sense to process, not because portions are amalgamable, but because portions grow – moreover, they *become*. For any portion of process with an open boundary, that portion of process is such that it can grow. It is not my intention to offer a precise explication of what the growth of process amounts to, but to offer some brief remarks on how I think best to understand it. Open portions of process are embryonic temporal particulars; they are apt for a notion of becoming, such as is often applied to time itself, in that the process itself ‘evolves’ in the direction of the future, growing to fill the moments immediately preceding its forward, open edge –

²⁰ Stout makes a similar point about starts and stops and distinct portions of process (see his 2003, p. 5)

it is in this sense that process accumulates to form larger and larger portions. As in growing block models of time, whereby the sum total of existence continuously increases, an open portion of process continuously increases in quantity.²¹ Though external forces can impede their growth, portions of process have a natural tendency to continue and develop, to come to fill increasingly longer stretches of time.

Though we might be tempted to say that the process comes to have new parts, particularly given that many if not all processes do have an intrinsic granularity, talk of parts should not be taken literally for the same reasons that we do not generally say that a pile of sand, say, on which more sand comes to be heaped, comes to have new parts; the pile of sand simply becomes a greater quantity of sand, and though we *can* talk of parts of the pile in a way, doing so doesn't really add to our understanding of the pile nor captures anything about its intrinsic structure. Note too that open, growing portions of process and closed, set portions of process are not metaphysically different *types* of thing, as cats and dogs are different types of mammal; rather, just as a full understanding of cats, say, includes recognising that cats grow, so a full understanding of process includes recognising that portions of it grow.

2.4. Process, Objects, and Granularity

I wish to now make plain something I have hitherto been taking for granted, namely that process is enacted by objects. *Enactment* is the relation between objects and process that Anthony Galton and

²¹ One wants to question the rate at which open portions of process and grow, and by what increments they do so. The rate at which a portion of process grows will be the same rate at which time passes. As for the increments by which a portion grows, the growth of a process will be smooth profile, not a step-like profile, even considering a processes intrinsic granularity – this, at least, is much more in keeping with the continuity and density of time.

Riichiro Mizoguchi describe; if there is a portion of process, there is some material host(s) enacting the type of process the portion is an instance of (Galton & Mizoguchi, 2009, p. 2). It is this fact that in part allows for much of what can be said about actions and activity to apply to events and process; ‘material host’ is here understood exceedingly broadly, covering objects as diffuse as energy fields and fields of force, along with more typical objects like animals and agents. According to an enactment view of process, there can be no process, and so no events, in empty space.²² That objects play some role in there being process is suggested by the various schematisations and principles given that concern process— in such schematisations, there is always an agent, an S that is *V*-ing. This is most obvious in the realm of agential activity – it is agents (or at least organisms) that engage in running, pushing, buttering etc. – but the point holds for non-agential process too – stars engage in converting, galaxies in spinning, rocks in falling etc. Consequently, when talking of enactment generally I eschew using ‘agents’, simply because the term is too suggestive of conscious, intentional agents engaging in activity purposefully, and I wish to capture enactment as it applies in non-agent cases too; henceforth, I will speak of enactors, or just simply objects. Where I use the term ‘agent’ in relation to enactment, it will be with a more general sense akin to ‘creature’, so as to include non-human animals.

The processes an object enacts (and here I speak of types of process) are what that object does or can or will do. It’s first of all important to note that doing is not meant to be understood

²² That process must be enacted by material objects gives us some insight into the relationship between events and space. As well as dating events, we are apt to assign them some spatial location; the 2012 Olympics happened in London, the birth of my sister happened in Queens Medical Centre, Nottingham, weddings happen in churches etc. We can resist questions about their spatial boundaries, questions which tend to leave us perplexed, if we are suitably guarded; to say events have spatial location is not to say they have spatial *dimension* – events do not *fill* space (see, for example, Dretske, 1967, pp. 484-485, Hacker, 1982, pp. 9-16). Events exist by there being a type/types of process being enacted so as to yield portions of process of particular forms, and the location of an event depends entirely on the location of the enactors of its constitutive process; they are ‘in’ space only insofar as their constitutive material must be enacted by material objects which *do* themselves fill space. Thus we should say, as Hacker does, that the relationship of events to space is only indirect. As such, many of the questions we ask concerning things that do directly fill space cannot be sensibly asked about events.

simply as causing; though doing is, I take it, a kind of causing, the relevant notion of doing to be employed here does not accord with what might be our pre-theoretic or intuitive understanding of causing, if that understanding is one of a relation between distinct existents. In understanding the notion of doing at work here, it is useful to think of devices, as devices are the most straightforward examples of objects that do things. Devices generate outputs from inputs. An internal combustion engine, for example, is a device that converts chemical energy into mechanical or kinetic energy – this is what we can call its function - and so we might say that an internal combustion engine enacts the process-type *converting*, or even *converting energy*. We also want to say, though, that an internal combustion engine enacts the process-type *combusting*. This highlights a crucial distinction that must be recognised when exploring objects and process, a distinction between what Galton and Mizoguchi call *internal* process and *external* process (*Ibid*, pp. 14-15); the external process(es) a device enacts are *what* the device does, and the internal process(es) a device enacts are *how* the devices does what it does. An internal combustion engine converts chemical energy into kinetic energy by combusting fuel; the converting of energy that is going on is an external process of the internal combustion engine, and the combusting that is going is an internal process.

That processes are enacted by objects makes salient again matters of granularity, not in the way our discussion of homogeneity did, but in that whether what portions of process that are going on are internal or external depends on a point of view (*Ibid*, p. 15). With our attention focused on the internal combustion engine as a whole, i.e. if we consider the device in its entirety, the converting energy that's going on is an external process, and the combusting that's going on is an internal process. If we focused our attention on the combustion chamber and considered that as a device in its own right, and not *just* as a part of the internal combustion engine, the combusting that's going on would be an external process, and the rotating of the pistons (which is how the combustion of the fuel is achieved) would be an internal process. Similarly, if we expanded our focus

from the internal combustion engine to include, say, the car of which the engine is a part, the converting energy that's going on would be an internal process, as this converting is (in part) how the car does what it does, which is to move. Note that it's of no consequence to the internal-external process distinction whether the process going on goes on inside the device or not, such as the combusting that goes on inside the combustion chamber. The distinction is purely one of what a thing does and how it does it.

