Fatally Confused: Telling the Time in the Midst of Ecological Crises

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Focusing particularly on the role of the clock in social life, this article explores the conventions we use to "tell the time." I argue that although clock time generally appears to be an all-encompassing tool for social coordination, it is actually failing to coordinate us with some of the most pressing ecological changes currently taking place. Utilizing philosophical approaches to performativity to explore what might be going wrong, I then draw on Derrida's and Haraway's understandings of social change in order to suggest a fairly unconventional, but perhaps more accurate, mode of reckoning time in the context of climate change, resource depletion, and mass extinctions.

In attempting to explain humanity's seeming inability to respond swiftly and proportionately to the massive ecological changes currently taking place, environmentalist Bill McKibben has suggested that one of the key problems is not a lack of political will or capacity for agency. Instead, he argues that we are in the grips of a "fatal confusion about the nature of time and space" (2003, 7). This confusion rests on the implicit distinction Western societies make between the time of culture and the time of nature. That is, even while it is commonly assumed that time is all-encompassing, McKibben notes that "though we know that our culture has placed our own lives on a demonic fast-forward, we imagine that the earth must work on some other time-scale" (2003, 7). The accelerated shifts in technology over the last couple of decades, for example, seem far removed from the much slower scale changes wrought by evolution or plate tectonics. As McKibben writes, "the long slow accretion of epochs—the Jurassic, the Cretaceous, the Pleistocene—lulls us into imagining that the physical world offers us an essentially stable background against which we can run our race" (ibid.). We thus seem to think, suggests McKibben, that while culture is in time, nature somehow is not.

What makes this confusion a potentially fatal one is the fact that the natural world is, of course, far from stable. As McKibben recounts in his article, this supposed "backdrop" to human life is rapidly changing, with

glaciers and icecaps melting at unprecedented rates, mass extinctions, and widespread resource depletion. Ironically, he argues that as climate change accelerates, it is humankind who has become slow-moving and seemingly unchanging. He thus argues that "the contrast between two speeds is the key fact of our age: between the pace at which the physical world is changing and the pace at which human society is reacting to this change" (ibid., 12). However, both of these speeds are obscured when nature is treated simply as a background to human life.

McKibben's diagnosis of a temporal confusion in regard to timing, synchronization, and pace echoes in the work of a wide variety of environmental philosophers, who argue that there are many problematic temporal assumptions deeply embedded within Western systems of knowledge. The conflation between the passage of time and progress, the obfuscations of linearity, the destructiveness of hyper-acceleration, and the denial of coevalness are amongst some of the usual suspects. What this suggests is that a key task of the environmental humanities is transforming the temporal framework that supports the radical de-coupling of what has been classed as "nature" from that which has been classed as "culture."

What is particularly interesting about McKibben's diagnosis of a "fatal confusion" is that his concern with time is not necessarily metaphysical, or even existential, but rather highlights the seemingly prosaic problem of co-ordination. Arguably the primary use of time within social life is to provide methods of enabling and managing the timing of encounters, meetings, tasks and activities. This can be seen through the wide array of calendars, schedules, timetables, and so on, that arise from social institutions, logistical systems, personal life, and communications systems. Yet, far from being able to coordinate our actions with the significant changes our world is currently undergoing, we are increasingly out of synch. Schedules for transitioning to low-carbon energy production, for implementing truly sustainable fishing policies, or for developing transport systems independent of cheap fossil fuels, for example, are all running decades behind. Our conventions for coordinating ourselves—for telling the time—are thus simply not adequate in the current context.

Despite this, we don't seem to have lost faith in our ability to tell the time. Statements such as, "It is now 11:23 a.m.," continue to make sense, to feel like an unquestionable fact. One reason for this is that, in providing a blank, seemingly objective, framework, clock-time transcends our different scheduling tools, providing a means of translating between each one. In doing so the clock appears to promise that everything can be assigned to its proper time. However, one of the key problems is that even while the clock appears to be all-encompassing, it actually only affords certain relations, while obscuring others. I take

this to be the crux of McKibben's argument—that the inter-relations between "nature" and "culture" are hidden because one is not thought to be in the time of the other. When we look at a clock or calendar we can see fairly quickly whether we are becoming out-of-synch with some worlds, but not with others. That is, while the clock appears to do very well in affording the "demonic fast-forward" of contemporary capitalism, the equally alarming acceleration of climate change seems to be occurring in a different realm from the everyday lives of many of us. We coordinate ourselves with work, school, and transport schedules, with periodic bill payments, public holidays, and anniversaries, while our efforts to respond to climate change are squeezed into the spare moments around this, if at all. So while the clock can tell me whether I am late for work, it cannot tell me whether it is too late to mitigate runaway climate change.

In focusing our attention on the problems of coordination and synchronization, McKibben gestures towards an issue that has been relatively under-explored in philosophy—time's role in managing the intertwined relationality of everyday life. Indeed, what I want to propose in this article is that, in the current context of multiple ecological crises, time needs to be more clearly understood, not as a quantitative measurement, but as a powerful social tool for producing, managing, and/or undermining various understandings of who or what is in relation with other things or beings.[1] Seen in this way, the act of "telling the time" gains a political and ethical dimension that is absent from our usual understandings of time-keeping. Importantly, such an understanding of time can extend philosophical interest in the issue beyond metaphysical and phenomenological questions, towards an examination of the choices communities make about the way they will tell time and thus who or what they choose to keep time with.

I will begin by looking more closely at the notion of time-keeping, partly in order to expand what counts as a "clock," but also to pry open the common-sense notion of time as an objective form of measurement. In contrast, I will discuss how different clocks are used in different contexts, emphasizing in particular their materiality and contingency. Understanding the time we use in everyday life as a set of conventions, rather than as a simple fact, opens up the opportunity to analyze statements about time in novel ways. I'm particularly intrigued by the possibility of reading statements, such as "It is now 11:23 a.m.," as performative, rather than constantive statements. Notions of performativity have played an important role within philosophy in efforts to unsettle and rework seemingly objective categories, with

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1.   This way of understanding time is particularly indebted to the work of the anthropologist Carol Greenhouse (see especially Greenhouse 1996).

