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Guest Editorial: Alternative Valuations

Ton Otto and Steffen Dalsgaard

This issue of *Valuation Studies* presents an anthropological take on 'alternative valuations'. The three articles in this issue stem from a workshop held in August 2012 at James Cook University in Cairns, Australia. The workshop was organized by the authors of this commentary along with Bruce Kapferer, and the focus was on *Values of Dominance and Difference*. The contributions came from anthropologists, sociologists and economists especially, and there was a strong focus on affairs that were relevant to an Australian audience at the time. One collection of contributions was later published in the Australian interdisciplinary journal *eTropic* with a focus on transvaluation and globalization (Dalsgaard and Otto 2014). The present contributions are all anthropological and were collected because they bring three distinct approaches to the theme of *alternative valuations*. On first sight the articles go in divergent directions but collectively and in relation to each other they illustrate present limitations as well as potential future directions of anthropological theorizing on value.

The 2012 workshop was a continuation and development of a workshop that was held in December 2011, also at James Cook University, entitled *The Anthropology of Value*. The aim of this earlier workshop was to explore the possibility of an anthropological theory of value. Whereas all participants agreed that value was a productive analytical lens through which to look at and describe certain cultural and social processes, opinions were starkly divided as to whether a distinct anthropological contribution to theory was possible and even desirable. The revised contributions have been published as two special issues of *HAU: Journal of Ethnographic Theory,* edited by Ton Otto

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and Rane Willerslev (2013a, 2013b). In the introduction the two editors represented the two main opposing opinions concerning the status and possible development of an anthropological theory of value (Otto and Willerslev 2013c). Willerslev maintained that anthropology's role was not to develop a grand theory about value but rather to wage a kind of intellectual guerilla warfare against major theories—as provided by other disciplines—based on concrete ethnographic cases that challenged existing assumptions and theoretical premises. Otto, on the other hand, argued that anthropology had contributed some important theoretical ideas to general social theory on value and that ethnographic fieldwork certainly could and should be an inspiration to theory formation, but conversely that field research was also productively inspired and driven by theoretical questions. The 2012 workshop from which the present collection derives engaged in a wider debate between disciplines and considered practical challenges resulting from conflicting principles of valuation. The present collection refers to this wider engagement, but takes up again the question of anthropological contributions to theories of value and valuation.

Anthropology has a long history of theoretical investment in value questions. Following the seminal and long-lasting influence of Marcel Mauss's work on *The Gift* (1990), numerous anthropologists have remained concerned with identifying cultural and social impulses in and to economic thinking and practice. Especially in recent decades this debate has been reinvigorated through a renewed focus on different approaches to the concept of value (e.g. Graeber 2001), or the opposition between notions of the singular and primarily economic 'value' and the plural and primarily cultural 'values' (Miller 2008). A dominant theme in these debates has been the role of the culturally implicit background of economic value and valuation. Some have drawn inspiration from Polanyi substantivism (e.g. Hann and Hart 2009) or Dumontian structuralism (Robbins 2013), while a long-standing voice such as that of Marshall Sahlins (1976, 2013) has argued since the 1970s that western economism itself is a particular cultural form of reasoning.

Anthropological approaches to value and valuation are naturally impacted by the way the term is also a key analytical concept in the social sciences more generally, even if its meaning and application vary widely according to discipline and field of study. In a simplifying but still valid way one can distinguish between (at least) three social domains that are treated differently. In the cultural-religious domain, values are part of the identification of ethnic and religious groups who distinguish themselves by their different worldviews and cultural practices. In the political domain, values—such as human liberty, democracy, security, well-being—are considered as the basis for political organization and policymaking. Finally, the economic domain

focuses on the production of wealth and specializes in the measurement of value to allow for the comparison and exchange of different things and practices (including labour).

There is extensive scholarship on the historic development and hierarchical relationship between these domains or spheres, for example Louis Dumont's (1977) analysis of the emergence of an economic ideology in the West that diverged from and later dominated religious and political ideologies, and Bruce Kapferer's more recent work on the emergence of the corporate state, which is subordinated to and controlled by the terms of the market (e.g. 2010).

Needless to say, no matter how such spheres are conceptualized and defined, they will frequently overlap, and both past and recent anthropological work has been concerned with identifying their interrelationships, including for instance how economic valuation is symbolically constituted (Sahlins 1976); how commodification and the 'individualized' entrepreneurial action praised by neoliberal economics depends on relational factors such as kinship (Elyachar 2005), or on gift-giving and reciprocity (Tsing 2015); or how political 'values' and objects of governance become organized through numerical rankings and indicators (Shore and Wright 2015). The role of economic performativity stressed by scholars focusing on science and technology studies (e.g. MacKenzie et al. 2007) has furthermore begun to gain influence in anthropological studies of the (communicative) making of the economy (e.g. Holmes 2014).

Anthropological theorizing has remained concerned with two key questions, where value conflict and/or domination come to the fore.

First, there is the question of the underlying model of society that we use. Since the birth of the social sciences, scholars have argued over the extent to which 'society' is primarily based on a consensus of values or rather on difference and negotiated conflict. Is it vital for a sustainable society to have a hierarchy of values in place or is it necessary and possible to accommodate an ongoing process of value negotiation and conflict? This is a crucial issue in today's world, where value differences are often represented as fundamental and non-negotiable—cf. Samuel Huntington's idea of a 'clash of civilisations' (1996). Value conflicts occur not only between nations and ethnic groups but are also part of the political process within modern (corporate) states. The 'Occupy Wall Street' movement was a case in point demonstrating the development and expression of anti-hegemonic values across the western world. The strong division caused by the 2007–2008 so-called 'Intervention' in Australia also highlighted the potential contradictions between core political values such as the human right to freedom and the state's obligations to protect human life (security) (Sutton 2009; Lattas and Morris 2010).

The second key concern, which is the one the articles in this issue are addressing in different ways, is whether practices of the market

and the state implicitly create a hierarchy of values that is no longer discussed and thus constitutes a hegemonic environment that silences alternative valuations. We refer to the development of universal standards of value measurement, such as money, in the market economy and corresponding measures of categorization and enumeration practised by modern states to map, monitor, control and service their citizens. Both complexes, market and state, imply a drive to totalizing systems of comparison and control that set the tacit background for more explicit discussions and conflicts about value (such as engaged by the Occupy movement). As a reaction to and correction of the dominance of monetary value standards, alternative measurements systems are being developed to support policy decisions such as the 'quality of life', 'social quality' and 'social well-being index'. But the premises on which these alternative standards are based often still appear to reproduce basic assumptions of the economic model.

In the invitation, the contributors to the Cairns workshop were asked to address the following two questions in particular.

1. In view of the power as well as the obvious limitations of monetary systems for comparing and measuring different kinds of values, is the development of alternative systems for comparing and quantifying values such as 'quality of life' or 'social wellbeing' a viable and desirable solution or rather the reproduction of a biased model, that excludes alternative forms of valuation?