Though the notion of a device is particularly germane to designed objects, Galton and Mizoguchi rightly point out that it can be tenably applied to non-designed objects. The first, most natural step in doing so is to consider biological 'devices' – brains, kidneys, livers, enzymes etc. A kidney is an object that clearly exhibits function without (intentional) design; what a kidney does is filter blood and regulate blood pressure, so we can say that the external processes of a kidney are filtering and regulating. A kidney does what it does by, among other things, maintaining and altering of salt and water levels, and the secreting of various hormones – these are the internal processes of a kidney, the way it achieves its function. These alterings and secretings will in turn be regarded as external processes if we narrow our focus to the parts of the kidney. Conversely, we might say that what objects we see is a matter of the processes we focus our attention on; when we look at the processes of filtering blood and regulating blood pressure we see a kidney, as it is the kidney considered as a whole that enacts these processes, whereas when we look at the secreting of hormones, we see glands. Identifying external processes is a way of identifying objects (*Ibid*, p. 19).²³

²³ We should not be tempted to conclude from the fact that the function of a device can be explicated in terms of the function of its parts that the device is some kind of illusory object reducible to those parts; for one, as the parts of a device can be regarded as objects in their own right, if we were so tempted we would have to regard those parts, and the parts of those parts as similarly illusory. Rather, the thought we should take from this is that the enactment of external processes is a condition on there being a complex object – a complex object is a unity enacting an external process; there is a complex object when simple(r) come together in such a way as to enact a process we can regard as external and, conversely, there is a part of a complex object when a putative part contributes to the enactment of the process regarded as external. Generally, the processes there are can identify

But the processes we identify as external is not just a matter of the objects we are attending to, but the way we are thinking of or picking out those objects. This is most obvious when we extend our notion of a device another step, to objects that we might think are not as apt to regard as functional as we are things like kidneys. Consider a star. On the one hand, a star is apt to be considered as a ‘device’ that converts lighter elements into heavy elements – so considered, the external process of a star is fusing. On the other hand, a star is apt to be considered as a ‘device’ that heats and illuminates solar systems – so considered, the external process of a star is radiating. On this latter understanding, fusing is an internal process of the star, as it is through fusing that radiating is achieved; on the former understanding however, radiating is an internal process of the star, because radiating is a by product of the external process, fusing.²⁴

The point I wish to draw from all of this is that though *external* and *internal* are relative properties of portions of process that depend on our perspective, and more, that what processes we *identify* is a similarly dependant matter, the reality of the processes is not under threat; the fact that we find different processes at different granularities does not entail that the processes we find on more coarse-grained pictures of reality are any less real than those we find on finer-grained pictures. Consider again Gill’s example of a leaf growing, used by her to highlight problems in characterising portions of process as homogeneous. The problem, recall, was that when observed up close, the putative homogeneity of the growing process breaks down into complex clusters of heterogeneous processes. The worry for homogeneity as homogeneity was originally mooted still stands, but with the present understanding of process, we can now say a little more as to why (O) holds true. The dividing and elongating of cells, and the seeding of new cellular structures we see when observing a

what objects, complex objects, and parts of complex objects there are. As this is not an essay on objects I shall not discuss this point further; for more information, see Galton & Mizoguchi, 2009, pp. 19-22 and 25-29.

²⁴ To reiterate, what’s salient to whether a process is regarded as external or internal depends on whether the process is regarded as being what the object does, or else how it does what it does or is a by-product of it’s doing what it does.

growing leaf under a microscope are internal processes of the leaf – they are how the leaf enacts its external process of growing; growing is going on because that is what it is for a leaf to be growing. That is, the dividing, elongating, and seeding come together, unite in such a way as for there to be growing (of the leaf) going on, and going on throughout the period over which the leaf grows. There is growing going on, and there are these other processes going on too; the processes don't depend on our attention for their existence. Sometimes speakers choose to focus just on bits of what's going on, and indeed what's going on at any one time can be described from a number of different perspectives; what we see and so say is going on depends on where and how close we are looking, as Gill herself recognised (see Gill, 1993, pp. 382-383).²⁵

Speaking generally (and, admittedly, somewhat nebulously), the reality we inhabit is one of continual flow, of ongoing structured changings, processes, ordered hierarchically. What we see around us is the processual flow of reality, and we can witness this processual flow at (possibly innumerable) many hierarchical levels. At any time, t , such that t is present, there are numerous process-types being enacted by objects to yield portions of process which grow as time moves inexorably forward. These portions may be homogeneous, or they may be heterogeneous; what's crucial for the event-process distinction, i.e. whether in due course we can pick out an event or just a mere portion of process is the form these portions of process take on, the boundaries they come to

²⁵ These comments regarding granularity and substructure will impact on our understanding and account of states. Much of what has been said seems applicable just to things that exhibit complex behaviour, things that we can happily regard as doing stuff, and we are, I think, apt to ascribe states to things that do not exhibit such behaviour. A rock, for example, does not appear to do very much, and we might want to regard a rock as being in a state, rather than enacting any process. But a rock *can* do things; it can fall, roll, spin around etc. From the point of the view of the rock, these would be external processes, and the rock is able to enact them because of a constant ongoing internal process of maintaining structural integrity, enacted by the various components of the rock. These internal processes are going on whether the rock is moving around or not (see Galton & Mizoguchi, 2009, p. 27). Similarly, we have learnt that when observed sufficiently close up, even the vacuum of empty space has stuff going on in it, filled as it is with so-called vacuum energy. The lesson to take from this is that what may, from one perspective, be regarded as an unchanging state can, from another perspective, be seen a seething mass of ongoing process. As an account of states does not impact on our discussion of the nature of the event-process distinction, what we are to say about states is a task I leave to others.

have. Mere portions, so we say, can have any old boundaries, whereas events must have particular boundaries. In the last chapter then, we'll examine what's particular about the particular boundaries events have.

Chapter 3

Form

3.1. Steward on Processes

Events are typically supposed to be the temporal analogue to spatial substances – things like cats, elephants, tables, and planets etc. – the particulars of time with particular forms that fall under sortals providing principles for counting. Recently, this supposition has been challenged by Helen Steward. Focusing on actions, she argues, for reasons to do with mutability, that a) actions cannot be events, b) that events are not the temporal analogues of substances, and, most interestingly c) that the particulars we count in the realm of action, are not best thought of as events but instead as individual processes (Steward, 2012, pp. 377-380 & p. 382). I wish to focus on claim (c), for though Steward and I share a very similar outlook with regards to process, her discussion contains a wrinkle that must be ironed out.

Steward's argument that actions are not events turns on certain of the difficulties raised for the standard Davidsonian analysis of actions and events that were highlighted at the outset of this essay. To reiterate, certain adverbial modifiers do not fit with Davidson's analysis of actions as events; in particular, it is comparative adverbial modifiers that generate the most pressing difficulties, for so modified sentences denote things, actions, that change over time. This is troubling as we do not want to think our talk of changing actions is a mere *façon de parler*, but nor do we think that events, as changes, themselves change; something must give.

