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Attending to Grape Vines: Perceptual practices, planty agencies, and multiple temporalities in Australian viticulture

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Abstract: *This article considers the agency of crop plants within socio-cultural processes by examining how grape vines influence seasonal labour patterns in Australian viticulture and wine production. Drawing on ethnographic research within a large Australian wine company, I examine how vineyard managers and winemakers coordinate the timing of the grape harvest with the ripening of grapes. I argue that by making the harvest's approach perceptible to humans, chemical and sensory tests of grape ripeness precipitate seasonal changes in viticultural work – rendering grape vines active participants in patterning social time. Practices of attention to ripening grapes thus render the social agency of grape vines perceptible. I analyse these time-reckoning practices as a 'learning to be affected', in which human viticulturists actively strive through multiple sensory practices to become attuned to plants' activities. However, attending to the multiple practices used to reckon the 'right' time to harvest grapes also emphasises that these ways of enacting the times and agencies of crop plants may interfere or conflict with one another. Highlighting the emotional stresses and tensions between viticultural workers that this may generate, I suggest that agricultural time is both more conflicted, and more suffused with power relations, than theoretical accounts have typically indicated.*

Key words: viticulture, temporality, learning to be affected, wine, more-than-human, multiplicity

Introduction

Relationships between plants and humans form a crucial dimension of issues including agricultural sustainability, food security (Head et al. 2012), biosecurity and biodiversity conservation (Barker 2008), and of questions about how human and nonhumans are to share urban green spaces (Cloke and Pawson 2008; Hitchings 2007; Whatmore and Hinchcliffe 2010). As such, some of the most pressing social and ecological problems which confront contemporary social and cultural geographers concern questions about how humans and plants might and should live together (Jones and Cloke 2002; Head and Atchison 2009). More fundamentally, it is arguable that human life, and the social formations typically studied by human geographers, exist only by virtue of myriad intimate relationships with plants. Head et al. (2012: 29) suggest that: ‘whatever humanness is, it requires plantiness. We are made by plants in the sense that they have provided the atmosphere that we breathe and provide much of the sustenance that we eat. They have had agency in the ways our bodies evolved, and continue to be fundamental to our daily bodily relations.’ Through these evolutionary and ecological entanglements, plants and plant products – from foodstuffs and fabrics to a breathable atmosphere and certain fossil fuels – have come to pervasively subtend human life, rendering the very survival of ‘the human’ contingent upon their presence (Clark 2011; Hall 2011).

Human-plant relationships’ existential importance to human survival, and their relevance to questions about contemporary societies’ ecological sustainability, have spurred a small but growing corpus of human-plant geographies to contest a perceived empirical and theoretical neglect of plants’ participation in the social (Head and Atchison 2009; Hitchings 2003).

Expanding upon a well-established turn to studying more-than-human dimensions of social life (Clark 2011; Hustak and Myers 2012; Whatmore 2002; Whatmore and Hinchcliffe 2010), geographers are enthusiastically exploring human-plant relationships within gardening practices (Cloke and Pawson 2008; Ginn 2008; Hitchings and Jones 2004; Hitchings 2007) and human engagements with wild or feral vegetation (Barker 2008; Franklin 2006). Yet interventions investigating human-plant interactions in agricultural settings remain comparatively rare (although see Head et al. 2012; Inhetveen 1994; Jones and Cloke 2002; Richardson-Ngwenya 2012).

I would suggest that a closer attention to agriculture might open up important new avenues for research in human-plant geographies, because agricultural human-plant relationships can potentially offer particular insight into social life's reliance upon plants. In coaxing the staple foods which sustain most contemporary human bodies from crop species, cultivators surely transact mundane and yet uniquely intractable forms of human-plant co-dependence. Indeed, some authors – both within academic social theory (Head et al. 2012; Tsing 2012) and in more popular genres (Margulis and Sagan 2000; Pollan 2002) – even portray the development of settled agriculture, state polities, and urban life as issuing from the domestication *of* cultivators *by* crop plants. Such accounts imply that modern 'human' sociality and culture do not originate from an intersubjectivity transacted among people alone, but arose through cultivators' relationships with crop plants. Taking these arguments seriously suggests that researchers cannot understand the social – conceived as the corporeal, but also meaningful, associations which interweave the conduct of multiple humans' and nonhumans' existences into collective formations whose constituents define and depend upon one another (Latour 2005) – without attending to entanglements among plants and humans. Engagements with human-plant relationships – the stuff of this special issue – thus become

central to the work of social and cultural geography, for taking account of plants becomes a prerequisite for any coherent understanding of more-than-human social life.

This article therefore seeks to attend to crop plants', and more specifically grape vines', active participation in the more-than-human processes which compose social life (Whatmore 2002; Whatmore and Hinchcliffe 2010). I suggest that registering these plants' involvement in the social will require that social and cultural geographers learn to perceive plants' capacities to affect and displace human bodies and activities – that is, to become sensitive to planty agencies.¹ Drawing on Greenhouse's (1996) argument that people's accounts of time disclose their formulations of agency, I suggest that crop plants' contributions to the rhythm of agricultural life and labour might be rendered perceptible through attention to the 'ecologies' (Jones 2011) of time-reckoning practices employed by contemporary cultivators. Turning to my own ethnographic research within a large Australian wine company, I describe three practices – maturity testing, weather-watching, and field assessment – through which viticulturists and winemakers temporally coordinate their preparations for the grape harvest with ripening grapes and changing seasons. Teasing out relations and tensions between these practices, I argue that each enacts both its own form of time and its own account of how grape vines act and are affected. By exploring this multiplicity of planty times and agencies, I question prevalent accounts of agriculture as either harmoniously conforming to a singular natural time (Inhetveen 1994) or oppressively imposing a purely 'social' clock-time upon subjugated crop plants (Adam 1998). Instead, I suggest, attending to the practice of time-reckoning in viticulture renders perceptible the tensions and stresses which emerge as cultivators attend to or ignore particular forms of activity and change in their crops. In so doing, it enables social and cultural geographers to question which political, economic and ethical values may be transacted through the particular enactments of planty time and agency to which specific agricultural practices give rise.

Attending to Agency

Human-plant geographers seeking to explain intellectual indifference towards plants often focus on their tendency to become inextricably intertwined with other beings and processes in collective formations such as landscapes and food systems. Plants' subsumption within composite entities and processes is argued to make them difficult to address as autonomous individual organisms possessed of the ethical standing and independent agency which have generated academic interest in animals (Hall 2011; Hitchings and Jones 2004; Marder 2011). Human-plant geographers have therefore been anxious to recognise, and conceptualise, plants' own distinctive ways of affecting, displacing, and making differences within the conduct of collective life (Latour 1999; Bennett 2010) – that is, to identify specifically *planty* forms of agency (Head et al. 2012; Hitchings 2003). Yet how plants might exercise agency and what the qualities of *planty* agency might be remain somewhat contested questions.