2. How can societies deal with different value systems in a way that does not lead to the total domination of one system by another? Can we design political institutions that make it possible to discuss, negotiate, and even generate value differences both within and between political, economic and cultural units?

The articles in this collection thus explore and present studies of systems where there are qualitative and political contests between different and alternative values and valuation forms, and especially reactions to the attempt to realize one dominant system of valuation whether it is quantified estimations of carbon (non)emission, market exchange or appreciations of biodiversity.

Simon Foale, Michelle Dyer and Jeff Kinch's contribution deals with the question of how biodiversity is valued by different groups of users and stakeholders. Their regional focus is on rural Melanesia in the South Pacific and here they observe a stark contrast between the valuation by transnational conservationists on the one hand and Melanesian subsistence farmers and fishers on the other. Whereas the former ascribe an intrinsic value to biodiversity, based on biological and philosophical assumptions about the irreplaceable value of individual species, the latter have a more pragmatic attitude towards the species existing in their environment based on their need to sustain a livelihood in it. The opposition is evident and in order to convince

rural Melanesians to support conservationist agendas, the transnational conservationists try to argue for the local economic value of biodiversity. These arguments however do not carry much persuasive power for people who experience in daily subsistence practice that a reduction of the species they use can actually lead to greater yield and return on their energy input.

From a comparative-theoretical perspective, the interesting issue in this conflict of valuations is in the way the authors interpret the different value perspectives. Whereas western transnational conservationists appear to base their valuation on ideological premises, Melanesians are presented as taking a more praxis-oriented approach prompted by the demands of living in a certain environment. This opposition is reminiscent of Sahlins's famous discussion of two main strands of theorizing in anthropology: a focus on culture versus a focus on practical reason (1976). In Sahlins's view anthropologists have made a faulty opposition between the West and the Rest. Whereas non-western societies have been interpreted as being dominated by culture, the West is depicted as driven by other forces that are summarized under the term 'practical reason', which includes economic development and technological adaptation. Sahlins's key argument is that the apparent economism of the West in fact is a form of cultural reason as well. For example he contends that the motivation to gather interest on money, a key capitalistic principle, is not based on a universal drive for maximization but is rather engendered by a culturally defined value. Thus western societies are as much culturally grounded as non-western ones (see also Sahlins 2013, 2015).

The case presented by Foale, Dyer and Kinch appears to turn Sahlins's argument on its head. While the global conservationists are portrayed as being motivated by cultural valuations of nature, Melanesian farmers are depicted as pursuing a practical logic of adaptation and maximization of effort. Foale et al. argue that conservationists have to take these practical considerations into account, when they are dealing with local populations in Melanesia. Does their finding indicate that the West has turned to cultural reason in its relation to nature, while non-western societies should be seen as sustaining more utilitarian concerns? This is of course a simplified reading of the carefully argued and richly documented article by Foale, Dyer and Kinch, but the article clearly shows that Sahlins's dichotomy is still relevant to think with. Do cultural values uphold a certain autonomy and arbitrariness as cultural systems in relation to the objective world they mediate, or are they imbued with practical determinants deriving from human action in a social and natural environment? And what happens when people guided by different principles of valuation try to persuade and influence each other? Are

there ways to create a common language to discuss and compare the value of the different interests?

Dealing with an ethnographic case from Mozambique, where market women engage in some form of reciprocal relations with subterranean dwarfish twins to increase their sales, Bjørn Bertelsen can be seen to take the opposition between culture and practical reason in another direction. At face value he appears to be caught in the same dualism, between an economic (practical reason) understanding of value and a cultural one. He acknowledges the presence of both kinds of valuation, but argues against an implicit or explicit assumption among many analysts, that cultural valuations are dominated by or encompassed by the encroaching value logic of the market. For example, he criticizes Comaroff and Comaroff's concept of 'occult economies' for implying the dominance of capitalism in African societies where witchcraft and other 'occult' practices are interpreted as constituting the dark underbelly of capital itself (Comaroff and Comaroff 1999). According to Bertelsen one needs to accept that there are two different systems at play, without any one being dominant over the other. So it appears that Bertelsen, in contrast to Foale et al., defends the continuing importance and vigour of cultural reason in non-western cultures in contrast to the practical western market logic.

In an apparent return to older theoretical positions, the critical contribution that Bertelsen is making lies in his understanding of cultural value as an expression of human generativity. The ethnography of the reciprocal but also mutually exploitative relations between the market women and the dwarf couple can be interpreted from the point of view of the valuation of generativity. Bertelsen finds theoretical support for this perspective in David Graeber's important book *Toward an Anthropological Theory of Value* (2001), which considers 'creative potential' as the key to understanding value. Moreover, Bertelsen links this understanding of value to Deleuze's concept of the virtual as a component of the real, in addition and contrast to the actual. The virtual component of reality can become actualized in tangible phenomena through human action. Interestingly, Bertelsen finds additional inspiration in the philosophy of Cornelius Castoriadis with its focus on social transformation, human autonomy and self-creation. Here we are at the brink of a new understanding of culture as a continuously creative endeavour that builds on virtual realities as much as on actual ones.

Steffen Dalsgaard's article on the emergence of carbon valuations allows us to extend this line of thought on the basis of alternative cultural forms of valuation that are actually emerging globally. Carbon value can be seen as a way for states and other institutional actors to direct and stimulate desired behaviour. So far there is nothing new. The truly interesting development is that carbon value makes a claim to be able to compare actions and non-actions, things and non-things. In

other words: actualities and virtualities. In carbon valuation the descriptions and measurement of alternative worlds—such as the non-use of forest resources when exploitation is planned—are brought into play to measure and impact upon the actuality. One could argue that by including the virtual in the very measurement of value, carbon valuation is a generative form of value. This appears to go beyond the opposition between culture and practical reason, because it opens up for the emergence of new systems of valuation that include both the aspect of practical reason in relation to perceived threats and necessary adaptations, and the aspect of cultural reason through the value of generativity. Through this inclusion of the virtual in the valuation of the actual, culture can no longer be considered as an autonomous and arbitrary *tertium quid* between the human subject and the objective world as in Sahlins's original theoretical framework (1976), but it should rather be understood as a subject-driven interface that may transform society through the generation of new forms of valuation.

We expect that a focus on the potential generativity of cultural forms is a productive way to advance the anthropological theory of value, by including the virtual in the evaluation of the actual. Not only does such theory allow for an alternative understanding of social change and the emergence of new institutions. It might also better equip anthropologists to participate in productive multidisciplinary discussions about alternative systems of valuation, such as quality-of-life and carbon credits.