This much is right of course – many philosophers of action are coming round to the view that agents do not engage in events but in activity. Individual processes, what Steward sometimes refers to as *changings*, can themselves change, precisely because individual processes grow:

“At t' , for example, it [an individual process] may consist of a certain set of temporal parts; but by t'' it may consist of another, larger set, because further things have happened in the changing that is underway. And this is real change in the process itself – the process now has properties it did not have before.” (Steward, 2012, p. 384)

This much is commensurate with what I put out in §2.3. The truths of adverbially modified action sentences of the kind that so troubled the Davidsonian account of actions are secured by growing, changing portions of process; it is the fact that portions of process can and do grow that allows for such truths. So, for example, it is true that Smith ran the London Marathon at first enthusiastically and then increasingly beleaguereedly yesterday because Smith was enacting a portion of running such that first it was an enthusiastic running and then became increasingly beleaguered running.

Steward is absolutely right to explicate the change and growth of portions of process as she does, and to point out that it is because processes behave in this way that a swim can be increasingly frantic, a walk be increasingly tedious etc. However, Steward does not exercise due care in cashing out the sense of change at play, and indeed seems to vacillate between two different senses, sometimes in the same breath. This makes her proposal less clear than it otherwise might be. Consider the enactment of a process-type by S at t' yielding a portion of process filling $t''-t'$, and let's simply call this portion Process. Suppose at t' , Process is actually $\neg F$. There are two claims we can make with regards to there being change in Process, each dependent, in part, on facts about t' , specifically whether t' is past or present:

1. (When t' is present and Process is still going on, still being enacted) Process *could* become F and/or become increasingly/decreasingly F-ly and remain Process.
2. (When t' is past and Process is no longer going on, no longer being enacted) Process *could have* become F and/or become increasingly/decreasingly F-ly and remained Process.

The kind of change Steward is interested in finding room for, the ‘real’ change needed to make various adverbially qualified action sentences come out true, is the kind of change described by (1). However, not all portions of process do participate in this kind of change. Specifically, it is only those portions of process with what I have been calling open boundaries that participate in change as described by (1), present portions of process that are still actually ongoing. Present, ongoing portions of process grow, participate in real change, not because *we* are immersed in the flow of time, as Steward seems to suggest, but because *they themselves* are so immersed; ongoing portions of process participate in real change because of the real, metaphysical fact of temporal becoming. Portions of process with what I have been calling closed boundaries, whole portions delimited by both a start and a stop and so residing in the past cannot any longer participate in real change as described by (1), for the reasons given in §2.3.

Steward says that individual processes are ‘freed up in thought’ for participation in such things as change and growth (*Ibid*, p. 384). I maintain that this is not quite right with regards to the real change Steward seeks to find room for, as described by (1) – portions of process participate in real change in virtue of them having open boundaries, and they have open boundaries in virtue of a fundamental structural feature of time itself. Once a portion of process is closed, (1) no longer applies; a closed portion of process is something like an event, at least when events are naively understood *just* as those things denoted by sentences with perfective aspect, as finished, over-and-done-with portions of process. Indeed, Steward does seem to envisage an event as nothing more than that, for example when she says that to think of a whole set of temporal parts of a process that has occurred is to think of an event (*Ibid*, p. 384). One reason for her doing so is simply the very fact that closed portions no longer participate in real change; closed portions of process are entities that cannot grow, and Steward sees an inability to grow, to change, as indicative of events (*Ibid*, p. 383). This much is in keeping with the standard and well-founded views of events as unchanging changes.

But even when a portion of process is closed, when (1) can no longer be truly applied, (2) still can. But that (2) truly applies to a closed portion of process suggests we are thinking of the portion, the particular delimited by both a beginning and an end of enactment, as an *accidentally* delimited particular, as something that could have gone on for longer, say, but just simply didn't. This is what Steward says of portions of process when she discusses them elsewhere (see Steward, *forthcoming*, pp. 26-27); whole portions of process are accidentally delimited particulars. However, there is a tension between the fact that (2) can be truly said of any closed portion of process, Steward's claim (c), and the example she gives. In concluding her argument, she says that,

“...the things we quantify over...when we adverbially qualify an action sentence which has perfective aspect, such as ‘Jones swam the Channel cautiously yesterday’, say, are individual processes and not events.” (Steward, 2012, p. 384)

Now, ‘Jones swam the Channel cautiously yesterday’ is putatively an event- or an accomplishment-sentence. Presumably, given that we understand process as the stuff of events, such sentences with perfective aspect do, as Steward suggests, denote whole, individual portions of process, and (2) should apply to these portions. But even given this, we do not want to say that the process denoted could have been other than how it actually is *and still* comprise Jones' cautious swim of the Channel; the swimming that is Jones' swim of the Channel does not seem to be an accidentally delimited particular. We can allow for the portion of process, or the individual process, to use Steward's phrase, to have been different from how it actually is in certain, largely irrelevant and uninteresting ways. But for there to be a swimming of the Channel, cautious or otherwise, there must be a portion of swimming organised in a certain way – a swimming of the Channel is not just any old portion of swimming.

3.1.1. Two Kinds of Temporal Particular

Steward is right insofar as she recognises the need to acknowledge the existence of changing, growing, *open* portions of process, and even insofar as she claims that action-sentences with perfective aspects denote individual processes. But her failure to properly discriminate between open and closed portions of process means her claim that when we count in time we count individual processes is not completely clear; to claim that what all action-sentences with perfective aspect *quantify over* are individual processes threatens to make no room for the thought that some whole portions are accidentally delimited whilst others are not. In a certain sense of course, Steward is right, in that action sentences with perfective aspect pick out or denote, and are true in virtue of, individual portions of process; just as at a certain level of analysis every spatial particular can be characterised as an individual lump of matter, so every temporal particular can be characterised as an individual lump of process. There are, however, two senses of ‘lump’ we may use, which Crowther puts as follows:

“Something is a lump of F (or a ‘[portion]’ of F) *in the liberal sense* if and only if it is a complete, spatially bounded particular made of F...Something is a *mere lump* of F if and only if it is a complete, spatially bounded particular made of F, and it does not possess restrictive boundary conditions for the occupancy of space and time in virtue of its nature.” (Crowther, 2011, p. 20, my emphasis)