Planty agency is perhaps most frequently figured as a stubbornness or excess. Plants are often portrayed as subverting human designs in unexpected ways, particularly in accounts of indigenous and European plants' propensities to 'abscond' from their assigned roles and places within postcolonial Antipodean ecologies to produce unruly and sometimes hazardous landscapes (Barker 2008; Franklin 2006; Ginn 2008). Accounts of gardening, meanwhile, often emphasise plants' capacities to call forth unexpected activities and meanings from gardens (Clope and Pawson 2008). Plants' activities can thus trigger subtle disturbances of gardens' spatial and affective characteristics, which their human occupants may experience as enjoyable spontaneity (Hitchings 2003) or find awkward and unsettling (Hitchings and Jones 2004; Hitchings 2007). Hall (2011: 12), however, argues that plants are 'perceptive, aware, autonomous, self-governed, and intelligent beings' whose capacities for reasoning, intentionality and self-expression must be recognised in order to contest their unbridled

subjugation and exploitation by humans. Hall's argument succeeds in imputing to plants capacities beyond that of resisting or seducing humans, but in so doing also reproduces a deeply-ingrained identification of agency with autonomy (Whatmore 2002). This way of thinking portrays action as originating within an independent actor unaffected by a world external to itself: 'one who is moved by itself, and only by itself, that is the one who will not be moved, put into motion by others. ... one who will not be affected' (Despret 2004: 118). Yet this conception of agency, like that mobilised when a purposefulness is attributed to plants' 'genetic blueprints' (Jones and Cloke 2002; Pollan 2002), is grounded in a problematically anthropocentric vision of a *human* actor idealised as rational, self-interested, and self-moving (Hustak and Myers 2012; Whatmore 2002).

Plants, in particular, are surely poor candidates for the independent, and indifferent, individual subjectivity which this account of action depicts (Head et al. 2012). Inextricably 'rooted' in, and engaged in constant material interchange with, the soil and atmosphere from which they grow, plants' seemingly-endless capacities to be affected by various environmental others are surely among their defining characteristics (Hustak and Myers 2012). Plants' pervasive corporeal embroilments in their 'external' environments have led Marder (2013: 100) to characterise them as 'heteronomous' beings, arguing that: 'the plant's self, bereft of interiority, is the other ... the environment from which it is never fully set apart.' Hall (2011) himself acknowledges plants' characteristic openness to being moved and affected by such 'external influences.' Indeed, he portrays this as having led a Western philosophical tradition which casts agency as a zero-sum game, in which an autonomous subject's actions necessarily dominate and pacify all the entities affected by them (Gomart 2004; Gomart and Hennion 1999), to dismiss plants as radically inferior beings devoid of agency. By this logic plants are seen as intrinsically passive due to vegetal life's dependence upon photosynthetic metabolic activities, for: 'The imperfection of the plant is attributed to

its incapacity to determine itself ... due to the plant's rootedness outside of itself, in the external—*exōterikoū*—element on which it depends' (Marder 2011: 476).

Basing arguments for the recognition of plant agency, and for the ethical consideration of plants, on their status as autonomous and self-governed organisms therefore seems to require not only that crucial aspects of plant life be overlooked, but also that plants once again be judged according individualistic and anthropocentric definitions of agency against which they will always be found wanting. Moreover, this account of agency gives rise to deeper political and ethical problems, for its position that being affected or influenced by others annuls or represses an entity's agency renders interaction and cohabitation synonymous with domination and exploitation (Hustak & Myers 2012; Ingold 2000). If agency is conceived as autonomy then crop plants, whose (re)productive capacities have been manipulated and appropriated to suit the needs of their human domesticators, may only ever occupy a position of abject enslavement. Plant agency therefore becomes something found only in wild plants – plants 'alone' in a space and time of their own, safely removed from the contamination of human influence (Hall 2011; Marder 2013). This assertion that plants may act and flourish only if safely segregated from humans threatens, much like the spatial enactment of separations between nature and society through the establishment and conservation of 'wilderness' areas (Katz 1998), to 'cast any use as *ab*-use, and thereby denies us a middle ground in which ... might attain some kind of balanced, sustainable relationship' (Cronon 1996: 85). In portraying the cultivation of crops as synonymous with their subjugation, it casts a retreat into an aestheticised, speculative contemplation of the botanical as the only ethical form of human-plant relationship (see for instance Hall 2011; Marder 2013). However, such a move precludes more nuanced discussion of the political and ethical stakes of human-plant cohabitation in a world whose human population's survival depends overwhelmingly upon agriculture's products (Head and Atchison 2009). It also leaves

geographers facing an unappealing choice between adopting analytical approaches focused upon 'wild' plants alone or generating exclusively 'human' geographies which are inattentive to plants. Accounts of agency-as-autonomy therefore scarcely offer a promising starting-point for geographies of human-plant relationships (Head et al. 2012; Latour 2005).

Perhaps, then, the terms of debate might be productively shifted if plants' subversive capacities were instead apprehended as arising *through* their characteristic entanglements in their environments (Marder 2011). This shift in perspective might be accomplished through adopting a 'relational materialist' (Anderson and Harrison 2010) account of agency, which figures access to and influence over other bodies as products of material connections to them and views the autonomous agent's isolation from, and indifference to, a world 'out there' as precluding both perception and action (Latour 1999). To this way of thinking: 'to have a body is to learn to be affected, meaning "effectuated", moved, put into motion by other entities' (Latour 2004: 205). Action therefore neither arises spontaneously within nor belongs exclusively to autonomous individuals, but is instead elicited as bodies make a difference to one another and in so doing also make each other act differently (Gomart 2004; Gomart and Hennion 1999). Sensitivity to differences in others proliferates capacities to act in new and different ways, so that being affected produces not passivity but a more varied, sensitive, and subtle repertoire of capacities for action (Ingold 2000; Lorimer 2008). By this account, plants' promiscuous couplings with their environments render them 'difference generators; they constantly ... improvise new ways to articulate themselves, to register new kinds of differences in the world, and to invent new ways to make a difference in the world' (Hustak and Myers 2012: 105).

Understanding agency as a 'learning to be affected' (Latour 2004) thus suggests that planty agency is not exercised most forcefully when plants are sealed off from human perception

and action. Rather, it becomes most tangible when the material textures of plant bodies become embroiled in the conduct of more-than-human social life, and thus become capable of provoking humans to act differently (Hustak and Myers 2012). This relocation of plant agencies offers human-plant geographers new opportunities to register their force through exploring associations, practices, and encounters within which changes in plants become capable of affecting, displacing, and transforming human bodies and conduct (Despret 2004). More specifically, this approach suggests that researchers may become enabled to appreciate, and render perceptible, the agencies of crop plants through attending to the modes of human-plant cohabitation enacted within agricultural practices.