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The Value of Tropical Biodiversity in Rural Melanesia

Simon Foale, Michelle Dyer and Jeff Kinch

Abstract

In this paper we discuss differences in the ways transnational conservationists and Melanesian farmers, hunters and fishers value 'biodiversity'. The money for conservation projects in developing countries originates from people who are embedded in a capitalist system, which allows engagement with nature as an abstract entity. Their western education has given them a scientific/evolutionary-based worldview, which attributes *intrinsic* value to all species (and particular arrangements of species, e.g. rainforests and coral reefs), irrespective of economic value or ecosystem function. Because this value system is mostly not shared by the custodians of the biodiversity that conservationists want to save, alternative tactics and arguments are utilised. These inevitably take the form of so-called 'win-win' economic rationales for preserving biodiversity, most of which do not work well (e.g. bioprospecting, ecotourism, non-timber forest products, environmental certification schemes, payments for ecosystem services, etc.), for reasons which we detail. Agriculture- and aquaculture-based livelihoods appear to enjoy more success than the 'win-win' options but do not necessarily obviate or deter further biodiversity loss. Artisanal use of species-poor but productive and resilient pelagic fisheries is increasing. These ecological and economic realities bring into sharp focus the importance of understanding differences in value systems for successful biodiversity conservation in the tropics.

Key words: epistemology; worldview; poverty; conservation; education; development

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Introduction

This article explores the incomplete correspondence of economic (or 'utilitarian') and intrinsic (or 'inherent' or 'heritage') values of species-rich tropical ecosystems in Melanesia[1]—coral reefs and rainforests—and the problems this poses for western conservationists on the one hand, and the people who own and use the resources provided by these ecosystems on the other. Following a detailed elaboration of what we mean by 'intrinsic' value, we argue three main points. First, that the intrinsic values of reefs and rainforests, and the numerous species they comprise, are particularly salient to people who subscribe to the crisis narrative of accelerated species extinction—a narrative contingent upon a belief in the theory of evolution and the concept of geological time. Second, that these beliefs are mostly not shared by the great majority of the people who own and use the reefs and rainforests in Melanesia. Third, that attempts by western environmentalists to retro-fit economic values to reefs and rainforests often fail because it is often possible for resource owners to achieve a similar or greater economic benefit from replacing substantial fractions (typically not all) of their species-rich natural ecosystems with species-poor (indeed in some cases monoculture) systems whose economic value is greater.

Additionally, western environmentalists' attempts to approach a clash of values by reframing their conservation arguments in terms of economic benefit often ignore complex political realities operating at multiple scales (Filer 2000, 2004, 2011a), affecting both the governance of natural resources and the delivery of the health and education services that are so notoriously lacking in most of Melanesia (West 2006). These realities include profound power inequities between urban educated elites and rural villagers as well as lingering antipathies among many different language (or 'ethnic') groups, which often lead to inequitable distribution of services as a result of cronyism, corruption and clientelism among national and provincial politicians. Finally we examine the logical implications of these value mismatches in terms of resource management and economic development policy.

The Intrinsic Value of Rainforests and Coral Reefs and the Global Extinction Crisis

The global extinction crisis is undoubtedly the most compelling narrative in the worldview of most modern transnational conservationists. While humans have caused large numbers of extinctions both prehistorically (Steadman 2006; Steadman et al.

[1] In this paper we use the term 'Melanesia' to broadly refer to Papua New Guinea (PNG), Solomon Islands, Vanuatu and Fiji. However, the overwhelming focus of our arguments here is on PNG and Solomon Islands, where the three of us have, between us, over 40 years' experience.

2002) and historically, the current rate of species extinctions is considered to be 100–1000 times the natural rate (Rockstrom et al. 2009)—a rate of loss not seen since the last global mass extinction event.

Accelerated species loss is a problem in the minds of scientifically educated conservationists for two main reasons: (1) species have an intrinsic value which is lost forever when they become extinct, because they cannot simply re-evolve within a human lifetime (Adams 2004; Wilson 1992); (2) all biological species are part of a functionally interconnected ecosystem that delivers 'ecosystem goods and services', and the attrition of species reduces the capacity of ecosystems to deliver these goods and services (Hooper et al. 2005; Mora et al. 2011). For the purposes of this argument we are interested in the relative priority of these two aspects of the species loss problem in the minds and motivations of western conservationists (Foale 2001; Foale and Macintyre 2005), and how this plays out in conservation writing and policy implementation. We will discuss the second aspect further below.

A third aspect of the value of species is aesthetic. This is less commonly articulated in scientific literature but is very prominent in the publicity and fundraising material of conservation organizations (and many scientific agencies, university departments and centres), in the form of images of colourful or otherwise charismatic organisms (Foale and Macintyre 2005). Aesthetic aspects of species can be compellingly imbricated with intrinsic value for species that display spectacular evolutionary adaptations such as cryptic morphology (e.g. leafy sea dragons, pygmy seahorses and stick insects), warning colouration (e.g. nudibranchs and poison arrow frogs), or other features that show how perfectly the species is adapted to its environment. Images of organisms with these striking features tell a powerful story about evolution, and remind us of the long timescales involved in the processes of natural selection and adaptation.

The aesthetic value of coral reefs and their associated fauna is greatly enhanced by the fact that corals tend to grow best in warm, nutrient-poor, clear water, which makes them attractive places for recreational snorkelling and diving and thus more amenable to aesthetic consumption. People are more comfortable donning a diving mask in an environment where it is easy to see both the attractions and potential dangers. High water clarity and the fact that many reef creatures are brightly coloured (for reasons still poorly understood and not always explicable by evolutionary narratives such as warning colouration or sexual selection) means that photography is also relatively easy (Foale and Macintyre 2005), which in turn has greatly expanded the popularity of aesthetic consumption of coral reefs among affluent populations. The extent to which photographically mediated aesthetic fetishization of reef and rainforest organisms

reinforces their scientific intrinsic value, which in turn influences (a) the emotional drivers of western environmentalist fervour (Milton 2002) and (b) the way conservation-related *scientific* studies are shaped and framed, which is particularly worthy of closer examination.

Environmental Values of Rural Melanesia

About half of the populations of Papua New Guinea (PNG) and Solomon Islands have no more than six years of primary education. In PNG, the average length of schooling received by people aged 25 years and older is 3.9 years, which is comparable with the Solomon Islands at 4.5 years (UNDP 2014). Thus, the great majority of the customary custodians of coral reefs and rainforests have not had the privilege of a scientific education to secondary, much less tertiary, level.