Every spatial particular is a lump in the more liberal sense of the term. Some of the lumps of matter we pick out have particular, restrictive boundaries, and it is in virtue of having these boundaries that those lumps suffice to constitute substances or parts of those substances; other lumps of matter do not have such boundaries and are instead disorganized, in a certain sense, such that they do not constitute substances – these are lumps in the formal sense, mere lumps. A gold ring is a lump, or a

portion of gold in the former, looser notion of a lump, as is a bronze statue and a clay bowl – the substances we pick out are apt to be thought of as lumps of matter, or collections of lumps of matter, but as lumps with particular boundaries; substances are matter organised in certain ways. Crowther talks of boundaries *completing* particulars (*Ibid*, p. 17); the spatial particular that is the lump of wet clay on the potter's wheel must be formed in a particular way, must have a particular boundary, if it is to complete, say, a bowl, and if it fails to have such a boundary then it fails to complete a bowl, though it remains a spatial particular, a mere lump or portion of clay, for mere portions are completed by any old boundary. Whole, closed portions of process are analogous to portions of matter, and just as not every portion of matter completes a substance, so not every portion of swimming, say, completes a swim of the English Channel. A swim of the English Channel, even a cautious swim of the English Channel, is constituted by some whole portion of swimming, but a portion with a particular boundary – English Channel swims, like bowls, must be constituted from portions of stuff with particular boundaries.

Stout is forthright in claiming that events and processes are distinct types of particular, countable *things*. On the present understanding we can see that he is right to do – Stout's mistake was to move too quickly in getting individual processes on the scene. We acknowledge the existence of individual, countable processes, i.e. portions of process, in just the same way as we acknowledge countable portions of matter – just as in getting matter on the scene we get particular lumps of it on the scene, so in getting process on the scene we get particular portions of it on the scene, and as with space, on one mode of understanding, it is these countable portions that are the occupants of time. We distinguish between process and events – where events are naively understood just as the particulars of time – just as we distinguish between matter and objects in space. Nevertheless, with a more refined analysis we maintain that just as with spatial particulars, there are, broadly, two

categories to be recognised – there are events, the temporal analogue of substances, and there are mere portions of process, the temporal analogue to lumps of matter formally understood.

Gill has leveled an objection against the recognition of two distinct categories of temporal particulars (Gill, 1993, pp. 380-382). Gill points out that various putative activity-accomplishment sentence pairs can be made true by a single occurrence; ‘Linda is writing’ and ‘Linda is writing a letter’ could each be made true by a single occurrence of writing, and ‘George builds houses’ and ‘George built thirteen houses’ could be made true by the same group of occurrences of building. The most natural reading of her claim is that if all accomplishment or event sentences require for their truth is some activity, then it seems a better explanation, at least in terms of parsimony, to explain the differences between activity and accomplishment sentences in terms of differences in descriptive and informational content, rather than as tracking some deep metaphysical distinction. She says that,

“Our use of ‘Linda is writing’ may simply reflect our ignorance about an occurrence which in fact does, or will have, a definite end-point...the lack of information about an end-point in a description does not justify the conclusion that there is no end-point.” (Gill, 1993, p. 380)

If we thought that inherent indefiniteness was the mark of activity and process, as Kenny, Vendler, and Mourelatos do, we would be hard pushed to explain why the differences between sentences such as ‘Linda is writing’ and ‘Linda is writing a letter’ are not explicable in terms of our epistemic position. Given that the truthmaker for each sentence is going to be some portion of writing enacted by Linda – what I take to be the best understanding of Gill’s ‘single occurrent’ – then perhaps it would be better to be ontologically and epistemologically modest, rather than thinking that our talk in this domain captures some kind of distinction at the level of fundamental reality (*Ibid*, p. 381).

Though Gill explicates Mourelatos' account with full mention of the analogy with spatial stuffs and things, there is very little sense that she has really taken onboard the idea that process is the stuff of time and of temporal particulars, and the way the objection is put suggests she may be confused in a similar way to Mourelatos. Where she says that 'is writing' refers to *a* process, it is unclear whether she means a type of process, or some portion of a type. One presumes from the examples given, as it is *Linda* who is writing, that Gill intends to speak of portions of process, and, from her use of the progressive, that these portions are open, ongoing portions.²⁶ If that's the case, though, her objection loses much of its force. Gill contrasts 'Linda is writing' with 'Linda is writing a letter', with each sentence denoting ongoing activity, and proceeds to raise doubts as to whether a metaphysical claim is really warranted, given that the differences between the utterances could be explained in terms of our epistemic standing. The metaphysical claim that she targets is that events and processes belong to separate metaphysical categories; if we read her as targeting the proposed distinction between events and *process* – i.e. between temporal stuff and temporal particulars – her objection misses its mark, and all she succeeds in hitting is the claim that the sentences 'Linda is writing' and 'Linda is writing a letter' denote portions of different types of ongoing activity, i.e. portions of different types of process. That is, Gill's truthmaker objection falls upon certain categorial distinctions *within* the category of process.

If we take the analogy between spatial and temporal stuffs and things seriously, it shouldn't surprise us that the truthmakers for sentences in the perfective denoting temporal particulars are portions of process; this is simply a consequence of process being the stuff of time. What's salient, on our understanding of the distinction, is that the truthmakers for putative event sentences are not just any old portions of process. Here, the question is whether there's a genuine difference of

²⁶ There is further support from her reluctance to treat occurrences as 'abstract' (see Gill, 1993, p. 380, and p. 384) – by 'abstract occurrence' I presume Gill has in mind something like 'type of activity'.

metaphysical category between a whole portion of writing, say, that is just a portion of writing, and a whole portion of writing that is a writing of a letter. Some portions of process we recognise as being bounded and organised in the right way so that they suffice to constitute particulars of a special nature – walks to the shop, hurtlings into the sun etc. – whereas others are recognised as something like mere lumps of matter, perhaps cases such as failure, interruption, or incompleteness. What we now want to find is something genuinely metaphysical underpinning the distinction, so as to counter scepticism such as of Gill's.

3.2. Artifacts and Events

At the close of her paper, Gill expresses some rather nebulous concerns that the recognition of a certain category of events may reflect facts about how we think about and segment the 'ongoing causal flow of reality', that the classifications of occurrents have more to do with human interests, along with our conversational and descriptive practices, than anything intrinsic to reality itself (Gill, 1993, pp. 382-383). As it seems to me, the best reading of Gill's worries understands them to express the worry that the distinction between events and mere portions of process is *artifactual*, that temporal particulars like a writing of a letter, a climbing of a mountain, and a swimming of the Channel are artifacts, or artifactual particulars, coupled with the thought that artifacts and artifactual categories are not in good metaphysical standing with regards to their objective reality. I wish to focus on the first matter, on whether the supposed distinction between events and mere portions of process is artifactual or not.