Judith Butler's treatment of gender being the most prominent example (1990). For Jacques Derrida, speech act theory illuminates the key question of ethics and politics, namely how to understand the relation between intention and rules or conventions (1988, 97).[2] In both cases the interest is in understanding the possibilities of social change, while acknowledging the intractability of conventions and traditions.

So after highlighting the social, rather than objective, nature of clock-time, I will then move to a discussion of J. L. Austin's speech act theory in order to suggest that statements about time are not best understood as constantive statements, but as performatives that enact particular forms of relationality. Time is, of course, a multi-layered phenomenon that draws together a variety of experiences, material processes, and social conventions. But in focusing on time as a tool for managing the intertwined relationality of everyday life, I want to foreground the clock as a convention, one we implicitly assent to whenever we utilize it. Indeed, what I want to suggest is that rather than being a simple statement of fact, the statement, "It is now 11:23 a.m.," might be better understood as a statement of faith—in particular, faith that the clock will enable us to coordinate ourselves, and thus maintain ourselves in relation, with those things and beings that are most important and relevant to our daily lives.

If we come to understand the act of telling the time as performative then two questions arise in regard to the clock. First, how are we to understand our common-sense faith in our clocks and our concomitant inability to "keep to time" in the current context? In responding to this question I will address the issues of context and intentionality by discussing J. L. Austin's attempts to understand when speech acts go wrong, as well as Sara Ahmed's re-interpretation of his work and her concept of "non-performativity." Second, if we recognize that our clocks are indeed failing to coordinate us in a variety of necessary ways, how else might we go about telling the time? Here I am guided by Derrida and Donna Haraway, who both argue for the importance of recognizing the way new conceptual models already subsist within the system one is seeking to critique. I am particularly interested in bringing together Derrida's notion of the "originary performative" and Haraway's work on material-semiotic figurations in order to outline a number of key issues that would be involved in articulating other modes of measuring

2.   Indeed Derrida is so convinced of its importance that he goes as far as to say that "speech act theory is fundamentally and in its most fecund, most rigorous, and most interesting aspects . . .a theory of right or law, of convention, of political ethics or of politics as ethics. It describes . . . the pure conditions of an ethical-political discourse insofar as this discourse involves the relation of intentionality to conventionality or to rules" (1988, 97).

or reckoning time that may well be more appropriate in what Deborah Bird Rose and Thom van Dooren have called, the "time of extinctions" (2011). After looking briefly at some examples of current interventions into the public perception of time, I will conclude by suggesting that responding to the dischrony McKibben highlights may require a very different type of clock altogether, one that does not promise a new synchrony but that can "coordinate" us in a complex multi-species world, in which there are co-occurring and conflicting actions, values, loyalties, fears, and hopes.

Conventions and Clocks

The OED defines "clock" quite simply as "an instrument for the measurement of time." The word itself comes from the Old English term for bell.[3] And in its proper use, "clock" refers to a device that indicates time through bells or chimes, as well as through hands on a clock-face. In this section, though, I am interested in prying open this common-sense understanding of what a clock is by asking broader questions about the usefulness of clocks in our everyday lives. Why, for example, might a continuous series of chimes (or movements on a clock-face) be so significant for organizing daily life?

An initial clue comes from Aristotle, who notes that our capacity to perceive time is interlinked with our capacity to perceive change. In his complex discussion of the nature of time in the *Physics*, he argues that in order to experience time, one first has to be able to notice a change and then make a comparison between two different moments, "before" and "after" the change. When we do not notice a "before" and an "after" we do not perceive time as passing. That is, "when the state of our minds does not change at all, or we have not noticed its changing, we do not think that time has elapsed" (Aristotle 1984, 218b, 22–24). This suggests that while clocks may be understood as devices for measuring time, they could also be understood as devices for providing communities with continuous and predictable "befores" and "afters." In so doing they become useful because they enable us to reliably notice change and so perceive time as passing.

Importantly, in linking the experience of time to the *perception* of change, rather than to objective change, Aristotle's account has the potential to enlarge our common-sense understanding of the clock

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3.   Interestingly, while it seems more normal now to symbolise the clock visually, or to talk about "watching the clock," historically clocks have provided time aurally, through bells and chimes rather than a clock-face (Glennie and Thrift 2009, 82). This is partly because bells could be heard across a much greater distance than a clock-face could be seen, thus bringing more people into coordinated relations with each other.

further by emphasizing the importance of asking what counts as change and for whom. As already noted in the beginning, not all types of change register equally. The fatal confusion McKibben points towards arises from the disconnect between our ability to perceive change in the social world and our seeming inability to perceive change in what has been excised into the sphere of nature. The possibility that the perception of change underpinning shared understandings of social or public time may be variable (both within and between cultures) has not, however, been of central concern within the philosophy of time. Instead it is the philosopher-turned-sociologist Emile Durkheim who provides a second clue as to the potential for understanding clocks more broadly.

Put briefly Durkheim argues that the comparison between different moments does not occur abstractly, but is always made in reference to what is most relevant to a particular society or group. He notes that it is impossible to "represent what the notion of time would be without the processes by which we divide it . . . a time which is not a succession of years, months, weeks, days and hours" (1965, 22). Importantly, such divisions are neither objective, nor are they arbitrary. Rather Durkheim argues that they are developed in reference to what is significant within our communal lives and "correspond to the periodical recurrence of rites, feasts, and public ceremonies" (23). With regard to the notion of a "week," for example, Eviatar Zerubavel suggests that this device to measure time derives, not only from religious traditions, but also from the cycle of market days (1985, 10). Indeed while the seven day week is relatively taken for granted in many parts of the world, a "week" can vary from between three and ten days (e.g., 45). Of course, not everything about time is attributable to culture, but Durkheim's approach suggests that the use of time in everyday life is not apolitical, and, crucially, that individual and collective judgments about significance and relevance are utilized in the process of recognizing what counts as a change that is significant enough to produce a "before" and an "after."