While most people are overtly Christian, many pre-Christian belief systems and associated cultural institutions persist, sometimes in tension with Christian beliefs (Jacka 2010; Robbins 1995, 2004). Regardless of the level of syncretism of Christian and pre-Christian cosmologies, most people (a) have never heard of the theory of evolution; (b) may have heard of it but are unlikely to understand or believe it; or (c) follow religious teachings that explicitly deny it. Below is some text from the Seventh Day Adventist (SDA) study school booklet developed by the Pacific branch of the worldwide SDA church. One of us (MD) witnessed this lesson being taught in church on the Sabbath (holy day of rest for SDA church on a Saturday) in a village in the Western Province of Solomon Islands:

> 'The earth is the Lord's' (Psalm 24:1.2).
>
> A scientist once challenged the need for God. The scientist argued that he could create people just as well as any God could. God said; 'Okay, go ahead and do it.' The scientist began to gather some dirt. But God said, 'Wait a minute. Make your own dirt!'
>
> Of course this story is not true. But the point is clear; God is the only one who can create from nothing. God made all the things of the universe. These include our world, things we own, our bodies. He is the legal owner of everything.[2]

Further discussion in the study booklet during this lesson specifically mentions Charles Darwin, declaring that he was wrong about evolution. The fundamental belief on which Seventh Day Adventism is built is that God created the world in six days and on the seventh day he rested. Thus Seventh Day Adventists keep the Sabbath holy as a day of rest, doing no work or cooking from sunset on a Friday to sunset on Saturday. This basic tenet of the SDA church is obviously highly

[2] (Seventh Day Adventist Church 2013:39.)

incompatible with the theory of evolution and the church explicitly teaches that the theory of evolution and 'scientists' in general are mistaken on this point. The following quote is by Ellen G. White, an early SDA church leader writing in 1890 and is taken from the same church service and lesson as the previous:

> I have been warned that we shall have a continuing struggle. Science and religion will be opposed to each other. This is because limited men do not understand the power and greatness of God. These words of the Holy Bible were given to me, 'Even men from your own people will rise up and twist the truth. They want the believers to follow them'. (Acts 20:30 NIrV) (adapted from Ellen G. White, Medical Ministry, 98).[3]

While these examples are drawn specifically from Seventh Day Adventist teachings these views on evolution and the earth's creation stem from biblical teachings common to most Christian denominations. Consequently very few people are likely to share the epistemological premises that lead western scientists and conservationists to attribute intrinsic value to all species, and to problematize extinction for this reason.

However, religious teachings that deny evolution in favour of creationism are not necessarily contrary to a desire for biodiversity preservation. Strategic use of biblical text may be used to make a case for biodiversity conservation that credits God, not humans, with supreme knowledge and creation. Literature produced by a Solomon Island's indigenous conservation association links conservation buzzwords with certain tracts from the Bible. For example, Genesis 6:19 and 21[4] is cited to show biblical support for conserving biodiversity, specifically that these biblical passages teach that 'It is important to make sure ALL God's creatures are taken care of; even the smallest insects. God was saying that biodiversity is good' (KIBCA n. d., emphasis in original). Ezra 9:12 and Proverbs 13:22 are cited to show biblical support for using resources sustainably, that 'Sustainable means using resources in a way that meets the needs of people in the present while still making sure there will be enough left in the future' (KIBCA n. d., emphasis in original).

For the indigenous conservation association, headed by three elders of the SDA Church, this tactic allows a denial of evolution to coexist with a need to preserve biodiversity.[5] In this case, this reasoning was applied with a sincere belief in both religious doctrine and a need for

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[3] (Seventh Day Adventist Church 2013: 43.)

[4] These and other Bible quotations used here are taken from The Holy Bible: New King James Version (1982), Nashville, TN: Thomas Nelson.

[5] We are also aware of a local NGO in PNG that used this tactic.

preservation of biodiversity, and not with cynical intent based on privileging scientific 'truth' while manipulating religious beliefs to further an environmentalist agenda. This epistemological 'loophole' highlights the fact that not all environmentalist concern stems from an evolutionary-based worldview. Many western environmentalists also 'love' nature for a range of reasons other than the intrinsic value of species (Milton 2002), and many of the pre-Darwinian colonial environmentalists written about by Richard Grove (Grove 1990, 1995) were concerned with more concrete problems such as the effect of aggressive logging practices on soil erosion, the microclimate of small islands, and the sustainability of valuable timber resources.

The environmental values of rural resource owners are also profoundly shaped by their close and continuous reliance on the land and coastal sea for food, income and cultural reproduction. There is comparatively little in the way of a service sector in PNG or Solomon Islands (tourism has a more noticeable contribution to livelihoods in Vanuatu and Fiji).

In PNG, 83 per cent of food energy consumed comes from locally grown foods, derived largely from village gardens (Bourke and Harwood 2009). For most rural Papua New Guineans and Solomon Islanders there are very few cash earning opportunities outside agriculture, forestry and fisheries. Over 87 per cent of all cash income earned by rural people in PNG is from the sale of food crops at informal fresh food markets, commodity export tree crops and betel nut (Allen et al. 2009). Subsistence values are fundamental to people's relationships to land in which value is ascribed according to use. Value in land and resources is either (a) direct—such as a particular species of tree used to make canoes or house posts; (b) for income earning potential—through marketing garden produce, agricultural commodities (copra, coffee, cocoa) or other harvested forest or sea resources; or (c) through opportunities presented by foreign investment, such as palm oil plantations, logging, mining, etc.

Labour and the value of land

The importance of labour to the creation and augmentation of the value of land is paramount throughout most of rural Melanesia. Whether this requires clearing the original forest or almost invariably modifying it in some way is not the relevant point for most rural landowners. The rights to land gained through the invested labour, and the value in land thereby created is the main point of interest, socially and politically.

Once a person expends labour on the land then their rights to that land are created or added to. This helps to explain what may seem, from the outside, landowners' seemingly irrational choices over resource use. For example, it may be abundantly clear to villagers that they will gain higher income and better environmental outcomes by

using portable sawmills and engaging in sustainable forestry under an FSC (Forest Stewardship Council) model. This, however, involves input of labour and thus a level of business and social organization that is complicated and politically fraught. By contrast, when contracting a foreign logging company, negotiating power and distribution of benefits is most often controlled by a small group of men (Porter and Allen 2015), following an entrenched 'big man' model of leadership. While this results in sharing smaller profits among a larger group it inclusively reinforces the rights of the wider customary landowning group rather than creating exclusive interest by one group through the input of their labour. This also acts as a mechanism of maintaining social equality in the village (Dyer 2016). As one village leader said:

> Logging in the Solomon Islands is not for development, it's something for wealth, to share and eat to celebrate, to drink some beer. When we do logging in the Solomons that's how we think.[6]

As is evident from the above example, the ways that labour affects the value of land, and the economic choices people make, are not only profoundly important but also complex, and socially and politically contingent. By and large people carefully weigh the value of expected returns from a given enterprise with labour input and often switch deftly between alternatives depending on a range of factors, including fluctuating market prices (Foale 2005). However, socially and politically informed analyses of the economic strategies of Melanesian landowners (Curry 1999; Macintyre and Foale 2004; Curry and Koczberski 2012, 2013; Curry et al. 2015) frequently contradict the 'rational actor' (or *Homo economicus)* models of decision making favoured by many environmental economists.

Forests

In most of Melanesia, forested land provides the majority of resources essential to survival. But as we argue in the section on Coral reefs, there are striking contrasts with the scientifically informed value system. 'Folk taxonomies' (i.e. indigenous systems for naming and classifying flora and fauna) of forest plants tend to be extensive and have a relatively high correspondence with scientific categories at the level of species (e.g. Henderson and Hancock 1988; Kwa'iloloa and Burt 2001; Panoff 1969; Peekel 1984; Schmid 1991). Bird and mammal folk taxa also tend to have relatively high levels of correspondence with scientific categories (Majnep and Bulmer 1977, 2007). However higher level folk taxonomic categories frequently depart dramatically from phylogeny-based classification systems (e.g. Bulmer 1967; Dwyer 1976). Folk classification systems can also be

[6] See also Hviding (2015) for a similar anecdote.

highly variable within a linguistic group, and subject to regular contestation (Sillitoe 2002).