Time and Agency

Nevertheless, if agency is understood as a learning to be affected then this raises questions about how human-plant geographers might recognise and study plants' ways of disturbing and exciting their human companions. One way of registering humans' becoming-affected by plants is perhaps suggested by Ingold's (2000: 415) contention that responsive and accomplished action relies upon the ability of 'The skilled practitioner ... continually to attune his movements to perturbations in the perceived environment'. This perspective proposes that capacities to affect others – to act – arise when practitioners carefully coordinate their movements with changes and motions among the human and nonhuman bodies amid which their own activities take place (Despret 2004; Lorimer 2008; Whatmore and Hinchcliffe 2010). It thus presents dextrous synchronisation as generative of agency. This suggests that plant agencies become perceptible, and capable of affecting human bodies and activities, when a change in a plant body's texture or position facilitates or impedes the enactment of a practice sufficiently that its occurrence demands a change in human conduct.

That is, when a change in a plant, or a change in the world generated by a plant, comes to constitute an *event* (Bastian 2012).

This emphasis on events – conceived as changes which generate a perceptible difference between the world's arrangement before and after their occurrence (Anderson and Harrison 2010) – suggests that the perception of planty agencies is interwoven with the marking and reckoning of time. Indeed, this interconnection between eventfulness and difference-making leads Greenhouse (1996: 1) to contend that: 'time articulates people's understandings of agency: literally, what makes things happen and what makes acts relevant in relation to social experience.' Greenhouse argues that reckoning the temporal sequencing of events implicitly formulates an account of causality (Bastian 2009). The marking of time registers changes which make a noticeable difference to the way that the world is, and in so doing identifies agencies which have perceptibly affected and recomposed the more-than-human collectives amid which 'human' sociality takes place. Examining people's ways of reckoning the passing of time can thus draw attention to the relations through which nonhuman beings and processes come to make a difference to the social, for 'each clock can be read as an affirmation of a shared social relation *to* something' (Bastian 2012: 31).

It therefore seems probable that attending to practices through which people keep their own actions in time with changes in plants might render perceptible the relations through which plants' capacities to become affected and to affect – their agencies – come to move humans. Promisingly for geographers interested in crops' planty agencies, this approach resonates with a rich tradition of research into non-western cultivators' and pastoralists' time-reckoning practices – that is, their ways of sequencing activities and events in relation to one another and of measuring their duration (Malinowski 1927; Munn 1992). Numerous anthropological studies present agricultural success and survival as depending upon a fluent temporal

coordination between human action and changes in key animal and plant species (Evans-Pritchard 1969; Gell 1992; Thompson 1967). This literature thus figures the ability to perform the right tasks at the right times – to respond in timely and sensitive fashion to crops' or livestock's needs and development – as making the difference between scarcity and abundance, or between hardship and prosperity, for agriculturalists (Harris 1998; Inhetveen 1994).

Skill and success in raising crops are therefore portrayed as contingent upon intense attention to growing vegetation, animal migrations, and environmental events which may affect key productive organisms' behaviour. Cultivators are presented as actively working to attune their own labours to their crops' development by immersing themselves in the goings-on of the nonhumans around them (Ingold 2000). This striving after coordination is often argued to render the rhythms of agricultural life so thoroughly contingent upon crop growth that changes in plants, and other environmental processes, become 'time-givers' (Adam 1990) which set the pace not only of labour in the field but also of social and economic activity more generally (Evans-Pritchard 1969; Gell 1992). Such accounts thus figure the temporalities of agricultural social life as being co-fabricated among humans, plants, animals, and landscapes through a process of mutual attunement and response (Harris 1998; Krause 2013).

From Ecological Time to Temporal Ecologies

This struggle to fluently couple one's perception of plant and animal development with action upon the crops can easily be interpreted as cultivators' learning to be affected (Latour 2004; Despret 2004). For this literature argues that agriculturalists must attune their labours and social lives closely to changes in their nonhuman companions if they are to become enabled to skilfully intervene in their crops' growth and secure the harvest (Harris 1998; Ingold

2000). Such sensitivity to crop and livestock species' corporeal rhythms is often presented as constituting a holistic regime of time-consciousness, termed 'oecological time' by Evans-Pritchard (1969), in which the passage of time becomes inseparable from sequences of agricultural tasks. This 'task-oriented' (Thompson 1967) temporal regime is frequently defined through its opposition to a presumed modern, Western norm of reckoning time primarily through mechanical clocks and standardised calendars (Glennie and Thrift 2009; May and Thrift 2001). In particular, ecological time's irregularity in relation to mechanical clocks is often considered its defining characteristic (Malinowski 1927). Discussions of ecological time have therefore frequently emphasised its sensitivity to environmental changes, such as seasonal rains, whose occurrence humans cannot control and which do not recur after intervals of fixed duration (O'Malley 1992).

This contention that ecological time-regimes ensure that social activities conform to a natural temporal order defined by uncontrollable environmental events and forces has precipitated both accusations of environmental determinism (Gell 1992; Krause 2013; Munn 1992) and rather epochal analyses of their relationship to clock-time (May and Thrift 2001). These are typically depicted as 'pre-industrial' modes of time-consciousness, gradually supplanted or marginalised in the Western world by the use of mechanical clocks (Adam 1990, 1998). Such analyses typically narrate clock-time's rise as effecting the standardisation of time and its disembedding from local environmental rhythms (Ingold 2000), so that 'clock time becomes a socio-symbolic invention concerned with more precisely regulating and coordinating the repetition of various social phenomena' (Glennie and Thrift 2009: 43). This treatment of clock-time as a social construction has often led to an assumption that its adoption – along with an associated mechanisation of labour – inevitably subjects activities formerly shaped by natural rhythms and cycles to human control. More specifically, measuring time mechanically is widely argued to *commodify* human labour-time – to subsume human action

into the socially-generated rhythms of capitalist accumulation by rendering labour interchangeable with money (O'Malley 1992; Thompson 1967).

As such, geographers' and sociologists' discussions of contemporary Western agriculture have often emphasised the role played by mechanisation, artificial agrochemicals, and genetic modification in disciplining both agricultural labour and the pace of crop growth to reflect capitalist accumulation cycles (Ingold 2000; Kloppenburg 2004; Boyd et al. 2001; Prudham 2003). The presumption often seems to be that as crop plants are subjected to the clock's mechanised and quantified 'social time' a more authentically planty time, closely coupled to 'natural cycles' of changes in the environment in which they grow, is lost (Adam 1990; Jones and Cloke 2002; Marder 2013). Contemporary agriculture's temporal practices thus come to stand as examples of a wider, and ecologically catastrophic, dissonance between human social time and natural environmental rhythms (Adam 1998; Inhetveen 1994).