Since what is significant will vary between groups and contexts, the set of changes chosen to mark the passing of time also vary. The conventional clock is far from being our only tool for marking time. Instead a great variety of material objects are tracked or monitored in our efforts to coordinate ourselves with what is important to us. For example, the change in position of the sun in the sky, the changes in the composition of layers of rocks, or the change in an atom as its electrons shift energy levels, are all specific changes that are useful in different contexts for providing a system for coordinating how things and beings are inter-related. Importantly, although time is generally understood to be all encompassing, our varying ways of telling the time, through the use of different data sets, only coordinate particular kinds of activities. For example, using the variations between layers

of rock to tell the time is highly relevant within the specific contexts of geological and archaeological research. Seriation and stratigraphy both utilize the layering of rocks to determine how different types of rocks, fossils, and artifacts are ordered in relation to each other. In this case a shift from one type of rock to another becomes the significant change that provides the archaeologist or geologist with a method of coordinating the information they have to hand and are interested in understanding. This method of telling the time is meaningless, however, for a receptionist needing to coordinate an organization's parcel pick-up times. What this brief example suggests it that particular methods for telling the time facilitate particular kinds of interactions and do not necessarily translate well across contexts.

The particularity of ways of telling the time holds true even for those methods that are commonly understood to be universal. The sun, for example, would seem to be the quintessential object that has been tracked and monitored throughout history in order for human beings to coordinate themselves with each other and with the world.[4] The regular and predictable changes in its positions in the sky provide a set of changes that have much broader significance than the layering of rocks. The time given to us by the sun may thus appear to be all-encompassing, with day and night continuing to regulate our activities even with our extensive use of standard clocks. However, as E.P. Thompson has suggested to "labour from dawn to dusk can appear to be "natural" in a farming community" (1967, 60). Nevertheless, the sun is not necessarily the primary timing device, for "fishing and seafaring people [who] must integrate their lives with the tides" (1967, 59). In this case the moon is a more significant provider of data for telling the time. Neither is the kind of time provided by the sun of primary usefulness for those involved in care-work, for example, who may need to coordinate themselves with the varying and unpredictable rhythms of the ill or a newborn child. In this case it is the changes in the person or child themselves that will regulate the timing of activities. Importantly, these other modes of telling the time do not coexist harmoniously with the time told by the sun, but result in a variety of social exclusions for those who do not operate in accordance with more socially common rhythms (Adam 2006, 124).

However, while one can even make the case for solar time being useful for facilitating interactions only in specific (if broad) contexts, the context-bound nature of devices more properly understood as

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4.   The role of the sun (along with the moon and stars) in telling the time is even ordained in the Bible: "Let there be lights in the expanse of the sky to separate the day from the night, and let them serve as signs to mark seasons and days and years" (Genesis 1:14, NIV).

clocks is even less obvious. Their precision, reliability, and extremely fine gradation enable them to appear in a wide variety of situations as context-free tools for coordination. Thus, in daily life the time told by the clock is more often experienced as an objective (if burdensome) fact, rather than as a contingent, context-specific convention. As Barbara Adam writes, "the time of the clock is quantified and standardized, unaffected by context and seasons" (1998, 70). However, just as the kinds of "clocks" discussed above depend upon a particular material context in reference to which particular changes can be foregrounded, neither is the clock free of context. Instead it is itself tied to its own particular materiality. "Seconds," for example, are currently based upon the "before" and "after" produced by tracking the changes occurring within cesium atoms when electrons shift energy levels. Despite the seeming obscurity of these changes, they become significant and relevant in a wide variety of contexts because of their precise consistency. This precision facilitates the accurate co-ordination of the trillions of bits of information transmitted through satellites, computers, mobile phones, and GPS devices. In fact, it is partly due to the way social life is mediated by these particular atoms that the "demonic fast forward" pace of life that McKibben highlights is possible.

While cesium atoms are useful for facilitating a broad range of interactions, this does not mean that they provide a universal framework for coordination. This has already been argued extensively across the humanities and social sciences with regard to the inability of clocks to translate between quantitative and qualitative time. Indeed it has become common to argue that standard clocks act to obscure and de-legitimize qualitative experiences of time. However, what I am particularly interested in demonstrating is the way that cultural decisions having to do with significance and relevance, as well as the particularity of material contexts, are still at work at the very heart of quantitative time.

That is, while the precision of atomic time would appear to have solved the problem of devising an accurate and consistent clock, atomic clocks cannot synchronize precisely with the rotation of the Earth, since this rotation is variable. This means that if we told time by the atomic clock alone, our clocks would eventually become desynchronized from solar time. In order to avoid this, the clock-time used in daily life is not actually a single form of measurement, but rather the result of an attempt to coordinate between two different kinds of time—International Atomic time (TAI, told in reference to the cesium atom) and Universal Time 1 (UT1, the successor to GMT which is told in reference to the rotation of the earth). The time told on our clocks is actually a third "time"— Coordinated Universal Time (UTC)—which negotiates between solar time and atomic time through the augmentation of TAI with "leap

seconds" (Essen 1968, Nelson et al. 2001). As the rotation of Earth is not consistent, but varies over time and is currently slowing, the number of leap seconds that need to be added is predicted to increase (Nelson et al. 2001, 519). Because these irregularities cause significant issues for a variety of communications systems, there are currently debates over whether to discontinue the use of leap seconds altogether. Despite the potential loss of synchronization with solar time, many are arguing that this is of less consequence than the difficulties produced for I.T. systems (e.g., Chang 2012a, 2012b).

Thus, even the seemingly objective clock requires ongoing decisions about what is of significance to us, and consequently which elements of our world we want to keep to time with and which elements we can afford to drop from our sphere of direct concern. Given the central role of choice, values, relevance, and decision to the production of clock-time, it is therefore not at all the case that clock time is context-free, nor is it produced simply through the objective measurement of reliable change. Instead, it arises as the result of the negotiation between the desire for "objective" or context-free precision and the recognition that we are nonetheless bound by our shared context, by our lives spent on an unsteadily turning globe.

A clock is thus much more than a simple measuring device. Indeed, in light of the above discussion, I want to propose the need for a broader definition of the clock, which, for the purposes of this article, is *a device that signals change in order for its users to maintain an awareness of, and thus be able to coordinate themselves with, what is significant to them*. Moving away from the notion that a clock merely measures time, this definition enables us to more readily acknowledge the choices involved in how we go about telling the time. Further, each clock can be read as an affirmation of a shared social relation *to* something—to the layering of rocks, to the sun, to a particular type of atom. Rather than measuring a disembodied time, clocks become profoundly material. They also become more closely connected with issues of faith and belief, since in telling the time we can be understood as expressing our faith that the physical referent utilized by the clock will tell us what we need to know about the world and enable us to keep coordinated and synchronized. However, when these choices are ill-considered, or when conditions change and our clocks are not re-calibrated, problems arise. Using the wrong time scale in the wrong context, we risk tricking ourselves into thinking we are aware of, and thus able to coordinate with, those other beings or things that are most crucial, when in fact we may be falling further and further behind.