As with some of the fish families on coral reefs (see below), species-rich but economically unimportant groups of forest fauna, such as beetles, can often be taxonomically 'lumped' (Berlin et al. 1973; Bulmer 1982). Conversely, folk categories for varieties of domesticated plants are often highly elaborated. Most farmers can name a large number of varieties of key staples such as yams, taro, bananas and even sweet potato. Francoise Panoff (1969) recorded 129 named varieties of taro (*Colocasia esculenta*), 36 of bananas (*Musa sapientum*) and 37 of sugar cane (*Saccharum officinarium*) being cultivated by Mengen farmers (East New Britain, PNG) in the 1960s. A similarly rich proliferation of named varieties was found for the yam species *Dioscorea alata* and *D. esculenta* at Lihir in PNG (Macintyre and Foale 2013). Melanesian farmers have also enthusiastically adopted over 2200 varieties of 90 food crop species introduced in the post-colonial era (Bourke 2009).[7]

Nutritionally, forests are mainly used by rural Melanesians as places to practise swidden agriculture, given their capacity to return nutrients to soil during the fallow cycle. In other words, the primary value of forested land is for farming, a process that requires *removing* the forest and its associated biodiversity. The efficacy of the fallow cycle, where trees are allowed to take over a garden patch after it has produced staple food crops for two or three (rarely more) years, is primarily a function of time—ten years is usually ample; less than five is often insufficient. The longer the fallow period, the more nutrients are returned to the surface layers of soil (principally as leaf fall). In some areas farmers deliberately accelerate the fallow process by staking yam vines with cuttings of fast-growing deep-rooted species (e.g. *Hibiscus tiliaceus*). Fallow period is in turn a function of human population density (which is quite low in PNG and Solomon Islands—at 18 and 23 people/km^2 respectively[8])—the fewer people who claim rights to a patch of forested land, the longer the average fallow cycle that is possible throughout that patch. According to Geertz (1969), the carrying capacity of forest bush fallow agricultural systems is at least one order of magnitude lower than that of the (pre-Green Revolution) wet rice systems of Southeast Asia.

Melanesian forests are also poor producers of protein, as evidenced by the fact that coastal people choose to obtain most of their protein from the sea, and that following the post-contact expansion of access

[7] The South American sweet potato (*Ipomea batatas*), first introduced to PNG (via Indonesia) in the late 1600s, accounted for 63.57% of PNG's total food crop production (by weight) in 2000 (Bourke et al. 2009).

[8] However, much higher densities can be found in places, particularly on many small islands. Foale et al (2011) provide maps showing coastal population densities in both PNG and Solomon Islands.

to tinned fish and tinned meat in the PNG highlands, the nutrition of those populations improved measurably (Dennett and Connell 1988).

While traditional medicines derived from forests are still in frequent usage, many, if not the great majority, of traditional medicines that are still in use are planted around villages or sourced from roadsides or in regrowth areas. Modern medicines such as antibiotics, antiseptics and antimalarials, along with immunization, clean drinking water, improved sanitation and human waste disposal—have dramatically improved rural health levels. This is evidenced most clearly by the almost exponential increase in human populations since these medicines and lifestyle changes were introduced in the early to mid-twentieth century (Bennett 1987; Caldwell et al. 2001; Denoon 1997).

A similar argument can be made in relation to the use of forest biodiversity for traditional housing. Apart from the fact that so-called 'permanent' houses, made from sawn timber and corrugated iron roofs, are almost universally preferred (Macintyre and Foale 2004), many if not most of the materials used to construct traditional houses are sourced from domesticated or semi-domesticated species: sago, bamboo, black palm, betel nut palm, pandanus and coconut. People who live in close proximity to forests naturally obtain much of their housing material from them, but this does not mean that alternatives do not exist. Polynesian and Micronesian people living on coral atolls across the Pacific have been able to construct robust dwellings from the extremely depauperate flora of those environments. Many of the traditional houses on Tikopia, a remote and tiny high island with a profoundly humanized terrestrial ecosystem (Kirch 1997; Kirch and Yen 1982) were able to withstand 370km/h winds of Category 5 Cyclone Zoe in December 2002, an outcome more attributable to their ingenious and highly adapted engineering knowledge than to Tikopia's biodiversity.

The ongoing conundrum represented by Melanesian forests is that the market value of the timber extracted from them by transnational corporations is rarely converted to any significant improvement in the long-term wellbeing and human development of the traditional custodians (Allen 2011; Bennett 2000; Filer and Sekhran 1998; Hviding 2015; Hviding and Bayliss-Smith 2000). Industrial logging remains an environmental and economic tragedy because the allure of the (inevitably ephemeral) cash windfall it generates appears to be so irresistibly economically and socially expedient.

Forest conservation projects promoted on the basis of economic return cannot compete with the simplicity of the 'neo-bigman model' (Moore 2008), offered since at least the 1980s by large-scale logging companies. Alternatives to large-scale logging such as eco-

tourism, FSC certified sawmilling, REDD+[9] programmes and other alternative livelihood projects often lack implementation plans practical to village politics and the complications of customary land tenure (McDougall 2005). They mistakenly assume a communal business structure exists within the village community (Schoeffel 1997) and/or are difficult to sustain without outside input or expertise, especially in initial phases (Gegeo and Watson-Gegeo 2002). By contrast commercial activities carried out by a foreign logging company, for example, only require people to sign a piece of paper. This money is seen as 'free' money even though people are aware of the negative consequences—environmental and social—of such activity (Dyer 2016). Additionally, capturing financial benefit from such projects is most easily achieved by the more highly educated urban dwelling community or tribal members who will facilitate negotiations and who do not depend for their livelihoods on the land and resources to be exploited.[10]

Prior to 2004, most forestry leases in PNG and Solomon Islands did not extinguish local sovereignty over the land on which the logging took place, thus guaranteeing continued use for agriculture. This meant that, short of catastrophic soil loss from erosion, food security was not seriously threatened. This fact, combined with the cash windfall (albeit ephemeral) received as royalties for village dwelling landowners, the larger amounts received by those directly involved in negotiations with the companies (usually the educated elite) and the importance of this revenue for governments, has no doubt contributed to the high rate of sign-on to logging deals (see also Kinch 2006: 28–31). Since 2004 in PNG, however, the advent of Special Agricultural and Business Leases or SABLs (Filer 2014; Nelson et al. 2014) poses a greater potential threat to customary land rights and associated food security.

Coral reefs

The lack of salience of species belonging to the most species-rich groups of organisms on coral reefs (for example corals (494 species in

[9] The United Nations Collaborative Programme on Reducing Emissions from Deforestation and forest Degradation in developing countries. "REDD+ goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks" (http://www.un-redd.org).