If each enactment of time *does* disclose a corresponding formulation of agency (Greenhouse 1996), then mapping clock-time and ecological time onto the dichotomy between the social and the natural surely threatens to reinstate the impasse of a zero-sum opposition between human and plant agency. Moreover, in so doing it arguably tends to pre-judge both the political and the affective complexion of agricultural 'timescapes' (Adam 1998) in advance of empirical enquiry (O'Malley 1992). The 'natural' tempo of non-mechanised agricultural work tends to be treated as a basically harmonious coupling between human activity and natural events. Labour is presented as largely enjoyable, or at least agreeably unhurried, for traditional cultivators (Glennie and Thrift 2009; Harris 1998; Thompson 1967), for whom any temporary sense of urgency is balanced by 'rest periods or pauses for reflection and tranquillity laid down by nature' (Inhetveen 1994: 270). Industrialised, mechanised agriculture is figured, by contrast, as striving 'to break and overcome the stubborn resistance

of ... the independent temporality of “nature” itself” (Marder 2013:101) and, in the process, imposing intensified workloads, new anxieties, and unbearable economic vulnerabilities on human cultivators (Adam 1998; Boyd et al. 2001; Pollan 2002).

Yet uncritically valorising broadly non-industrial agricultural time regimes due to their ‘naturalness’ and autonomy from human control can occasion a somewhat romantic nostalgia for the ‘earthiness’ of manual labour conducted by subsistence farmers or in private gardens sheltered from capitalist economic imperatives (for instance Inhetveen 1994; Pollan 2002). It thus risks encouraging a disengagement from the political tensions and ecological problems which practitioners of ‘conventional’ agriculture must negotiate (Head and Atchison 2009). I will therefore turn instead to a growing body of empirical research arguing that the use of calendars and clocks remains supplemented in contemporary Western societies by a varied cast of other time-reckoning practices (Bastian 2009; Jones 2011; Krause 2013). Such works question the narrative of an overarching temporal modernisation driven by clocks (Glennie and Thrift 2009), arguing instead that ‘social time is not singular or stable’ (Greenhouse 1996:87) and that multiple ways of enacting time and agency often coexist. In particular, several recent empirical studies of intensive Western agriculture have emphasised the persistent ability of crop plants as different as apple trees (Jones and Cloke 2002), sugar cane (Richardson-Ngwenya 2012), and wheat (Head, Atchison and Gates 2012) to temporally pattern the work of their human companions. Significantly, these studies emphasise that agricultural plants’ and animals’ seasonal cycles continue to contour contemporary Western agricultural temporalities alongside, and are imbricated in complex combinations and tensions with, clock-time (Baker 2009).

Attending to such more-than-human ‘temporal ecologies’ – in which multiple enactments of time coexist and interfere with one another in varying degrees of harmony, tension, conflict,

or mutual indifference (May and Thrift 2001; Jones 2011) – offers opportunities to bypass the dualistic stalemate between a naturalised ecological time and a socialised clock-time. This approach understands time to be a local phenomenon which may be done differently across different practices, undermining the notion that human practitioners could ever achieve a harmonious and unproblematic conformity with a singular natural *or* social temporal order (Clark 2011; Latour 1997; Glennie and Thrift 2009). By this reasoning, differences in the reckoning of time among various activities and settings can mark practitioners' efforts to achieve coordination with different bodies (Mackenzie 2002; Baker 2009) and thus signal that different *agencies* are at work (Greenhouse 1996; Bastian 2009). Attending to the *multiplicity* at work within temporal ecologies, then, dispenses with the supposition that any singular social *or* natural time-regime necessarily dominates agricultural timescapes. Instead, it invites researchers to question what relations, forms of bodily attunement, and distributions of agency particular temporal practices might be intended to generate and maintain. For if time can be done in multiple ways, then it becomes both possible and important to ask why time should be reckoned and enacted in one way rather than another (Bastian 2012; Mol 2002).

However, if 'not all types of change register equally' (Bastian 2012: 28) in each time-reckoning practice then keeping to any one time is liable to render only certain entities and processes capable of perceptibly altering more-than-human collectives, and to obscure the activities of others. Different modes of time-reckoning thus enact and distribute agency in different ways, adjudicating over which beings may make a difference within the social (Mackenzie 2002). Attending to the multiplicity of time-reckoning practices at work within the temporal ecologies (Jones 2011) of industrial agriculture therefore promises to enable geographers to move beyond simply disavowing their disrespect for 'natural' temporalities (as do Inhetveen 1994; Marder 2013). It facilitates a more nuanced questioning not only of

which agencies are brought to notice and which are overlooked by each time-reckoning practice, but also of how these practices (with their respective enactments of time and agency) might be related. Of how they might conflict, yes, but also how they might complement one another or rub along awkwardly together (Mol 2002). Attending to temporal ecologies thus offers geographers a mode of enquiry sensitive to broader possibilities for human-plant cohabitation than are permitted by a binary choice between social time's subordination to natural cycles or crop plants' subjugation by clock-time.

In what follows, therefore, I aim to examine how plant bodies become enabled to make differences – and to exercise agency – within a large Australian wine company practising an intensive and heavily mechanised form of viticulture. Analysing viticultural practitioners' use of several different time-reckoning practices in judging the best time to harvest grapes, I ask to which bodies and processes these practices accord the capacity to change the time. I thus examine what forms of planty agencies, and of human-plant relationships, might arise through the interplay of these practices. In so doing, I consider what political and economic values might be transacted and contested, and what affective experiences of seasonal labour are generated, within the temporal ecologies of industrial viticulture.

Viticultural Seasonality and Sociality

It is difficult for residents of wine-producing regions to overlook grape vines' patterning of human activity, for the seasonal physiological transitions that vines undergo precipitate changing tasks for viticultural workers over the course of the year. For viticultural practitioners, like other cultivators, these entanglements of human labour and crop growth compose a specialist calendar of working seasons, each of which groups several human activities together with changes in the vines to compose a qualitatively distinct period (Gell 1992; Harris 1998). Seasonal change therefore comprises multiple intermingled

transformations in human-vine interactions, so that seasons overlap in gradual, messy transitions or 'liminal periods' (Krause 2013; Olwig 2005), as figure one illustrates.

(Figure 1)

For reasons of brevity this article will focus upon just one such liminal period (for a more comprehensive description of the viticultural working year see Ulin 1996). The transition between the growing season and vintage, the grape harvesting and winemaking season, typically occurs somewhere between mid-January and mid-March in Australia's viticultural zones. This seasonal shift's precise timing varies depending on each wine region's local climate and on the year's prevailing weather conditions. As vintage begins, the ripening of grapes precipitates a radical change in the tempo of working and social life for both grape growers and winemakers, whose production of new wine must take place alongside the relatively brief annual grape harvest (Ribéreau-Gayon et al. 2006; Unwin 1991).

During the growing season grape growers and vineyard managers observe a regular, even monotonous, routine of leaf thinning and pesticide spraying – tasks usually accommodated comfortably within a working day which begins early in the morning but often ends by mid-afternoon. Winemakers, having usually already matured and bottled most of the previous year's vintage of wine, often have minimal work commitments and many take long holidays during the summer months of December and January. But when the grape harvest begins, the ripening of grapes comes to dictate the tempo of their work, and keeping pace with the crop's development can be gruelling. The grapes' maturity and quality will affect their price, and so for grape growers a year's income is at stake in delivering their crop to the winery ripe and unspoiled. Meanwhile, the marketability of wine producers' goods depends upon securing a supply of suitable-quality grapes. So changes in the grape crop make especially significant

economic differences to both growers and wine companies – they *affect* viticultural humans with particular potency – during vintage.