Time as (Non-)Performative Statement

On the face of it, making a statement that tells the time does not feel like an act of faith, as I suggested above, but rather something we simply read off a mechanical or digital device. And yet, I want to suggest that we are, in part, affirming that the information it provides us with will apply to the world in such a way that it will enable us to coordinate ourselves with others. What if, then, to tell the time is to affirm that the device proposed as the most valid or relevant for managing our inter-relationality with others (in our case the device that negotiates the relation between the cesium atom and the movements of Earth) will provide us with the right "time"? If this is the case, then to make the statement "It is now 11:23 a.m." is not to make a simple statement of fact about how the world is ordered; rather it is an act that orders the world in particular ways. In this sense, then, statements that tell the time are not factual descriptions, but performative acts.

Understanding how and why performative statements go wrong is a quite different task to understanding why a statement of fact may go wrong. Rather than being examined solely in terms of their truthfulness, performatives are analyzed in terms of the conventions and contexts within which they occur and the intentions of those making them. Thus, approaching statements about time as performative, rather than descriptive, enables us to ask quite different questions about how statements about time work or do not work and thus enables us to add another layer to the present analysis of humanity's fatal confusion about time.

First developed by J. L. Austin (1962), speech act theory proposes that along with the constantive statements that are traditionally the focus of philosophical analysis (that is, those statements that report, state, or describe), there are also modes of speech that *do things*, that perform and make things happen or occur—known as speech acts or performatives. One of the most well used examples of this is the statement "I do" within a wedding ceremony. Austin argues that this statement is not a description of the promise made but is the actual performance of the act of promising.

A performative that works (sometimes described as a felicitous or happy performative) conforms to two criteria. First, it occurs within well-regulated and accepted conventions. For "I do" to work, for example, it has to occur within the context of a recognizable marriage ceremony and be accepted within law. Second the person uttering the performative has to believe that her or his statement is true and intend to act as if it were the case (1962, 14-15). So for "I do" to be a felicitous speech act, it has to also be uttered by someone who actually means it and who intends to act in accordance with this promise in the future. If

both of these conditions are met, then saying "I do" accomplishes what it sets out to do.

Initially it would seem, even when we understand telling the time as a performative, that statements about time should still work according to Austin's criteria. That is, when we look at the clock and say "it is now 3:30 p.m.," we are using regulated and accepted conventions, we genuinely believe it to be the case, and we will act as if this were the case in the future. However, it is when we analyze statements about time through the broader lens I suggested above that it becomes clearer why the act of telling the time, in a world with a changing climate, might actually be so infelicitous, or unhappy, that it may actually be better understood as the "fatal confusion" that McKibben pronounces it to be.

First is the issue of context and convention. That is, are we really making statements about time in a context where they can do the work we want them to do? As I suggested above, telling the time can be understood as an act of faith that affirms that the data set provided by tracking the "before" and "after" of a particular material encounter (be it with tides, rocks, a star, or an atom) will provide us with the information required to coordinate and/or synchronize key activities, events, or relations. However in a context where humans are failing to coordinate with some of the most important changes shaping the current world, to continue to tell the time in the same ways brings about the effect of not being in time, of being out of synch and uncoordinated.

That is, rather than reflecting our current context, our conventions for telling the time (and UTC in particular) provide support to the sense of a stable background that McKibben seeks to challenge. This is because time told with ultimate reference to the cesium atom tells us the before and after of a well-regulated and unchanging interval. It does not provide us with a measure of the time before and after the mass extinction event currently taking place, before and after resource depletion, before and after dramatic changes in sea levels, before and after climate change. Rather than representing the urgency and danger of these changes, clock time emphasizes continuity and similarity across all moments and projects an empty and unending future. While it appears useful to us because it appears to be all encompassing, this appearance of utility is increasingly dangerous, since within a mode of time that does not discriminate between types of moments, global warming becomes incorporated into the flow of moments as just one more problem in the long list of things wrong with the world. As McKibben suggests, global warming can be treated as a minor concern, or lifestyle issue, rather than the crisis that it is. It would seem, then, that although our context has shifted our conventions have failed to

follow suit. As a result, our statements about time are not felicitous but might more properly be understood as "misfires" (Austin 1962, 16).

With regard to the second issue of intention, however, things are a little more complicated. There is little doubt that western societies, in particular, are highly invested in telling the time. Clocks are an ever-present element of personal and public life. Time-management gurus promise us that we can be productive beyond our wildest dreams if we follow their multiplying techniques for organizing our lives and priorities. However, despite this overwhelming commitment to time, something is still missing the mark. What I want to suggest is that perhaps, in the current context, our statements about time might be understood not simply as performatives that produce, rather than describe, the world, but as a particular kind of performative developed by Sara Ahmed which she terms "non-performative."

In articulating the notion of the non-performative, Ahmed argues that it applies to cases where "the failure of the speech act to do what it says is not a failure of intent or even circumstance, but is actually what the speech act is doing" (2005, §3). In developing this account she does not discuss time specifically. Rather her interest is in finding ways of analyzing statements about anti-racism and diversity, particularly those made in whiteness studies (2004) and in institutional diversity and equality statements (2005). She notes that despite the prevalence of such statements and their being perceived as a key part of the process of addressing racism, they still fail to perform as one might expect. Instead, Ahmed argues that despite the overt intentions of many of those involved in drafting a statement, the statement itself actually blocks the performance of the necessary follow-up actions that would show that the commitment was sincere (2005, §17). For Ahmed, the danger of anti-racist statements is that they are taken as proof that the person or organization making the statement actually *is* anti-racist. Having produced the diversity statement, for example, Ahmed claims that "it is as if the University now says: if we are committed to anti-racism (and we have said we are), then how can we be racists?" (2005, §10). Reference to the existence of a diversity statement is taken as sufficient proof that the institution itself is aligned with the content of the statement.