[10] There is a long history of involvement of Solomon Islander national politicians, including prime ministers, with companies that contract foreign logging companies. These Solomon Island owned companies are often granted 100% tax exemptions and have been (and are) accused of illegal logging activity. A recent example is Minister for Forestry and Research, Heinz Horst Bodo Dettke (re-elected November 2015). Detke is 60% owner of Success Company Ltd, a company currently involved in a legal dispute over illegal logging above 400m altitude on Kolombangara Island (http://www.abc.net.au/news/2015-02-16/solomon-islands-landowners-challenge-logging-approval-kolombanga/6091994).

Solomon Islands and 418 in Milne Bay, PNG (Allen et al. 2003; Green et al. 2006)); damselfishes (100 species); and gobies (120 species)) is reflected in the small number of names for these organisms in local languages. For example, in PNG and Solomon Islands, there are typically fewer than a dozen folk categories for corals (Foale 1998; Hviding 2005; Levinson 2008; Osmond et al. 2003; Ross et al. 2011), and less than a quarter as many folk categories for small reef fish as there are scientific species (Cohen et al. 2014; Foale 1998; Goto 1996; Hviding 2005; Ross et al. 2011). The word for coral in the lingua francas (Tok Pisin and Solomon Pijin) of PNG and Solomon Islands (*ston*) simply means 'stone'.[11]

Turtles have been the subject of intensive international conservation campaigns in Melanesia, where people traditionally harvest them with alacrity. Turtles have high economic and prestige value, and it is understandably difficult for local people to perceive the spatial and temporal scale of stock-replacement processes in such a highly mobile, slow-growing and long-lived species (Benson et al. 2011), and consequently the impacts that unrestrained harvesting can have on population viability over the long term. In Solomon Islands and PNG, Hawksbill turtle (*Eretmochelys imbricata*) populations were decimated in the nineteenth and early twentieth centuries as a result of the high demand for their shells internationally (Bennett 1987; Kinch and Burgess 2009), including from other Pacific Island groups (Shineberg 1966).

Most coastal people in Melanesia attribute relatively high economic/utility value to the species they commonly eat and sell, and their sense of agency in relation to populations of a small subset of high prestige-value species (mostly those which are traded or sold for cash) is embodied in tenure systems and other cultural institutions that restrict access to space, gear and species. Debates over the extent to which this sense of agency equates to a traditional conservation ethic have been reviewed by Foale et al. (2011) for Melanesia and the Pacific and by Davis and Ruddle (2010) more generally. Both argue for more socially informed analyses of these institutions than functionalist approaches (e.g. Berkes 1999; Berkes et al. 2000; Johannes 1978), which, though empirically weak, remain popular with many conservationists.[12]

Traditionally in some parts of Melanesia, a number of species were made taboo for particular groups of people, and in some cases only at certain times, due to their totemic status, or other beliefs about the

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[11] This also applies to many vernaculars (Ross et al. 2011), including the Misima language in Milne Bay, PNG, where the term nali, meaning 'stone', also glosses for all hard corals.

[12] See also Bulmer (1982), Polunin (1984), Carrier (1987) and Foale and Manele (2004).

effects of eating them. However even the functionalists (e.g. Johannes 1978) discount any significant conservation value of these institutions, mainly due to the small number of species to which they apply. Many beliefs and practices which come under the gloss 'totemic' have diminished or completely vanished across most of the Pacific.

Retro-Fitting Ecosystem Goods and Service Values to Intrinsic Values

Environmentalist groups appear to have tacitly understood for some time that the custodians of biodiverse ecosystems in various parts of the world do not share their Darwinian–Linnaean worldview that reifies the intrinsic/heritage value of species. An understandably common response to this has been to find ways of commoditizing species and ecosystems to use in arguing for their preservation. This approach includes the well-established ecosystem services (ES) approach of environmental economists (Costanza and Daly 1992; Costanza et al. 1997). In this section we examine and critique some of the ways this logic has been used in the case of coral reefs and rainforests in Melanesia.

Alternative income quick fixes

In Melanesia, bioprospecting and ecotourism have long been important platforms of the nature-as-commodity approach. For various reasons, neither of these options has provided, or is likely to provide, significant financial benefits for rural people in PNG or Solomon Islands, particularly compared to extractive industries and development aid (Gay 2009). In the case of bioprospecting, effective systems for equitably distributing any royalties from new drug discoveries have never been found, apart from the well-publicized case of a single village in Samoa (Cox 2001), and it is often possible to cheaply synthesize many compounds once discovered and characterized. Tourism suffers from lack of transport and infrastructure, and tourist fears of high crime levels (especially in the capital cities) and infectious diseases (see Foale, 2001; Filer, 2011a).

Coral reef fisheries and food security

Fish (harvested for food and income) is an ecosystem service provided by coral reefs that is increasingly used to justify transnational marine biodiversity conservation interventions. The following statement on the home page of the Coral Triangle Initiative exemplifies:

> These unparalleled marine and coastal living resources provide significant benefits to the approximately 363 million people who reside in the Coral Triangle, as well as billions more outside the region. As a source of food, income and protection from severe weather events, the ongoing health of these ecosystems is critical.[13]

[13] http://www.coraltriangleinitiative.org/about-us, accessed 27 March 2016 .

In a somewhat more sober analysis, Teh et al. (2013) estimate that around six million people worldwide fish on coral reefs, and around three million of those live in Southeast Asia. Teh et al. (2013) also find that in the Western Pacific, coral reefs supply approximately 14 per cent of the total value of landed fish. Most of the rest of that value is represented by industrial tuna landings, the rent from which accrues almost entirely to national governments.

While healthy coral reefs provide complex topographic structures that can support a large standing stock of reef fish in the absence of fishing, the actual production *rate* of reef-associated fish is generally quite slow (Birkeland 1997; Russ and Alcala 2010). This is because corals are uniquely adapted to low-nutrient conditions (the same conditions that produce the plankton-free water clarity so coveted by diving tourists) and the rate of conversion of coral primary production to fishery production is very low. In contrast, high levels of productivity of a comparatively small suite of non-coral-dependent pelagic fish species (including sardines, scads, mackerels and tunas) are frequently found in waters enriched by nutrient-laden upwellings (Ruddle and Ishige 2005; Villanoy et al. 2011) and terrestrial run-off (Gehrke 2007; Oczkowski et al. 2009; Weng and Sibert 1997).

In Langalanga Lagoon, Solomon Islands, high human population and market pressures, combined with destructive fishing practices, have led to declining catch-per-unit-effort (CPUE) of reef fish species associated with a 22km barrier reef enclosing the lagoon (Sulu et al. 2015). In response to this, many Langalanga fishers have, over the past three decades, switched to targeting fast growing, short-lived, small pelagic fish (sardines and scads) in reef passages at night, using lights and gill nets. Their mean CPUE for this new fishery is between two and five times the CPUE of reef fisheries, including relatively lightly fished reefs in other parts of the region (Roeger et al. 2016; Roeger 2013). Fishers interviewed by Roeger et al. (2016) claimed that the small pelagic fishery was not only higher yielding than the reef-fish fishery but also showed no sign of decline. There are many indications that as human populations and market pressures increase, coastal people in Melanesia will increasingly shift fishing effort away from species-rich, but low-productivity reef-associated fisheries to high-productivity pelagic fisheries comprised of a handful of species (Albert et al. 2014; Albert et al. 2015a).