Tables, chairs, hats, coats, cities, and national borders are all types of artifact; particular instances of them do not occur naturally, but rather depend for their existence on the aims and intentions of humans or other creatures. An artifact is, very basically, a product of intentional activity. Being somewhat more specific, an artifact is something whose existence and nature depends on its intended function; it is an intention-dependent thing that essentially has relational properties of a mental kind, differing from natural objects in being intentionally produced and used in order to realise various goals (Hilpinen, 2011, p. 8, Baker, 2006, p. 133, and Kroes & Meijers, 2006, p. 1). Characterisations of artifacts can sometimes emphasise the functional component of artifacts in a way that suggests it is function that is the salient feature of artifacts; this is a mistake, for there are many natural objects for which function is their most salient feature – kidneys, lungs, eyes, and other organs being the most notable examples (see *Ibid*, pp. 2-3). Artifacts are objects whose distinguishing feature is that they have been made or modified by agents – the full account of an artifact makes essential reference to the intentional input and aims of some agent, where that agent need not be human. Artifacts are things with authors, authors being the agents responsible for the artifacts, the ones who make the artifacts (Hilpinen, 1993, p. 156). Disciplines differ in exactly what they classify as artifacts; the archeological sense of ‘artifact’ encompasses all the products of an author’s activity, whereby both the bench and the wood-shavings that result from the carpenter’s planing qualify as artifacts, whereas our more layman use of the term might only recognise the bench, the intended product of the carpenter’s planing, and not the wood-chippings, the unintended product of the carpenter’s planing (Hilpinen, 2011, p. 3). For now, let’s proceed with a quite general concept of artifacts, as things explicable in terms of the intentions or the aims of agents, so as to include both the intended and the unintended products of work.

Alongside spatial artifacts, we can identify temporal artifacts. As Crowther highlights, given this basic understanding of artifacts, the portions of process resulting from agents intentionally

engaging in activity seem to count as artifacts, for they are explicable in terms of their enactor's aims and intentions (Crowther, 2011, pp. 19-20). Hilpinen also accepts this (see his, 1993, p. 157). It is, I think, an intuitive idea that there's something different about portions of process resulting from agents enacting process-types from portions of process resulting from objects enacting process-types, that there's something different about a rock falling from a person walking – bringing in artifacts is a way of accommodating this intuition. Note, of course, that it is not the case that *every* portion of process yielded by an agent engaging in activity is apt to be considered an artifact; people trip, they fall, and many of these portions of tripping and falling can likely be explained without reference to any aims or intentions. For those portions of process yielded by purposeful enacting of process-types by agents though, it seems we can say they are artifacts.

Plausibly, accomplishments – the subset of events that are to do with agents – are artifacts in a more thoroughgoing sense. To see this we can look a little more closely at the notion of success. Authors don't simply make artifacts by causing their existence; authors 'shape' the properties, the character of the artifact. The intention to make an artifact is the intention to make something of a certain type, conceived of under a description of the type which is included in the author's intention and that the thing must exemplify. The type or sortal description works in conjunction with various other subsidiary descriptions to determine the thing's intended character, definable simply as a set of predicates; a thing's intended character is the way the author intends the artifact to be (Hilpinen, 1993, pp. 157-159). Something's intended character will in turn be determined by the purpose of the artifact, its function, what it will be used for; in order to be suitable for its intended purpose, an artifact must have certain *relevant* properties rendering it capable of realizing its purpose, and these properties will obviously be different for different purposes. The more of these properties the resulting product of an agent's activity an artifact has, the better it will be at its intended function (*Ibid*, pp. 162-163). Hence the matter of success and failure is germane to artifacts. I may intend to

make something for the purpose of pounding nails into hardboard – a hammer – but may fail to make what I intended, for example by making it out of play-dough, making an object that's not fit for purpose. As Hilpinen puts it, the study of artifacts is intrinsically evaluative (Hilpinen, 2011, p. 12).²⁷ We can give three evaluative criteria that assess a thing's intended and actual character (*Ibid* p. 12):

- E1: the degree of fit or agreement between the intended character and the actual character of a thing.

(E1) allows us to evaluate whether something is a successful embodiment of the author's intentions.

- E2: the degree of fit between the intended character of a thing and the purpose, F , i.e. the suitability of a thing of the intended kind for the purpose F .

(E2) allows us to evaluate whether the character an author intends to give something is suitable for the purpose that thing will be put to.

- E3: the degree of fit between the actual character of a thing and the purpose F , i.e. the suitability of an artifact for F .

(E3) tells us whether the product of the author's productive activities is fit for purpose. When an author makes something with a sufficient degree of fit, measured in terms of the number of relevant properties specified by the type description the finished product has, that thing can be regarded as a successful embodiment of the author's intentions – an artifact in a more thoroughgoing sense of the term (Hilpinen, 2011, p. 13).

²⁷ Some philosophers go so far as to say that something is an artifact proper only if an author's productive activities are successful, at least to a degree sufficient for the resultant object to be used for its intended purpose (Hilpinen, 1993, Bloom, 1996, Thomasson, 2003). To my mind this is overly restrictive, as it obscures a chief motivation for recognising an ontology of artifacts, that there is something interesting to say about the things that are the result of intentional productivity. Certainly though, we want to recognise successful artifacts as an important, and arguably primary, sub-class of the class of artifacts.

Sortal concepts determine what is right and proper for their associated particulars, giving criteria of synchronic and diachronic identity, and providing an answer to the question ‘what is it’ for things of the relevant kind (Grandy, 2008, p. 2). When we understand particulars as made of stuff of some type with a certain form determined by some particular sortal, we must attend to the fact that there is a condition/are conditions of correctness laid down by the sortal in terms of which the particular is susceptible to evaluation. Sortals govern the organization of stuff; particulars are understood as stuff organised according to a sortal principle and evaluable in the light of that principle. What it is for there to be stuff organised according to a sortal principle is just for there to be a particular that can be evaluated as meeting the correctness conditions laid down by the sortal (Crowther, 2011, p. 21).

Accomplishments are agent-centric sortally governed temporal particulars, and, what is more, are evaluable in the light of (E1), (E2), and (E3); to see how, we can reintroduce the notion of telicity, as introduced in §1.2.1. Many action sentences present activity as progressing towards a telic point, a finishing or completion point, e.g. ‘John is walking to the shop’ and ‘Mary is turning on the light’. A telic point is, quite simply, a specific completion point towards which an agent is reaching and that gives closure to activity (Mourelatos, 1993, p. 386); the notion of completion is thought to apply only to activity directed towards telic points – undirected activity merely ceases (Gill, 1993, p. 381). Completion is achieved when the desired ‘state’ specified in the telic point is realised.²⁸ Telic points can be seen as the purposes to which activity is put, analogous to the functional uses to which spatial artifacts are put; telic points are the goals around which activity may be organised (Crowther, 2011, p. 28), and they are what’s reached when goal-directed activity goes well.