As Austin himself argues, a performative commonly necessitates, that "either the speaker himself or other persons should *also* perform certain *other* actions" (1962, 8). And yet, in the case of the statements that Ahmed discusses, it would appear that the effect of diversity statements has been precisely to enable the avoidance of performing the necessary follow on actions that would be required of a sincere commitment to diversity and equality. As such, these statements are "non-performative" because they "work *by not bringing about the effects that they name.*" That is

"such speech acts are taken up as if they are performatives (as if they have brought about the effects that they name)" (2005, §3).

In a similar way, telling the time through the use of Coordinated Universal Time suggests a commitment to "universal coordination." However it is as if our society's stated commitment to being in time is taken as sufficient proof that it actually *is* in time. This assurance may actually be blocking our ability to perform the *other* actions required for this commitment to be realized. Like the rhetoric of the institutional diversity statement, UTC appears to announce a certain social commitment, while enabling the status quo to continue unimpeded. Put in terms of Ahmed's example above, it is as if our modes of telling the time say "if we are committed to providing accurate methods of coordination (and we have said that we are), then how can our methods be inaccurate?" We say that we will tell the time, but do not then perform the necessary actions to ensure that we remain coordinated with the changes we need to be most aware of. Thus, if we are to break out of this non-performative mode, we may need to lose a little bit of faith and step back from our assurance that our clocks are accurate so that we can begin to think through how we might recalibrate them in new kinds of ways.

Alternate Conventions in the Present

Coming to see statements that tell the time as performative speech acts not only helps to shed light on why our temporal conventions are a problem in the current context, it also provides clues for how these conventions might be transformed. Ideally, when performatives work, it is because there are shared social conventions providing them with the supportive context that allows them to be understood by others. "I promise" works because both those saying it and hearing it understand what a promise is, the proper ways to make one, and the kinds of actions one has to perform subsequently for it to remain valid. Absent of such conventions and contexts, however, a new phrase or device may have little chance of having a significant effect, since it is more easily dismissed as nonsense or as irrelevant. What I want to outline in this section, then, is an approach that takes seriously the power of conventions and the difficulties of altering them but still allows for the possibility of social change. This approach will draw together Jacques Derrida's work on the "originary performative" and Donna Haraway's work on figurations. What is particularly interesting about each of their approaches is their discomfort with the desire to disavow a particular present convention in order to shift to a radically new one. Instead, in their different ways, they each argue that the conventions most likely to succeed in transforming dominant conventions are already available within the (contradictory and multiple) present.

Key to Derrida's interest in speech act theory is the possibility that performatives might be both productive and active, even while failing to conform to accepted conventions and regulations. In *Specters of Marx*, for example, he thinks through the possibility of transformative speech acts that do not either completely align or completely exceed a particular set of conventions, but instead cause productive tensions within a context itself. These "originary" performatives exhibit a creative "force of *rupture*" (1994, 31). Derrida suggests that this rupture does not in and of itself create a new convention or context; instead it entices others to produce new conventions, institutions, and traditions in response to it. A practical example of this can be found in an interview with Maurizio Ferraris, where Derrida discusses the difficulties of translating philosophical texts (Derrida and Ferraris 2001). He notes that "A work that appears to defy translation is at the same time an appeal for translation; it produces translators, and new protocols of translation; it produces other events that make it possible for a translation that does not exist to be produced" (2001, 16). What he is thus suggesting is that there are some performatives that can work outside of a receiving context, without blocking action (as Ahmed's non-performatives do), but by instead inspiring active and creative responses to the enigma they represent. That is, rather than acting by conforming *to* conventions, they act by calling *for* conventions.

According to Derrida then, the trick, when seeking to transform restrictive conventions, is to look for something within a particular context that goes against the dominant currents and yet seems to call for greater recognition or awareness. These less established currents are always available, since even while there are indeed strong and established conventions, "each and every time, epoch, context, culture, each and every national, historical or disciplinary moment, has a certain coherence, but also a certain heterogeneity—it is a system in which there are zones of greater and of lesser receivability." This means that even within firmly established conventions "there is another current, as yet secondary, virtual, inhibited—it waits pregnant with a possible receivability" (2001, 15–16). The task of those who are called by this virtual current is to prepare a place for its reception, to develop protocols, concepts, and audiences that enable it to become more widely accessible. Promisingly for my purposes here, this suggests that the potential to develop new devices that could signal the fundamental changes transforming the planet is already at work in the present.

With Derrida's account in mind, I want to turn to Donna Haraway's account of her method of figuration, which has a number of affinities to the notion of the originary performative, but which I would argue significantly extends our understanding of the hospitality towards the unknown that Derrida advocates. Put briefly, Haraway's method

emphasizes the development of specific figures that intervene into habitual ways of both living in and understanding the world in order to denaturalize the commonsense feel of conventions and open them up so that things may work differently. She writes, for example, that "figures must involve at least some kind of displacement that can trouble identifications and certainties" (Haraway 1997, 11). Like Derrida's originary performatives, then, her figures also bring with them "a force of rupture."

But Haraway's figures also bring a much more explicit attention to the way the potential that arises from those "virtual currents" is not a purely imaginative one, but arises from specific material contexts. She writes, for example, that the figures at work in her book *When Species Meet* are all "mundanely here, on this earth, now" (Haraway 2008, 5). Figurations are not, therefore, only illustrative thought experiments. Rather they encompass (and thus challenge) what has been divided into "reality" and "fiction." In discussing her work to date she argues that her "figures have always been where the biological and literary or artistic come together with all of the force of lived reality." That is, her figurations are "at the same time creatures of imagined possibility and creatures of fierce and ordinary reality" (4). Developing new clocks in line with this approach, then, would involve paying attention to the potential at work in the present, but with the realization that these new devices will not be invented from scratch but are already immanent and embodied. Indeed they may actually already be telling our time.