In the Philippines and parts of Indonesia, where human population densities are between one and two orders of magnitude higher than they are in Melanesia, small pelagic fisheries have been intensively fished for several decades (Dalzell and Pauly 1990; Dalzell et al. 1990; Dalzell and Ganaden 1987). Although small pelagic fisheries have been fished to capacity or are already overfished in the Philippines (Dalzell and Ganaden 1987) and the Java Sea (Cardinale et al. 2011), their contribution to both income and food security throughout much of

Southeast Asia, including the 'Coral Triangle', substantially outweighs that of reef fisheries (Dalzell et al. 1990; DABFAR 2014). By making comparisons of the productivity of these very different fisheries we do not intend to imply that coral reef fisheries do not provide significant benefits for some groups of coastal Melanesian people (Albert et al. 2015b) nor do we imply that reefs and their associated resources should not be managed. But the crisis narrative that a failure to protect coral reefs will lead to critical food shortages for large numbers of people does appear to be motivated more by an a priori concern for the intrinsic values of coral reefs than by their actual importance as an irreplaceable food supply.

Forests versus oil palm

Once forests have been logged and the timber sold (and the windfall spent), replacement with oil palm plantations has in some cases been a more economically beneficial option for significant numbers of local people than resuming farming and waiting for the forest to regrow. The nucleus estate oil palm model already established in PNG and Solomon Islands during the late colonial period generates incomes that allow large numbers of rural landowners to send children to school[14] and achieve a far higher standard of living than they could with traditional farming (Koczberski and Curry 2005; Koczberski et al. 2012). In West New Britain in PNG, many smallholders also make food gardens on a portion of their land, thus maintaining a level of food security in addition to the oil palm-generated income (Koczberski et al. 2012).[15] It is clearly problematic for people from rich countries that have already built much of their affluence through forestry and industrial farming and fishing, to expect rural villagers in poor countries not to want to do the same, by appealing to a set of scientific values they do not share.

Policy Implications

Many rural Papua New Guineans and Solomon Islanders continue to have a high level of control over their customary land and seas, though this is now being seriously threatened in some parts of PNG (Filer 2011b, 2014; Nelson et al. 2014). But they are unlikely to embrace the intrinsic value of species living in their biodiverse rainforests and reefs if these species are not of significant economic or utilitarian value to them. Additionally the opportunity cost of conservation may be high,

[14] The PNG Government started rolling out its universal free education programme around 2011, though some smallholder oil palm schemes have been in existence since the late 1960s.

[15] However more recent oil palm developments under the Special Agricultural and Business Lease (SABL) model appear far less beneficial to local landowners (Gabriel and Wood 2015; Nelson et al. 2014).

given the paucity of government service provision and the availability of more lucrative, though environmentally destructive, economic alternatives.

It is unlikely that any of the great conservation thinkers of the West needed to worry about earning sufficient income to pay for their children's education and health care, or indeed where their next meal was coming from (Adams 2004; Chapin 2004; Dowie 2011). Would rural Melanesian land and reef owners transform into instant conservationists if they were all miraculously given access to tertiary-level evolutionary biology courses? There are several other ontological factors that determine the extent to which we are able to prioritize the intrinsic value of species, wealth being perhaps the most important. There are very few conservationists who do not also enjoy disposable incomes and significant amounts of leisure time.[16] The creation of a modern conservationist worldview requires not just acceptance of the evolutionary paradigm, but also a cocoon of affluence that affords a sense of separation from nature, and thus the capacity to objectify and idealize it (Chapin 2004; Ingold 1993). Is it possible for a population of economically marginalized farmers, hunters and fishers in the Solomon Islands and PNG, countries ranked by the UNDP as equal 157th out of 187 on the Human Development Index, to acquire the affluence and education levels of conservationists without first destroying the biodiversity the conservationists wish them to value? Are development and conservation compatible (Filer 1994; Filer 2004; Keppel et al. 2012; Kinch 2010; McShane et al. 2011; Helden 1998; West 2006)? The imperatives of economic development that dictate transforming the natural environment and social relations into 'fictitious commodities' (i.e. nature into resources, and exchange into labour, respectively: Polanyi 1944; Rist 2007) are at once inimical to the environmentalist agenda while being simultaneously employed by conservation organizations (Igoe and Brockington 2007).

While the mandate for continued economic growth in affluent countries lacks legitimacy (Jackson 2009; Raworth 2012; Wilkinson and Pickett 2009), growth can potentially provide much needed increases in human development indicators (particularly education) and standards of living in Melanesia. This in turn could potentially facilitate some level of flourishing of the same set of values that

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[16] Religious denomination and political leanings are also important factors. Although a recent Auspol survey (Wyatt and Stolper 2013) showed that, in Australia, agreement with the statement 'Evolution is currently occurring' was higher for university educated respondents (78%) than for those with a high school education (63%), a Pew Research Centre survey in the USA (2013) showed that significantly fewer Republican voters (21%) believe in evolution (due to natural processes) than Democrat voters (37%). The Pew survey also showed that fewer white evangelical Protestants (8%) believe in evolution by natural processes than white 'mainline' Protestants (36%) or 'unaffiliated' (57%).

motivate western conservationists. We can already see a microcosm of this potentiality among the small number of highly educated and relatively affluent Melanesians who have become dedicated conservationists. But with economies that are dominated by transnational primary resource extractors, and stubbornly high levels of corruption, corporate tax avoidance and capital flight (McKenzie and Baker 2014; McKenzie et al. 2015; Mousseau and Lau 2015), economic growth at present is not only slow, but always seems inevitably to be at the expense of forest and fisheries resources.

Mining, if adequately governed, has at least the potential to deliver significant economic benefits, though the contemporary reality is dominated by many negative social and economic impacts (Baines 2015; Filer and Macintyre 2006). Despite producing massive cash flows, mining appears to have largely failed to do much to alleviate poverty and improve service delivery in PNG (Johnson 2012).

There are many structural difficulties with local, provincial and even national governance institutions that seem to systematically stymie adequate resourcing of education and health. These problems have at least some of their roots in the deep cultural and political divisions that PNG and Solomon Islands inherited when their boundaries were demarcated by former colonial powers, and are unlikely to be solved quickly (Barclay and Kinch 2013; Firth 2006). There is nevertheless much that relatively powerful countries such as Australia can do to stem the immense financial haemorrhaging from Solomon Islands and PNG through tax and export/import duty evasion (Allen 2011; Henry 2012; Mousseau and Lau 2015; Shaxson 2011)[17] and other forms of illicit financial flows (Palmer 2015). Greater control over, and transparency of, foreign investment in Australian real estate would make it harder for corrupt Melanesian politicians and officials to hide bribe money and other illicit financial flows. Bilateral investment in well-structured institutional reforms to resource ministries could also go a long way to reducing the huge national losses resulting from corrupt dealings with transnational resource extractors. This would enable more complete capture of the economic rent from exported commodities, which could in turn be invested in chronically resource-starved education and health ministries.