²⁸ I use scare quotes around ‘state’ here simply because I am using the term in a rather all-encompassing way – for example, perhaps what is to be realised by reaching a telic point, the completion of some activity, is engagement in some further activity of a different type.

Telic points enter in with the evaluative criteria (E2) and (E3) as the purposes to which particular portions of activity are put. In order to reach and realise a telic point, it is not enough for activity just to go on – it must go on in the right way. The activity that goes on must have a certain character if it is to be suitable for reaching a specified telic point. If, for example, I am walking to the shop, my walking must proceed in a certain way; it must, for instance, proceed along a certain spatiotemporal path such that I am delivered to the right coordinates, and must do so at a rate sufficient to arrive at those coordinates before the shop closes. I intend to do some walking, and I intend for the walking that I do to have a certain character such that it will be sufficient for me to realise my goal of getting to the shop. That is, the character of the portion of walking I yield, its properties, its form, are shaped by my aims and intentions; the portion of walking is as it is partly in virtue of facts about me, about my mental states. Of course, the walking that I do may fail to be sufficient to realise my aims. I may be arrested halfway along, or I may forget where I'm going and arrive at the wrong location, for example; in such a case, the walk fails to be as I intended. Indeed, a number of factors can intrude so that the actual portion of process yielded fails to be a successful embodiment of my intentions. Similarly, I may, in taking a walk, decide to take the scenic route and, in appreciating my surroundings, arrive at the shop too late; in such a case, though the walk has the character I intended, it fails to be fit for purpose. In all cases there will be a temporal particular, a portion of walking organised according to the goal of getting to the shop – this much is guaranteed. What's not guaranteed is that the portion of walking completes a walk to the shop (Crowther, 2011, p. 28). Thus we can see the relevance of the three evaluative criteria: (E1) evaluates the degree of fit between the character I intend my walking to have and the character that it actually comes to have; (E2) evaluates whether the character I intend my walking to have is such that that portion of walking would be sufficient to realise my goal of getting to the shop; (E3) evaluates whether the actual character of the walking that I do is sufficient for me to have realised my goal.

A walk to the shop is a sortally governed temporal particular, whose sortal type contains a number of predicates along with one or many completion conditions, which together describe what a proper or correct particular of that type ought to be like. Some of the information contained in the sortal description, particularly that relevant to the completion condition(s), will be grounded in facts about the author's aims and intentions – in this example the desired location to be reached and, perhaps, the most efficient means of getting there. That is, a walk to the shops *qua* complete temporal particular, is a portion of the process-type *walking* governed by a sortal principle, a part of whose content is essentially related to facts about agents' mental states. The sortal principle determines how a portion of process must be in order to be a proper event, a 'good' temporal particular. If a portion does not have sufficient number of the predicates attached to it, it is defective in some way; if it fails to meet the completion condition(s), it is incomplete, not a complete particular of that type.

3.3. Natural Boundaries

Gill worried that we would not be able to distinguish between, for example, eating peas and eating a prescribed number of peas, or between walking and walking to the shop, without appealing to facts about us; there is, she thought, nothing intrinsically different between walking and walking to the shop. What distinguishes events from processes is our ways of describing the ongoing flow of reality, along with our interests and aims. Understanding Gill as talking about a difference between two types of particular, events and mere portions of process, and restricting ourselves to agent activity, we can now see that her worries express some truth. The difference between a particular that is just a walk and a particular that is a walk to the shop has more to do with the aims and

intentions of agents than it does with the deep structure of reality. It is aims and intentions that, ultimately, determine what a portion of walking must be like if it is to be a walk to the shop, and so stand apart from other portions of walking in this respect. It is we agents who shape the character of agent events, accomplishments, and who make the boundaries of certain temporal particulars ‘special’.²⁹

As I’ve said above, as far as I can interpret Gill, I understand her to be expressing scepticism towards differentiations of types of activity, types of process, for example between the putative activity-type pairs *walking* and *walking to the shop*, or *ate peas* and *ate a prescribed number of peas*. I sympathise with Gill’s scepticism here, to a point. We might want to say that the walking that constitutes a particular walk to the shop is also of the type, *walking to the shop*. For some processual stuff to be of the type *walking to the shop*, it would, I presume, involve that stuff unfolding in whatever we deem to be the right kind of way. I’m not inclined to take such a view, for much the same reason as I’m not inclined to regard the matter from which a cat is made as of the type, *cat-matter*. I can see no way in which what was right doesn’t have to do in part with us, because I can see no intrinsic difference between the portion of walking one enacts when walking to the shop, and the portion enacted when one walks around. Of course, a portion of walking that is a walk to the shop may well have properties that a portion of walking that is simply a walk will not have, but the particulars are

²⁹ Though we’ve been attending to artifactual portions of process yielded when agents enact process-types, there are also artifactual portions of process yielded when *objects* enact process-types. One such example is the portion of flying yielded by a cruise missile; another is the portion of moving yielded by a cricket ball. Crowther thinks that such portions are explained in terms of the aims and intentions of agents in a ‘completely different way’ to the way portions of agent process are so explained (see Crowther, 2011, p. 20, footnote 26), but I do not think the difference is as pronounced as Crowther suggests. There is little difficulty recognising that the products of machines are themselves artifacts in the straightforward sense of being authored by an agent (see Hilpinen, 1993, p. 157). All that distinguishes them is perhaps that such artifacts are indirectly authored; there is a diminished causal proximity between an author and an artifact such as the flight of a missile, or car from a production line, than there is between an author and an artifact such as a walk to the shop, or a hand-whittled knife. Both kinds of cases involve essential reference to aims and intentions, and both are subject to the various evaluative criteria and normative constraints for artifacts. At least, more must be done to show that such cases are ‘completely different’.

both, at root, comprised of stuff of the type *walking*. If we did take the view by which *walking to the shop* is a type of activity, we would, I think have to regard that type as artifactual.

I think Gill is right about this much. Whether these observations should engender scepticism about the category of accomplishments is something I will address in closing. The matter to be addressed now is that though some temporal particulars are artifacts, not all temporal particulars are artifacts – there is object process too. Gill's claim that the 'causal flow of reality' can 'in principle be segmented at any point' (Gill, 1993, p. 383) decreases in plausibility; with our understanding of processes enacted by objects, and delimited minimally by starts and stops, we have on hand a category of objective, mind-independent temporal particulars made of process such that their boundaries have nothing to do with how we segment the causal flow of reality. We *recognise* stops and starts. What we now want to know is whether there are distinctions within this category – is there a metaphysical basis for recognising a category of natural events, temporal particulars with special boundaries, where what's special about these boundaries is not to do with us?