Haraway's work suggests a number of further issues that I would like to briefly discuss before looking at some examples of new kinds of clocks. First is the importance of developing a figuration that is able to intervene into everyday embodied and affective experience. As I have argued elsewhere (2006), Haraway's figures are not produced for the fun of purely intellectual play but "for the hope for liveable worlds" (Haraway 1994, 60). As such, they ideally do not remain distant from everyday life, but provide charismatic reframings that draw people into a differently organized world. That is, "figurations are performative images that can be inhabited" (Haraway 1997, 11). These figures are not inhabited alone, however. Rather her figures are fundamentally about transforming understandings and experiences of relationality. In doing so Haraway seeks to move away from more entrenched binary modes of relating towards more complex, contradictory inter-relations. The figures she describes "gather up those who respond to them into unpredictable kinds of 'we'" (Haraway 2008, 5). This second issue of relationality is particularly important given my argument that clocks do not provide an objective measure of the world, but rather orient us toward particular relational worlds. In doing so, they afford certain modes of relationality, while hindering or obscuring others. In our

current context, where the hyper-separation of "nature" and "culture" continues to hinder our response to multiple crises, the clock that could orient us towards a more complex and unpredictable "we" would appear to be vitally important.

Summing up the work performed by figurations, Haraway at one point describes them as "condensed maps of contestable worlds" (1997, 11). This phrase neatly captures the multiple interventions made by these complex devices. It suggests that those figurations that are productive draw together worlds that have been distanced from each other, without however doing so with the aim of harmonization or homogenization. In this they may be thought of as performative, since to paraphrase Shannon Jackson, they do not simply reflect a world, rather they actually have the power to *make* a world (2004, 2).[5] Significantly, while Haraway uses the spatial metaphor of the map, she does tie her figures to temporality and timing. This can be seen particularly in *Modest_Witness@ Second_Millennium. FemaleMan©_OncoMouse™*, where she argues that "figures always bring with them some temporal modality that organizes interpretive practice" (Haraway 1997, 11). Her figure of the Modest_ Witness@Second_Millennium, for example, presents challenges both to the norms of self representation within scientific practice, as well as the temporal senses of history, progress, and apocalypse which Haraway argues inform this practice (1997, 9–10). The more recent companion species also bring complex temporalities with them, which, according to Haraway, "comprehend all the possibilities activated in becoming with, including the heterogeneous scales of evolutionary time for everybody but also the many other rhythms of conjoined process" (2008, 25). Given this it seems entirely plausible that figurations do more than draw together worlds that have been distanced from each other. They would also appear to be capable of drawing together worlds that have been desynchronized or detemporalized from each other. In recalibrating our devices for telling the time, then, we might very well be looking for figures that can act as "condensed *clocks* of contestable worlds."

To summarize then, the approach that I have outlined here suggests a number of issues that might need to be addressed when thinking about how to tell the time in the context of climate change, resource depletion, and mass extinctions. First, following Derrida, these clocks would appear to have the best chance of succeeding if they arise, not from outside of our current conventions, but from within them. Second, both Derrida and Haraway emphasize the importance of being drawn in by a particular figure, of it being intriguing in some way, without

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5.   The full quote from Jackson is "linguistic acts don't simply reflect a world but that speech actually has the power to *make* a world" (2004, 2).

fitting neatly into what is already known, as well as the need to maintain, rather than resolve, complexity and difference. Third, Haraway's work, in particular, suggests the need for a clear emphasis on materiality, relationality, and the affective power of figurations. Combined, Derrida and Haraway's approaches skirt between some of the most stubborn oppositions in thinking around social change and refuse to commit to either reality versus imagination or revolution versus reformation. Instead they provide an approach that emphasizes the importance of learning how to be hospitable to those ways of being and thinking that are, as yet, on the edges of receivability.

From Doomsday to the Long Now

The idea that standard clock time is not adequate in the context of climate change is not, itself, new. Impending crises regularly inspire an interest in rethinking how we tell the time. Given this, I want to now look at a few examples of how others have sought to address this issue. The Doomsday Clock is perhaps one of the most prominent examples. It was created in 1947 by the Bulletin of the Atomic Scientists (BAS) as a way of indicating the likelihood of nuclear war (BAS, 2010a). Unlike UTC, which problematically projects an unending future no matter the context, the Doomsday clock uses the commonly understood convention of midnight to signify the end of time. The meaning of the minute hand is transformed, no longer representing quantitative time, but rather the likelihood of reaching Doomsday. Interestingly, its remit was recently expanded to include the risks posed by climate change and biological weapons (BAS, 2010b), and, in part due to inaction over climate change, the clock was moved forward one minute to five minutes to midnight in January 2012 (BAS, 2012).

Another, more recent, example is the One Hundred Months project developed by the New Economics Foundation (NEF) (2008). Like the Doomsday clock, the 100 Months clock does not project an empty future but rather counts down to a finite end point. Started in August 2008 it indicates the number of months that the NEF suggest are still available for us to take action to avoid the Earth's average surface temperature rising above 2ºC. They argue that if we have not acted within this time period, it will be too late. Andrew Simms, NEF's policy director, suggests that in providing this representation, "there is now a different clock to watch than the one on the wall." Far from indicating empty, homogenous time, the 100 Months clock instead "tells us that everything that we do from now matters" (2008 n.p.).

Implicitly supporting the construction of both of these clocks is the assumption that everyday clocks are not all-encompassing and are in fact obscuring key changes in the world. Both propose another measure of the "before" and "after" in order to facilitate a communal

reorientation towards the dangerous changes currently taking place. The new clocks devised by the NEF and the BAS thus both fit well with the expanded definition of the clock that I proposed above. Both signal different changes (the number of months left to act and the likelihood of doomsday) so that their users can maintain an awareness of, and thus be able to coordinate themselves with, significant issues in the present.