Conveying the crop to the winery in good condition therefore requires that the harvest be precisely timed. Grapes cannot be picked until they ripen, but once ripe they must be picked quickly – before bad weather or disease can damage them, or they simply *overripen* – then crushed within a few hours, before their taste deteriorates. So winery staff must work until the day's grape intake is safely processed, a task which may require sixteen-hour working days during the busiest stages of vintage. Meanwhile, in addition to their regular tasks, grape growers are obliged to supervise grape picks which, if they utilise the mechanical grape harvesters which have become popular since the 1970s, often begin at 1 am or 3 am so that the fruit will reach the winery by the following morning. These seasonal pressures do not remain confined within the registers of commerce and labour, for the harvest's demands on vineyard and winery workers necessarily affect other aspects of their lives. Many workers can spend little time with their families and friends during the harvest, and the pressures of vintage often require realignments in childcare, domestic labour, and other responsibilities. The more-than-human temporalities generated as grape growers and wine companies attempt to coordinate human labour with ripening grapes are, then, just one of the numerous collective temporalities which viticultural workers' relationships generate. Moreover, many of the temporalities derived from relationships beyond the workplace bear little resemblance to those of viticulture, and the harvest's exigencies may combine or conflict with them in trying or stressful ways.

Yet temporal tensions also abound within the scheduling of harvest-work itself, and is to these that this article will primarily attend. In so doing, I will draw upon fieldnotes made over six months of ethnographic fieldwork within one of Australia's largest wine-producing

corporations, anonymised here as ‘The Company.’ During this time I repeatedly work-shadowed Company vineyard managers, winemakers, and grower relations managers. I observed these practitioners’ daily tasks and activities – from assessing the ripeness of grapes to sorting wines into quality grades – and also conducted a number of more formal qualitative interviews with Company staff. The Company’s production division offers a research setting in which changes in ripening grapes *matter*, since they affect the grapes’ ability to yield wine suitable for sale under The Company’s highly diverse product range. Yet ripening grapes are not the only partners with which The Company’s production schedules must be coordinated. The Company’s diverse and widely-dispersed grape crush is gathered from across a fiendishly complicated grape supply network encompassing hundreds of internal staff and external contract growers, and involving vineyards and wineries scattered across all of Australia’s major grape-growing states. Picking gangs or machine harvesting contractors must be hired to harvest each block within these numerous and far-flung vineyards on the correct day, and these must be swiftly followed by trucks – usually owned by separate contractors – to transport the grapes to the winery. So within The Company, a successful harvest requires that precise coordination be maintained not just with ripening grapes, but among myriad other bodies – human and nonhuman – which have their own agendas, practices, and temporalities.²

Responsibility for keeping the various participants in this formidably complex enterprise ‘in time’ with one another falls largely to vineyard managers, grower relations managers, and winemakers. These employees are responsible for organising and timetabling grape picks, and therefore for reckoning the correct time to harvest grapes. The time-reckoning practices of this highly specific group of predominantly white, male, and increasingly university-educated, Australian viticultural professionals are therefore accorded a privileged ability to intervene in and temporally order the work of human labourers and pickers. It is because

Company viticultural managers' relationships with their crops coordinate and articulate the work of others that my ethnographic account will focus on the practices through which they become attuned to grape vines' temporalities and agencies. In what follows, I attempt to denaturalise these practices and to ask what might be at stake in their various ways of temporally coordinating both their own and other labourers' work with the ripening of grapes.

Sugar Time: Perceiving photosynthesis

I encountered one such mode of becoming-affected in a 550 hectare vineyard owned by The Company, which contains more than 100 discrete management units, or 'blocks,' of vines. I repeatedly interviewed and work shadowed the vineyard manager, John, over several months, and soon became familiar with the precise criteria of crop quality and size to which he and his staff must work. Changes in grapes assume great importance here due to The Company's stringent emphasis upon fruit quality, and John and his staff carefully monitor their crop's development throughout the growing season. This monitoring is used to guide intensive management practices designed to persuade vines to produce the desired type and yield of fruit. Yet, as I will also argue below, it also highlights an anxiety that the vines may not passively conform to John's management plans; that other affects and relations may be at play in his crop's development.

(Field notes, mid-February 2011): 'This morning is different from my previous visits to John's vineyard. Now that we are well into the second half of the growing season, and vintage is approaching, John's staff have begun carrying out maturity tests on the grapes. Twice a week they collect twenty bunches of grapes from each block which appears, based on visual inspection, to be approaching ripeness. On returning to the vineyard's small field laboratory, they crush these grapes and conduct several analytical tests on the juice. They test its sugar concentration in Baumes, its pH and its titratable acidity (both measures of the juice's

acidity). But of these three measurements they pay *most* attention to its sugar concentration in Baumes, which will determine the resultant wine's alcohol content – an important influence upon its marketability. After completing each test, John's staff upload the result to The Company's computer network so that the winemaking team, based several hours' drive away from John's vineyard, can view the data and incorporate them into their planning for vintage. Once today's tests were complete John printed out a spreadsheet of test results, freshly updated to include today's data. He pointed out its key feature: a predicted harvest date for each block, calculated automatically from the test results obtained so far ...'

(Figure 2)

Changing sugar and acid concentrations acquire significance for John and his colleagues because their grapes' shifting biochemical composition can render perceptible a critically important, and characteristically planty (Head et al. 2012; Richardson-Ngwenya 2012), activity – photosynthesis. Vines photosynthesise throughout the growing season, converting carbon dioxide and water into sugar and waste oxygen. So as the growing season elapses, sugars accumulate in grape juice while the acids found there early in the season break down (Ribéreau-Gayon et al. 2006; Unwin 1991). These shifts in the grapes' biochemical composition make a crucial difference to John and his colleagues, because the alcoholic fermentation which converts grape juice into wine requires sugar. So sugar and acid concentrations roughly indicate their crop's current suitability for use in winemaking, and monitoring them allows Company staff to infer approximately how close their grapes currently are to ripeness. They thus signal how soon the crop can be picked, and therefore how soon vintage will begin.