3.3.1. Existential Change

The short answer is, quite plausibly, yes. Though we saw in §1.3.1 that we can happily count measured things, a good place to start is nevertheless with what Mourelatos suggests is the difference between counting by measuring and counting by having a principle for counting (Mourelatos, 1978, pp. 429-430), what Gill calls the difference between indirect and direct counting (Gill, 1993, p. 378). Both say that when we count via a principle, we look to some intrinsic feature of the process in virtue of which a finishing point, or limit, is determined; when we count by

measuring, that limit is in some way externally imposed. To speak loosely, we put stuff in extrinsic containers when counting by measuring, and count using those containers, for example when will fill a number of glasses with water. Now, this distinction between direct and indirect counting, insofar as we might think it has applicability to certain types of spatial stuff, does not clearly have such applicability to temporal stuff, for reasons already given above – portions of process are delimited by stops and starts, and these starts and stops are not obviously extrinsic to the portion in the way that, say, a glass is to the water it contains; stops and starts seem like perfectly good intrinsic features of portions of process that enable portions to be counted directly. There is, however, some truth to be teased out of Gill's attempt to further explicate what a distinction between events and processes amounts to along these lines, even when interpreting this distinction as a distinction of two types of temporal particular. Gill looks at some paradigm cases of events – building a bookcase, and writing a letter – and points out that what is particular to them is that they result in *existential change*, the coming into existence of some new object – a bookcase and a letter, in these examples (*Ibid*, p. 378). What's interesting about existential change is that it's binary – existential involves only the coming-into and going-out-of existence. Other kinds of change, such as qualitative change, or motion – those kinds Gill takes to be typically associated with processes – are gradual and admit of degree. The thought then is that existential changes are counted, whereas qualitative *changing*, say, is only measured (*Ibid*, p. 378).

There are some quite obvious problems with Gill's proposal here, particularly over whether one can cut a distinction between kinds of change in terms of whether they are gradual and so measurable, or binary and so countable. The very fact that what is measurable is nevertheless countable suggests that attempting to do so will get messy quickly; though we might be able to say A underwent more change than B, both A and B still both went through a change. Qualitative change, changes in the properties an object has, does not fit as neatly into this picture as Gill suggests,

precisely because it involves the coming and going of particular properties; equally, it seems that existential change can come by degree, precisely because we seem happy to acknowledge creative processes, such as building or writing. In fact, the only kind of change that falls clearly on one side of Gill's proposed divide is motion. Quite simply, whatever difference there might be between measuring and counting, it is neither clear nor robust enough to underpin a difference of metaphysical category. What's interesting about Gill's suggestions is their focus on the ways in which a portion of process might end, and, in particular, whether there is some metaphysical basis for a distinction between completing, and simply finishing.

One thing to be said is that existential change does give a clearer sense to the thought that those portions of process constituting events complete, or culminate, as is sometimes said (e.g. Parsons, 1989). Existential changes, comings-into or goings-out-of existence can serve as sufficiently sharp markers, or anchoring points – to use Galton and Mizoguchi's term (see their 2009, p. 13) – that would seem to imbibe the boundary of a portion of process with something metaphysically special such as to distinguish it from other possible boundaries. Consider two dust clouds, DC^1 and DC^2 , enacting the process-type *collapsing*. Suppose DC^1 starts enacting *collapsing* at t^1 and stops enacting *collapsing* at t^{10} , yielding a portion filling that interval; suppose DC^2 starts enacting *collapsing* at t^1 and stops enacting *collapsing* at t^{20} , yielding a portion filling that interval. Thus we have two temporal particulars, two portions of collapsing delimited by starts and stops, and we can say that there was a collapse by DC^1 and a collapse by DC^2 – both dust clouds collapsed. Now suppose that the collapsing DC^2 did result in the formation of a solar system, that a solar system came into existence with DC^2 's collapsing. Though it seems likely that the answer to the question of exactly when the solar system came into existence is that it is vague; nevertheless, we can say that *by the time* DC^2 had stopped collapsing, by the time that that portion of collapsing had finished, there was a solar system where before there wasn't. Both DC^1 and DC^2 did some collapsing, yielding two

temporal particulars, the collapse of DC¹ and the collapse of DC². However, there's nothing particularly special about DC¹'s collapse – it could have had different boundaries and still been a collapse; DC²'s collapse, on the other hand, has boundaries such as to qualify as an event, *the formation of a solar system*.

Many paradigmatic natural events appear to fit with this way of understanding events; fertilizations, gestations, decays, supernovae, to name but a few, can all be seen as portions of process that culminate in something's the coming-into or going-out-of existence. Moreover, understanding events as particular bounded portions of process accords is in keeping with a somewhat more sophisticated view of creation and destruction. Generally, we think, things do not pop into or out of existence; rather, objects like zygotes, creatures, and solar systems come to be following temporally extended processes. Few of us today are comfortable with the idea of creation *ex nihilo*, and inasmuch as we accept that, in the case of the actual world at least, the first law of thermodynamics – the total sum of energy in a closed system will remain constant – holds, we are increasingly comfortable that if some new entity is to come to be, there must be some transformative, creative process that goes on. Perhaps such types of process offer the best chance for understanding what it is about completing that distinguishes it from simply finishing, for we can point to some genuinely worldly difference between those portions of them that are allowed to run their course from those that are not.

Unfortunately, and as Gill points out (see her 1993, p. 379), this way of understanding events, and of contrasting them with mere portions of process, is overly narrow; there are numerous occurrences that we are pre-theoretically inclined to recognise as events, or at least as types of occurrences distinct from mere portions of process, that do not fit this model. Some notable examples would be certain cosmic events – solar flares and gamma ray bursts, say – as would certain

biological or physiological events – viral infections, heart attacks, and epileptic seizures, say. An epileptic seizure, to pick one to focus on, is, at a basic ontological level, a portion or a series of portions of neurological activity, enacted by brains, and whose starts and stops are influenced by a complex and diverse cluster of factors. Though qualitative change is certainly involved in epileptic seizures, existential change isn't, or at least isn't typically so – deviant neural activity simply starts and, at some later point, stops. Nevertheless, we want to say that an epileptic seizure is an example of an event, a temporal particular that is more than *just* some process. Now, we could propose an understanding of events that is radically revisionary, one that results in many of our pre-theoretic intuitions and judgments about which things are the events being mistaken, if the best or the only way to understand the difference between mere portions of process and those portions that comprise events is that the latter result in existential change; philosophers in general should not be averse to revisionary metaphysics, not if such revisions are forced on us by the only tenable formulation of a thesis. Yet such revisions do not seem forced on us with regards to events and processes.