Both the Doomsday Clock and the 100 Months Clock try to raise awareness of our closeness to disaster by challenging the standard clock's projection of an undifferentiated future and instead indicating an end of time that is very close to the present. However another approach has been to argue that the problem is not that we are responding too slowly, but rather that our experience of time is too accelerated and short term. There have thus been a variety of efforts to intervene into shared sensory experiences and expectations around the pace of time, including the slow food movement (Petrini 2001) and the related slow city movement (e.g., Mayer and Knox 2006, Pink 2007, and Parkins 2004). There is also a clock that is being developed in order to afford a deeper, more far-reaching apprehension of time. The Long Now Foundation are currently working towards building a 10,000 year clock that, rather than marking the frenetic oscillations of the cesium atom, significantly stretches the interval between the "before" and the "after" (Brand 2000). The clock, first proposed by Danny Hills, will be one that "ticks once a year. The century hand advances once every 100 years, and the cuckoo comes out on the millennium" (quoted in Kelly n.d.). Clearly aware of the way particular kinds of clocks will in turn tell particular stories about the world, Steward Brand argues that "such a clock, if sufficiently impressive and well-engineered, would embody deep time for people" (Brand n.d.). Thus, in building it they are aiming to intervene into the public imaginary by producing a clock that "should be charismatic to visit, interesting to think about, and famous enough to become iconic in the public discourse. Ideally, it would do for thinking about time what the photographs of Earth from space have done for thinking about the environment" (Brand n.d.). So if the Doomsday Clock and the One Hundred Months Clock are focused on providing a means for coordinating with imminent crises, the 10,000 year clock provides a different orientation that suggests the possibility of continuity and longevity and thus, perhaps, a dash of optimism.

Each of these clocks seeks to provide ways of challenging the empty homogeneous time of the conventional clock and so arguably move towards the development of more adequate ways of telling the time in our current context. However, while the success of these interventions into public time needs to be more closely analyzed, I am initially hesitant about their approaches. In particular it is not clear that they provide ways of indicating the wide varieties of clashing time

scales and modes that characterize the present and which we need to negotiate in our responses to climate change, resource depletion, and mass extinctions. As many writers have suggested, the variety of processes involved in each of these crises do not neatly match up. Instead there are clashes evident within a multitude of areas, including: multidisciplinary research that seeks to integrate scientific and social approaches (Wood 2008), for example nuclear waste research (Moser et al. 2012); the short term character of business management practices and longer term environmental processes (Adam et al. 1997); scientific research and social action (Brace and Geoghegan 2010); and within environmental political movements themselves (Szerszynski 2002). Barbara Adam draws together these contradictions in her notion of "timescapes," suggesting that we need to find better ways of indicating "the full temporal complexity of specific culture-nature intersections in their in/visible and im/material expressions" (Adam et al. 1997, 81). Thus, figuring out how to "coordinate" ourselves within a context of co-occurring and conflicting actions, values, loyalties, fears, and hopes may require even more radical refigurations of the clock.

Condensed Clocks

It is now 8:13 a.m., or so it says on my computer. From this I can predict a considerable amount of what is going on in my time zone at the moment. For example, a lot of other humans are in the last stages of getting ready for work. There are a multitude of trains and buses making their way around with people in them fighting for space. There are no children in school since it is summer. There will be other people still sleeping, or only just getting to sleep after being up all night. It would be unusual for someone to be blowing out their birthday candles right now, or to be at the cinema. I am let into this particular world in part due to the clock at the bottom right-hand corner of my computer screen. However its promise that everything happening in the world can be condensed within the time it tells is not true. My clock tells me nothing about what is happening on the Antarctic ice shelves. I cannot predict how much methane is being released from the melting permafrost. I do not know which creatures will go extinct today, nor how much plastic will reach the strange artificial islands forming in the ocean's gyres. So, rather than coordinating our lives with and through a stable and predictable atom, augmented by the movements of a planet around a star, what if we tried coordinating our lives with something less predictable, but maybe more accurate for the times we live in? An animal perhaps, rather than a planet and an atom? A turtle?

Not so long ago, a colleague suggested we explore the effects climate change was having on leatherback turtles. In beginning to look into the issue, I found a New York Times article that positioned the turtle as a key

indicator of the changes currently affecting the planet (Rosenthal 2009). What stuck me in particular were comments from Carlos Drews of the World Wildlife Fund, who described turtles as "very good storytellers about the effect of climate change on coastal habitats," due in part to the fact that "the climate is changing so much faster than before, and these animals depend on so much for temperature [sic]" (Rosenthal 2009, A8). Surprisingly, in this particular public appearance, an animal that most often symbolizes slowness and steadiness was described as being best placed to tell us about speed—the speed of climate change. Stories about turtles have for a long time been used to explain some of the paradoxes of space. The idea of "turtles all the way down," for example, continues resonating long after it was first thought. So this article inspired me to wonder what stories might turtles tell us about time?

Undoubtedly the notion of a turtle clock, as opposed to an atomic clock, is unconventional and strange. Performing time in this way would seem to break with all our current conventions for time and risks being dismissed as nonsensical. But one reason why I think turtle clocks may be an interesting option to pursue is that, like Derrida's "originary performatives," their very unintelligibility may work to inspire new conventions around time. Indeed the more one dwells with the possibility, the more one discovers/produces current contexts that could provide a hospitable framework in which its potential receivability might become realized.

For instance, judging the "before" and "after" in reference to other animals is not as unusual as it may sound. In the UK, for example, the arrival of songbirds has traditionally signaled the changing of the seasons from winter to spring.[6] Certain fossils, known as index fossils, are important geological markers of time (O'Brien and Lyman 1999). And in a gruesome and bizarre story, David Landes talks about an attempt to use a dog as a time signaling device (2000, 155). So returning again to the broader definition of the clock that I outlined above, it is already the case that changes in animals (in their location, their numbers, their behavior) are being used as signals to guide the coordination of humans with what is significant to them. In what follows, therefore, I want to explore two examples of how leatherback turtles in particular might also already be in popular consciousness, telling humans time. I pick these examples, in particular, because they also show how an attentiveness to

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6.   See for example this opening sentence from an article on the website for the Royal Society for the Protection of Birds called "The Voices of Spring": "During the spring and early summer, it's not just the milk van that will wake you early—it's dawn chorus time again" (RSPB, 2007, n.p.). With numbers of songbirds rapidly declining, however, this is less often the case.

turtles and their relations with humans enables a response to the two confusions McKibben discusses in regard to our conceptions of time—the misconception that nature provides a stable background to human lives and the failure to recognize that perhaps it is actually humans that are slow-moving and unchanging.