Through this practice of reckoning the harvest's proximity by monitoring sugar accumulation, the vines' photosynthetic metabolisms come to make the difference between

ripe and unripe grapes – and thus to effect the transition from growing season to grape harvest. So the duration of Company employees' work seasons becomes dependent upon vines' planty metabolisms. This mode of time-reckoning is especially important because sugar measurements may, if tests are carefully conducted and interpreted, be translated into the calendar dates through which labourers' working hours, grape deliveries, and the entire organisation of vintage are scheduled. This translation is particularly significant for The Company's winemakers, who must simultaneously keep the winery's work in time with hundreds of blocks of ripening grapes if The Company is to process its crush effectively. Many of their grape suppliers are, like John's vineyard, too remote from the winery for the winemakers to regularly inspect each block in person, and so winemakers rely heavily on the circulation of maturity test results and of predicted harvest dates in timetabling the activities of machinery and human staff. So the maturity tests' translation of increasingly sugary grape juice into dates which travel electronically enables distant winemakers to gain a sense of how soon their grape supply base will reach vintage, much as Latour's (1999) circulating scientific texts make their faraway referents present (Lorimer 2008). And, significantly, John and the winemakers usually respond by adjusting the scheduling of picks and deliveries, and of labourers' work hours, in response to changing sugar-acid balances rather than attempting to cajole the vines into ripening on a more convenient date. The *vines* thus temporalise *human* action, setting human bodies and machinery into motion by compelling Company staff to adjust their work schedules to the pace of photosynthesis.

So attending to maturity testing suggests that The Company's vines affect the pace of human labour – they act – by photosynthesising. Yet John's and his colleagues' efforts to recalibrate work schedules illustrate that the positioning and availability of pickers, grape harvesters, cellar hands, and trucks also makes a difference. Perfectly ripe grapes which cannot be harvested and transferred to the winery are no good to The Company, and labourers and

contractors are entirely insensitive to changing sugar test results. Rather, they work according to the hours and dates according to which their work engagements and pay are calculated. So maturity testing's *main* contribution lies in its capacity to maintain coordination between these different kinds of bodies, and to suture together two different kinds of time often portrayed as fundamentally incommensurable (Malinowski 1927; Harris 1998). So the field lab is not situated entirely within either Evans-Pritchard's (1969) oecological time regime or the clock-time regime of industrial capitalism (Adam 1998; Thompson 1967). In this setting, rather, human labour's attunement to grape vines' seasonal metabolisms seems to coexist with, and even complement, the use of clocks to coordinate the timing of tasks which involve multiple human bodies and machines. But, as John will soon explain, the temporal harmony that maturity-testing's 'sugar time' promises is fleeting.

Weather-Watching: Attending to unpredictable entanglements

(*Field notes, mid-February 2011*): '... after printing out the test results, John sat with me in his office and showed me how to read the spreadsheet. How each row held sugar and acid test results, grouped by test date, for one particular block. How each block's sugar concentration increased as the test dates advanced. And how these numbers didn't increase very much. John explained that in a 'normal' year the grapes would be riper by now. But this year's growing season had so far been unusually cool, wet, and overcast, and sugar accumulation in the grapes had been surprisingly slow.

John shrugged and explained that this was why he didn't set much store by the predicted harvest dates shown on the spreadsheet. When planning for vintage, he usually checked the weather forecasts and then reinterpreted the raw test data himself. And the weather forecasts were currently making him anxious. Eyeing the grey clouds visible through his office window he described how, if it rained heavily over the coming weeks as currently forecast,

his vines *might* absorb enough water from the soil to dilute their grapes' juice – cancelling out the small increase in sugar concentration that he *had* so far observed. How the rain might actually leave the grapes *further away* from ripeness, making vintage *more* distant, a week or two later.

This uncertainty about when the grapes might ripen was, John told me, frustrating. It made him nervous and agitated – always alert for the onset of a vintage that beckoned, but never quite arrived. The longer the grapes stayed on the vine, the cooler and rainier the weather would likely become, and the greater the risk he would face of losing his crop to storm damage or disease. By now John was becoming desperate for vintage to begin because it would bring, alongside the exhausting night-shifts, the reassurance that at least part of his crop was safely picked.'

John's dismissive attitude towards harvest dates calculated from maturity test data highlights that the speed at which photosynthesis and sugar accumulation occur – that is, how his vines *act* – depends heavily upon events and conditions in the environment within which they grow (Gladstones 2011). So when John scrutinises skies and weather forecasts, he enacts a quite different account of causality, and thus of plant agency, than maturity testing generates (Greenhouse 1996). He encounters vines which photosynthesise and act *because* they are pervasively entangled with events in the vineyard around them, and which are easily prompted by storms or sunshine to behave quite differently than maturity tests might predict. This sensitivity to meteorological processes makes a difference – and becomes perceptible – to John and his Company colleagues because it enables weather events to transform and distort the sugar time measured by maturity tests. As meteorological conditions change, the approach of vintage may speed up, slow down, or occasionally even run backwards in relation to the calendar. So for all the technical resources mobilised to translate sugar

concentrations into calendar dates, attending to a simple weather forecast can render the link between the two fragile and fleeting.

If John is to retain any grasp of what his vines can *do* – and avoid being caught unprepared by overripening or diluted grapes – he will need to utilise other ways of keeping time with them. And so John shifts his attention from changes in the grapes *themselves* to bodies and events capable of *affecting* his vines. To corporeal encounters with rainwater, sunshine, or humid air masses which might induce his vines to act differently, provoking changes in the grapes. In watching the weather, then, John learns to be affected and displaced by some of the agencies to which his vines are sensitive. He attempts to keep time with his crop by attuning his perceptual capacities until meteorological events excite or distress him as much as they do his vines.

Yet although John's weather-watching attunes him to changes in the vines' environment, and their seasonal time, this sensitivity comes at a cost. This practice entails acknowledging a seemingly-endless list of affective encounters capable of altering what a vine can do, and of recomposing grape juice, and it therefore attaches numerous awkward qualifiers to John's predictions about when the grape crop is likely to ripen. The vines *might* yield grapes whose sugar concentration exceeds a crucial threshold *if* the rain holds off; the crop *may* ripen by a certain date *if* this warm weather lasts. And while acknowledging such contingencies may help keep John's own work in time with changes in his grapes, it does little to facilitate coordination with contractors who work according to clocks and calendars. Weather events cannot be locked into predictable, calculable relationships with calendar dates and, worse, they interfere with sugar accumulation which potentially can be. So harvesting contractors' work commitments remain irritatingly insensitive to the weather; scheduled picks and shift

hours do not obligingly recede into the future when it rains, and nor does a heat wave speed their arrival.

So weather-watching's rather erratic relationship with calendars and clock-time prevents it from *replacing* maturity testing. Instead, John's attention oscillates between the printout in his hands and the clouds outside his window. He must keep both in view if he and his staff are to keep pace with what the vines are doing. The constant danger that their vines' sugar time will come adrift, under the pressure of weather events, from their human partners' clock-timed work schedules obliges John's staff to repeat their grape maturity tests every few days. John's team thus cultivate an increasingly intense *involvement* (Hustak and Myers 2012) in their vines' affective worlds as vintage slowly – all *too* slowly – approaches. By repeatedly alternating between weather-watching and maturity tests, the viticulturists gradually feel out which meteorological encounters may provoke the vines to act differently; they sensitise themselves to these plants' capacities to be affected by and to respond to their environment.