3.3.2. Sortal Governance

In looking for a category of what I have been calling natural events, we're looking for kinds of boundaries that are in some sense particular and special in a way that does not have to do with us, with our interests or conventions in carving up the causal flow of reality. There seems to be some promise in the thought that events, as opposed to mere portions of process, complete rather than merely finish; however, when 'completion' is understood as 'culmination', the criteria for something's being an event seem unduly narrow. There is, however, a more successful way to

understand the thought that what separates events from mere portions of process is that events complete whilst mere portions only finish, when we understood ‘completes’ more as ‘exemplifies’ and in terms of sortal governance.

To dip back into the realm of spatial particulars, space is populated by an abundance of natural objects, lumps of matter bounded and organised in a myriad of particular and special ways such as to comprise objects of a more metaphysically interesting nature than mere lumps of matter, and whereby this organization has nothing to do with us and the way we categorise the world. Such particulars are sortally governed, and the type or kind description contained within the sortal is natural, where a natural kind or type is an ordering that does not depend on human categorisation – natural orderings are recognised and discovered, not created (Bird & Tobin, 2012, p. 1). Staying silent on the metaphysical nature of sortals themselves, i.e. whether they are concepts, linguistic items, universals etc., sortals determine what is right and proper for particulars of the various types; for there to be a particular, F, that is an instance of some kind or type, G, there must be some matter organised in such a way as to exemplify the type description of G contained in the sortal governing F. Type descriptions, recall, are, in essence, lists of properties that specify the characters or natures, along with, perhaps, the essences, of the instances of types; a particular, F, must exemplify a sufficient number of the properties listed on the type description to make it a G. A sortally governed particular is evaluable in the light of the type description (though with different criteria to those listed above for artifacts); when a particular exemplifies the properties as listed in the type description contained in its governing sortal, we say that that particular is a complete particular of the type.

Following through with the analogy between spatial stuff and things and temporal stuff and things, the natural thought would be that in the temporal realm, some particular event of a type, E,

exists when there is some process, P, organised in such a way that it exemplifies the properties that suffice to make it an E. This is precisely the line that Crowther, and others, advocate (see Crowther, 2011, p. 18, & pp. 21-23, Galton & Mizoguchi, 2009, pp. 10-14, and Hornsby, 2012, pp. 240-241). When some portion of process is so organised as exemplify the relevant properties, we say that that portion is a complete particular of the type, a complete event. What we can suggest, then, is that what completing, as opposed to just finishing, amounts to is finishing in such a way as to exemplify the properties listed in a type description contained in a governing sortal. An event is a portion of process that has finished in such a way that it exemplifies the properties specified in the type description of its governing sortal – it is a portion of process that is such as to have unfolded, developed, or otherwise grown to *become* an event. As a lump of wet clay is shaped on the potter's wheel so that it exemplifies the properties specified by the type description contained in the sortal *bowl*, say, so some walking is shaped by an enactor so that it exemplifies the properties specified by the type description contained in the sortal *walk to the shop*, say; as various portions of matter come together, cohere, and organise in such a way as to exemplify the properties specified by the type description contained in the sortal *cat*, say, so some process develops, unfolds, and grows in such a way as to exemplify the properties specified by the type description contained in the sortal *coronal mass ejection*, say. Gill's scepticism towards there being a distinction of events from processes stemmed from, along with a misunderstanding of the ontological workings of masses, an understanding of completion as culmination, where the focus is on what goes on at the end of a process, i.e. whether some new thing came to be, which results in an overly narrow conception of what an event is. Understanding the distinction as one of sortal governance allows for a sufficiently broad understanding of events so as to uphold many of our pre-theoretic judgments about what occurrences are events, and accords much more naturally with the analogy that accounts of the event-process distinction trade on. Events are complete temporal particulars in the sense that they

are portions of process that have grown in such a way as to take on, to exemplify, certain particular characters given by temporal sortals.

3.4. The Particulars of Time

We acknowledge a distinction between events and *process* just as we acknowledge a distinction between spatial particulars and the matter from which these particulars are made. Process is the stuff of time, the matter of events, and it fills time like matter fills space. Crucially, events, understood *just* as temporal particulars, are made from *portions* of process, particular and individual instances of types of processual stuff.

Once we have portions of process on the scene, that is, once we've understood that measurable stuffs too come in countable instances, we begin to acknowledge a distinction between events and *processes*, that is, a distinction between two categories of temporal particulars. We recognise that some portions of process have special boundaries, special forms, whereas others do not. All portions of process have boundaries, and any boundary is such as to delimit an individual portion, a particular temporal entity, an event in the very broadest sense of the term. Other boundaries delimit entities of a more restrictive nature, that have more definite forms than the lumps, wedges, stretches, the mere portions of process; these are events in the more thoroughgoing sense of the term. They are sortally governed; events are complete temporal particulars, where complete is to be understood as finishing in such a way as to exemplify the properties specified by the governing sortal's type description. Portions of process grow, they unfold and develop – portions of process *change*, so later 'stages' of the portion may differ in character from earlier ones

(though, remember, talk of stages or parts should not be taken literally). The growth and development of portions of process may be directed and shaped by the aims and intentions of agents – such portions are artifactual temporal particulars. Other portions of process may grow and develop in virtue of a number of complex factors none of which are the aims and intentions of agents – such portions are natural temporal particulars. Some portions of process do not complete in the sense of coming to exemplify a sortal; they simply finish, and are delimited minimally by a start and a stop. Portions of process that complete are events; portions of process that finish are mere portions.

There remain questions to do with the nature of categories and types or kinds themselves.³⁰ There is certainly an inclination among philosophers to regard artifactual types, and their instances, as having a dubious metaphysical standing, as not being ‘as real’ as non-artifactual types and instances. I make no comment on such a view here, except for saying that it seems obvious that, at the very least, artifactual categories of entity will not be on the same level of the ontological hierarchy as the natural categories.³¹ Concerning natural types though, this are in perfectly good metaphysical standing, and I will not seek a defence of them here. Perhaps there are some remaining hang-ups that concern the matter of fundamentality – we may ask where the category of events and the category of processes stand, and stand in relation to each other, on the ontological hierarchy; such questions I leave for others to pursue. For now, I will finish simply by saying that insofar as we are happy with sortal governance and natural types, we can acknowledge a distinction of metaphysical category between events and processes, a distinction between two categories of temporal particular.

³⁰ For some discussion of the nature of ontological categories, see Westerhoff, 2002 & 2004.

³¹ For some discussion on the anti-realist attitude towards artifacts, see Soavi, 2009.

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