From a certain perspective our unconventional turtle continues to travel in dominant currents. This is because it is entirely possible to argue that turtles tell a very conventional story about the stable time of nature. Reiterating the sense of the "long slow accretion of epochs" that McKibben highlights, leatherback turtles are often described in terms of their long, seemingly unchanging, evolutionary history. They are described in one news article, for example, as "all but ageless" (Angier 2006). Further, with an evolutionary history reaching back over 100 million years, they often provide humans with a sense of continuity with a deep past. As conservationist Carl Safina writes in his *Voyage of the Turtle*, the leatherback, "whose ancestors saw dinosaurs rule and fall, is itself the closest thing we have to a living dinosaur" (2006, 1). In just one example of this trope's wider use—the promise of experiencing a connection with this deep slow time is often put to work in promotional material for tourists wanting to encounter leatherbacks at their nesting sites.

Looking a little more closely, however, the turtle can also be seen traveling on secondary currents that disrupt this nostalgic portrayal of them. Attending to the evolutionary histories of these seemingly placid, stable creatures tells an alternate, and much less placid, story about an unstable planet and the difficulties of surviving a changing climate. As Safina discusses a little further on in his book, there have been at least six species of Leatherbacks; however "only two species of Leatherbacks entered the Pleistocene and faced its ice ages. Only one emerged" (2006, 22). This means that "the modern Leatherback survived conditions that extinguished other Leatherback species about a million years ago" (2006, 22). Even then the survival of this one species was not assured. Instead "all Leatherbacks living worldwide today are genetically so similar that even the modern Leatherback probably came within a flipper's length of extinction" (Safina 2006, 22; see also Dutton et al. 1999). From this perspective the leatherback proposes that a quite different account of deep time needs to be thought, one that is nicely captured in Nigel Clark's claim that:

> As an alternative to both linear, progressivist narratives and flash-bang apocalypticism, attentiveness to long-term dwelling viewed in tandem with dynamic environmental history puts the stress on enduring, surviving, living on through whatever challenges the world delivers. (2008, 739)

As Clark's emphasis on the volatility and unpredictability of earth processes suggests, to have lived through deep time is not to have remained unchanged, but, on the contrary, to possess the ability to actively respond to dynamic and changeable environments.

Turtles not only tell us about the unstable time of an active Earth, they also tell the frustratingly slow time of human efforts to respond to recognized environmental threats. In a protracted series of events echoed in any number of conservation campaigns, Safina recounts efforts in the U.S. to reduce the high numbers of turtles drowning in fishing and shrimping nets (2006, 80–151). Although sea turtles had been recognized as an endangered species since the late 1970s, regulations to require devices that enabled turtles to escape from fishing nets took some time to be passed. Working on estimates of around twelve thousand turtles drowning per year, Safina writes "one hundred thousand dead sea turtles after the government first recognized the problem . . . the Fisheries Service in June 1987 published regulations requiring that shrimp nets of the southeast U.S. and Gulf states carry "turtle-excluder devices" (TEDs) to take effect several months hence" (Safina 2006, 84). However, a variety of issues impacted the effectiveness of the legislation, including court injunctions and conflicts between state and federal governments. Even once regulations were passed, the size of the required devices was not adequate for larger sea turtles, particularly adult leatherbacks and loggerheads, to escape (see Epperly and Teas 1999 and Lewison, Crowder, and Shaver 2003). Indeed, "not until August 2003 did the federal government require Leatherback-sized turtle-escape devices in shrimp nets along the U.S. East Coast and Gulf of Mexico" (Safina 2006, 89).

In his account, Safina is critical both of the government agencies involved and the shrimpers for their failures to respond in a timely way. However, what this example highlights is not necessarily the failure of particular groups to "get with the program," but rather the multiple and conflicting temporalities of conservation, the complexities of which mean that "timeliness" will be defined differently by the various actors involved. Moving according to different trajectories, each participant will draw on different histories in the hopes of different futures. So, while particular efforts to save sea turtles will appear timely to some, for others they may actually be experienced as the breaking or arresting of time. As Safina himself points out, shrimpers are also potentially facing their own extinctions, in that they are having to make "generation-breaking decisions" about whether to continue with businesses that are experiencing their own pressures (2006, 100). In this case, the turtle clock, which here tracks the changes in turtle populations alongside the lack of change in human shrimping techniques, enables us to maintain an awareness of the inter-meshing relations of turtles, governments,

conservationists, and shrimpers. In doing so, it foregrounds the inherent difficulties of coordination in a complex multi-species world, rather than hiding such work under the cover of a "universal" time.

These two small examples illustrate how telling the time with turtles opens up the complexities and incommensurabilities in what is all too often assumed to be a shared and all-encompassing present. As Euan Ferguson wrote recently in the U.K. *Observer* newspaper, exploring the interconnections between massive jellyfish blooms in the Irish Sea and increased Leatherback sightings in the U.K.:

> The more I learn, the more complicated becomes the world of marine biology. Sometimes it must seem as if there's only one law and that's the one of unintended consequences. It strikes me . . . that, if Europe ever got unaccountably sensible about fishing, then herring . . . might get a look-in again in the Irish Sea. Which would be good for eating the bad jellyfish. But that would then be bad for the good turtles, who would then . . . well, who'd be a marine biologist? Their heads must hurt all the time, and not just from the diving. (2011)

Following the turtle rather than the atom, we are led into a complicated world where there is no clear path forward. And yet these are our times, and so this is arguably what we need to coordinate ourselves with. In this way then, the figure of the turtle makes visible alternative temporal conventions that are already at work within the same Western culture dominated by an abstract clock time, and which may better serve us.

Of course the turtle-clock is just one example—one condensed clock for this contestable world. Such a clock, in breaking with conventions, risks being unable to perform as it promises, winding up perhaps as one of Austin's unhappy performatives. Worse, it could end up as one of Ahmed's non-performatives and block the ability to act, should the use of our strange and unusual clocks be taken as proof that we have solved the issues they were meant to address, without having to enact any of the follow-up actions that a performative requires. However, perhaps the leatherback's status as one of the charismatic megafauna that "are so vividly present in our imaginary lives" (Rose and van Dooren 2011, 1) might enable it to entice us into a differently ordered world. Rather than utilizing a clock that promises absolute commensurability and predictability, one that reduces "the time" to a sequence of numbers, perhaps we might gain from exploring the kinds of clocks that could be produced when we "coordinate" ourselves with and through other relationalities within our world.[7]

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