Yet John finds this process less satisfying than this vocabulary of involvement, attunement, and sensitivity might suggest. While he is striving to ensure that his work 'falls in' with his vineyard's 'natural rhythms' (Harris 1998, Ingold 2000), his vines' metabolic temporalities are constantly falling *out* of step with his plans. Sugar-time must be repeatedly dragooned back into alignment with events in other sites, and with workers whose labours generate their own rhythms – only for another storm to wrench it free again. The task is repetitive, largely thankless, and beset by uncertainty about whether the choreography between photosynthesis, weather, machinery, and human labour required for a successful harvest can be achieved. Uncertainty which John, who will likely be held accountable if the harvest fails, finds very stressful, and which ensures that the 'rest period' (Inhetveen 1994) imposed by an unusually long, slow growing season is far from enjoyable for him.

But despite John's best efforts, maturity tests alone cannot provide the predictive capacities required to firmly determine work schedules some days in advance in the reliable manner that harvesting contractors, haulage firms, and winery machinery all demand. Worse, the endless qualifications which attend John's weather-watching only compound the confusion. And so once the harvest begins, the interplay among these different enactments of time begins to generate tensions and ambiguities which threaten to plunge The Company's entire harvest into chaos. What The Company needs, if grapes are to travel from vine to fermenter in good time and good condition, is a single authoritative and accurate measure of each block's seasonal time, from which a definitive pick date can be reckoned. Company winemakers are charged with delivering this measure, and during vintage a winemaker is regularly dispatched to personally inspect all the blocks in a given region which maturity testing suggests are within a week or so of reaching sugar-ripeness. In early April 2011, with the harvest finally underway, I would accompany a winemaker, Nathan, on one of these field grape assessments.

Winemakers' Field Assessments: The right time to harvest?

(Fieldnotes, early April 2011): 'When we arrived at each block designated for assessment, Nathan would walk down a couple of rows of vines, picking and eating perhaps ten grapes as he went. Within about five minutes he would confidently suggest an optimum pick date for the grapes, but I had to follow Nathan closely as he walked through several blocks – looking over his shoulder as he took notes and occasionally tasting grapes for comparison – before I could develop any sense of what was informing these firm-sounding conclusions. Watching Nathan push deep into the leaf canopy to view the fruit up close, pop grapes into his mouth, and listen for the 'crack' of breaking grape seeds, I realised that these gestures were enabling Nathan to perceive a lot of additional signs about the ripeness of the grapes – and about weather and disease conditions in the vineyard around them. Grapes might taste riper than

sugar tests had suggested or yellowing leaves might indicate a canopy already going dormant for the winter, thus slowing photosynthesis and sugar accumulation. So by visiting the vineyard in person Nathan could become affected, and informed, by bodies, encounters, and sensations to which chemical maturity tests would be entirely insensitive. He could corporeally attend to the environment which affected these vines in new ways. He could therefore make inferences that a sugar test could not about how they would likely respond to conditions in the vineyard, how the grapes might develop over the coming days, and when the block might be ready for harvest.

(Figure 3)

Although Nathan's attention seemed entirely attuned to the vines and their environment during the assessment, other concerns resurfaced when we returned to the car in which Mark, the local grower relations manager, was driving us to our inspection appointments. Nathan was anxious to finish the day's vineyard inspections as quickly as possible – a long journey back to the winery lay ahead of him, and other tasks would require his attention after his return. He was already running late, and suspected that he would have to work an extended shift. Mark was sympathetic; he too was spending long hours 'in the field,' attending grape assessments with the winemakers. Such scheduling conflicts are, they told me, not unusual during vintage. Grapes ripen at their own pace, and often require inspection in inconvenient places at unfortunate times, but the travel which such inspections require remains exhausting and onerous for them.'

Nathan's impatience attests to the formidable capabilities that photosynthesising vines acquire, when rendered perceptible through maturity tests, to move human bodies. In this case sugar accumulation has compelled Nathan to travel, somewhat reluctantly, over one hundred kilometres from the winery where he works in order to assess *these* particular grapes

on *this* specific day. The circulation of maturity test results has rendered these vines' sugar-time capable of disrupting the clock's usual hold over work schedules at the winery, and of dislocating Nathan's usual timetable of tasks. But Mark and, especially, Nathan experience this eruption of planty metabolic time into their working day as an unwelcome intrusion – one which transforms the usually enjoyable business of 'getting into the field' into an arduous but obligatory chore.

Although Nathan may resent these vines' intrusion upon his own work, his field assessments are nevertheless intended to ensure that the rhythm of overtime and night shifts through which The Company's harvesting schedule patterns the labours of others is precisely coordinated with subtle material changes in their grapes. Twenty years of assessing grapes and making wine for The Company have taught Nathan to attend not just to sugar accumulation, but to the grapes' flavour and the texture of their seeds. Flavours and textures do not travel well – they are difficult to isolate from grape flesh and circulate electronically – but they nonetheless *matter* to Company winemakers because they affect wine's taste and quality. They thus affect the ability of the wine that Nathan and his colleagues will produce from these grapes to satisfy the tastes and desires of The Company's customers.

(Figure 4)

So maintaining customers' attachments to The Company's wines – and thus those wines' commercial success – requires that the picking of each block be carefully synchronised with the grapes' achievement of flavour-ripeness. But discerning flavour-ripeness involves drawing finer, and more ambiguous, perceptual distinctions than does monitoring sugar accumulation. This is why Nathan, an experienced winemaker with an extremely intimate knowledge of the qualities required in The Company's wines, must finally judge the grapes' readiness for picking. Yet like John, when he engages in weather-watching, Nathan must also

become sensitive to the vines' environment if he is to anticipate what they are likely to *do* over the few days remaining before the pick and how this may affect their grapes' palatability to customers. Nathan must corporeally share their location, get mud on his boots, and burrow into the vines' canopies, so that moist soils or the changing colour of leaves can move his body as much as the taste of grapes does. Through Nathan's broad repertoire of perceptual gestures, each block of grapes that he encounters – and each vineyard environment – comes to affect him slightly differently. He learns to reckon the proximity of ripeness slightly differently at each block, and this sensitivity to slight differences which a novice or a maturity test would overlook often leads him to recommend a slightly different harvest date than analyses of test data had predicted.

Such slight contrasts can make all the difference when fine-tuning a pick date to match flavour-ripeness, which is why Nathan's judgments are accorded particular authority and why his reckoning of the right date on which to pick is usually accepted. But while allowing Nathan's field assessment to finally determine harvest dates removes ambiguities over the reckoning of time – and further attunes The Company's production schedules to the ripening of its grapes – it also creates new complications. Winemakers are prone to alter harvesting schedules just days before a scheduled pick, after contractors have already been hired on the basis of maturity test results. Pickers therefore sometimes find that harvesting engagements are cancelled or postponed on short notice. This may leave them unable to secure alternative work on the date for which the pick was originally scheduled, and therefore facing a loss of income. Alternatively, if a pick date is brought forward then cellar hands at the winery may find their shifts unexpectedly extended and their workload intensified. Just as the Company viticultural team's efforts to attune their production schedules to the ripening of grapes do not simply harmonise their work with a singular natural time, they do not affect all of the harvest's human participants evenly either. Complex temporal ecologies (Jones 2011) are at

work in The Company's grape supply network, and grapes' achievement of flavour-ripeness is not the only measure through which the temporalities of labour could potentially be ordered.

As such, viticultural practitioners' efforts to become increasingly sensitive to changes in grapes – to induce grape vines' activities to affect the pace of their work – provide significant insights into how and why particular relations, and particular agencies, acquire perceptibility and potency within The Company (Bastian 2012). The Company's privileging of planty temporalities, as reckoned through winemakers' field assessments, certainly attests to the importance of maintaining coordination with grape vines. But the vines' metabolic activities become significant *through* their imbrication in The Company's economic relationships with its customers, to whose tastes and desires it must adjust its products if they are to remain commercially successful. Within winemakers' field assessments, materials' compatibility with customer tastes comes to influence the reckoning of the right time to harvest more intensely and forcefully than do the schedules, needs, and agendas of contractors and labourers. The Company's attunement of the harvest's tempo to the ripening of grapes thus sometimes involves eroding certain human workers' control over their hours of work, and therefore over monetary incomes calculated based upon hours of waged labour.

Conclusion

Animated by human-plant geographers' arguments that the collective formations which compose 'human' social and cultural life are subtended by cultivators' relationships with crop plants, this article has sought to render perceptible grape vines' active participation in contemporary viticulture. Drawing on Greenhouse's (1996; Bastian 2009) argument that agency denotes a capacity to effect perceptible change it has examined how vines become entangled in contemporary viticulturists' reckoning of seasonal time, and thus come to affect

and pattern human labour. Exploring ethnographically the reckoning of the ‘right’ time to harvest grapes within a large Australian wine company, I proposed that ripening grapes’ capacities to affect the scheduling and coordination of human labour attests to the persistence of vines’ agencies even within the intensively-managed supply networks of industrial viticultural enterprises.

Suggesting that intensive agricultural practices have not robbed grape vines of their ability to effect change, and thus the passage of time, disturbs prevalent arguments that the mechanisation and intensification of agriculture has produced an overarching transformation in time-reckoning and time-consciousness. It disputes narratives which posit the supplanting of an ecological time (Evans-Pritchard 1969) embedded in *natural* changes in plants, animals and landscapes by a clock-time regime concerned with maintaining *social* coordination among humans (Adam 1998; Thompson 1967). It thus contests the presumption that planty agencies may only be found in, and exercised by, autonomous wild plants safely segregated from inevitably-exploitative humans (Hall 2011) and challenges any simple opposition between the flourishing of plants and that of humans.

However, attending ethnographically to The Company’s viticultural staff has required a rethinking of how ‘planty agencies’ might take shape and might be conceptualised. These cultivators deploy multiple practices – maturity testing, weather-watching, and winemakers’ field assessments – in reckoning seasonal time. Each practice attends to different forms of change in grape vines, rendering different planty activities capable of affecting seasonal time and patterning human labour. The planty agencies to which this article attends are thus neither singular nor intrinsic to autonomous ‘plants-in-themselves.’ Rather, different forms of planty agency take shape as cultivators adopt varying practices and learn to be affected (Despret 2004; Latour 2004) by assorted planty processes.

Attending to viticulture's complex temporal ecologies (Jones 2011) thus suggests that plant life's temporalities, and plants' agencies within the social, acquire different forms as varying agricultural practices render divergent processes and changes in plants significant to, and capable of affecting, the conduct of collective life. The Company's eventual privileging of grapes' flavour-ripeness over sugar-time in reckoning pick dates, for instance, arises because the economies of mass-market wine production prioritise maintaining winemaking materials' consonance with customer tastes above offering labourers controllable and predictable working hours. Recognising this multiplicity raises the possibility that plant agencies and temporalities could be done differently (Clark 2011; Mol 2002). It thus highlights that the reckoning of agricultural time will often be a contested business – one which offers little prospect that human activity might unproblematically 'fall in' with a single overarching temporal order. In so doing, it questions both the proposition that 'traditional' agricultural temporal ecologies patterned by crop plants' seasonal growth and development are, or ever were, entirely harmonious and the concomitant argument that the economic and emotional strains of contemporary agriculture issue from the imposition of clock-time on crops through farming's intensification and mechanisation (Adam 1998; Inhetveen 1994). Attending to the concerns and anxieties of Company viticulturists has instead suggested that temporal tensions and discord in agriculture may often result from multiple enactments of plant temporalities' persistence alongside, and interference with, not only clock-time but also one another.

By emphasising tension and multiplicity, this article has argued that that human-plant geographies should attend to the processes through which particular characteristics of, and changes in, plant bodies become entangled with relations among humans instead of depicting cultivation as necessarily entailing either harmonious partnership with or a malevolent domination of plants. Attending to crop plants' capacities to form multiple, contingent, and unevenly-experienced affective associations with particular groups of humans positions crops

as active mediators of social life and, in so doing, offers a subtler account of cultivators' affective experiences of agricultural work. Yet it also entangles crops in contests among different humans over how time, agency, and the values of agricultural collectives might be transacted. Attending to contemporary industrial agriculture's often-conflicted temporal ecologies might thus enable social and cultural geographers to raise new, and more nuanced, questions about what it might mean for humans and plants might to live well – ethically, politically, and ecologically speaking – together.

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Footnotes

1. Following Head et al.'s (2012) definition, I use the term 'planty' to designate characteristics or capabilities peculiar to plants.
2. All grape and wine producers experience the challenge of finding the 'right' time to harvest their grapes in some form. However, the emphasis upon developing precise and predictable schedules for grape harvesting and delivery which I observed within The Company is probably specific to, and reflective of the particular coordination challenges which result from, The Company's position as a mass-market wine producer sourcing industrial quantities of grapes from numerous external contractors.

Captions

Figure 1: This diagram loosely illustrates the calendar months corresponding to each season of the viticultural working year in the southern hemisphere. However, attempts to represent this way of ordering time in a calendrical format are fraught with difficulties (as will be detailed below). In particular, the diagram can only partially present the variability of seasonal timing created by different regional climates, annual variations in weather conditions, and the differential flowering and ripening rates of different grape varieties. Frequent overlaps between seasons indicate that seasons are not sharply distinguished from, and often interpenetrate, one another.

Figure 2: A member of John's staff enters maturity test result data onto The Company's computer network in between testing juice samples contained in plastic flasks (lower centre).

Figure 3: A winemaker picks a grape in order to taste it during a field assessment.

Figure 4: A winemaker pushes aside the leaf canopy to examine a vine, and its fruit, more closely during a field assessment.

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