Conclusion

Ultimately, those of us who worry about biodiversity loss anywhere need to work harder at finding ways of (a) making those with the heaviest ecological footprint bear more of the cost of saving it, and (b) improving economic and human development in poor countries (Raworth 2012). This means moving beyond the neoliberal solutions

[17] Shaxson (2011) estimates that, around the so-called 'developing world', for every dollar of aid money that flows in, ten flow out as capital flight, due to, among other things, transfer mispricing of exported commodities and the use of financial secrecy jurisdictions (aka tax havens) by transnational corporations.

long favoured by big environmental non-governmental organizations (NGOs) (Büscher et al. 2012; Igoe and Brockington 2007), which rarely frame environmental destruction or economic inequality in terms of structural violence (Cole 2012; Farmer 2004), or try to confront the global-scale drivers of poverty outlined above. Instead they typically place most of the economic burden of conservation on rural farmers and fishers. These predominantly locally based measures too often constitute some form of austerity for people whose lives are already patently austere. Where so-called win-win solutions are proposed, they frequently embody the same logics of commoditization of both nature and social relations that fan the flames of consumerism and possessive individualism (Foster 2005; Hickel and Khan 2012; Macpherson 1962; Martin 2007), and in turn environmental destruction.

To more effectively proselytize the intrinsic, heritage value of biodiversity to the present-day custodians of Melanesia's tropical rainforests and coral reefs would require, at the very least, a serious commitment to equitable delivery of bottom-up, quality education services by adequately resourcing them. This in turn will require engaging with, among other things, the political economy of transnational resource piracy and the crony capitalist regimes that dominate the economies and manipulate the governments of these countries. It would be encouraging to see the conservation community taking a greater interest in combatting capital flight, including the role of governments of wealthy countries in condoning and legitimating the financial secrecy systems that facilitate it. There are many other compelling and culturally well-informed ideas for addressing the complex and formidable challenge of improving economic and human development in Melanesia[18] that also transcend the neoliberal solutions we critique above, but which space precludes discussion of here.

We conclude that a better understanding of the cultural, economic and historical underpinnings of the fundamental differences between the environmental worldviews of rural Melanesian farmer–fishers and transnational conservationists should lead to more epistemologically aware and less hubristic approaches to biodiversity conservation. Deterministic thinking about the relationship between biodiversity and ecosystem services risks producing project dependency and/or damaging the credibility of otherwise well-meaning interventions and interveners. We also hope that our argument stimulates a greater interest in and commitment to tackling some of the more egregious global drivers of poverty, inequality and underdevelopment in the region.

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[18] (Allen 2013; Curry and Koczberski 2013; Jolly et al. 2012; Macintyre 2008, 2011, 2012; McCormack and Barclay 2013; Patterson and Macintyre 2011).

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Valuable Subversions: Gendered Generativity and Sorcerous Production in Central Mozambique

Bjørn Enge Bertelsen

Abstract

How is one to analyze the existence of a subterranean dwarfish couple (*zwidoma*) occupying the space underneath cooking places and whose central purpose is to reinforce a market woman's sales—but simultaneously feeding off her very body? Using urban and rural ethnographic material from central Mozambique, where such assemblages comprising the *zwidoma* and a woman are integral to economic life and social orders, this article contextualizes such constellations—effectively interferences within various domains of value—by undertaking an analysis of gendered modalities of generativity. Further, by meditating on various understandings of cosmology and, ultimately, the dynamics constituting the realms of the real, it presents an alternative to influential analyses of capitalism, such as the notion of "occult economies." An argument is made not only for value's dynamic and changeable nature but also for the necessity to appreciate instances of its subversion with destructive effects. The article underlines, therefore, how such subversions of value, in various forms, is in line with Tsing's (2015) general argument that critical explorations of capitalism and regimes of valuation and production are best undertaken in peri-capitalist zones—such as urban and rural Mozambique.

Key words: value; gender; sorcery; economy; generativity; Mozambique

Introduction: Food, Women and an Extensive Household

Between 1998 and January 2016 I undertook multiple periods of fieldwork in and around the central Mozambican towns of Chimoio and, more recently, Gondola. In my work I have continuously shifted

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between stays in a rural locale that I call "Honde," as well the urban and peri-urban areas of Chimoio and Gondola. Rather than being a deliberate fieldwork strategy on my part, this long-term oscillation between sites has instead reflecte42d my interlocutors' relocations corresponding to changing seasonal and occupational aspects of their households. Moreover, such movements are also, at times, occasioned by recurring security concerns, in particular waves of robberies, instances of police and state violence and, more recently, the waxing and waning of prospects of civil unrest due to a deteriorating political situation in Mozambique from 2012 onward (see, e.g., Bertelsen 2009a, 2016).

Recurring movements between rural and peri-urban contexts aside, almost all economic activity is nevertheless based on or related to agricultural production: Here, the tilling of the soil crucially produces maize from which is made *sadza*—the staple dish that comprises the lunch and evening meal for a majority of the predominantly poor population. Normally consisting of maize meal (or, more rarely, meal from sorghum or cassava), the *sadza* is cooked into a porridge and served with relish, normally a sauce of green leaves or vegetables. In this mainly patrilineal social order, women grind the maize in large mortars and pestles in the household or take it to nearby mills (Sheldon 2002; Bertelsen 2014a). The maize meal (*ufu*) is central not only as a staple food but also richly important for cosmological and symbolic dynamics, often related to death and the regeneration of life, notions of fertility and instrumental in dealing with the problem of sorcery.[1]

For the purpose of procuring this vital maize meal, a household will normally work two varieties of plots of land differentiated by how moist the soil is and how close to running water, lush groves or streams these are located. The most humid or wet type of plot, the *matoro* (or *baixa*, from Portuguese "low") is used to grow water-intensive crops such as banana (*nzerapera*), sugarcane (*musare*), tomatoes (*matemate*), yams (*madumbe*), lettuce and beans (*nhimo, nhemba, dodsi*).[2] The dry-field plot, the *machamba*, will normally constitute the brunt of any household's pieces of land and is in the main used to grow maize and sorghum, while usually interspersed between maize stalks will be cucumbers, pumpkins, groundnuts or various strands of bean. Adding to the two types of land above, the

[1] This is also the case for other Southern African contexts, as for instance Maia Green (1997) elaborates in the Tanzanian rural context of anti-witchcraft practices or as Niehaus (2005) has analyzed for rural South Africa where zombies were experienced to steal maize meal.

[2] Except when otherwise noted all italicized terms here are given in chiTeve, the predominant language in Chimoio, Gondola and its rural and peri-urban hinterlands.

area around the house will typically also be used as a garden where sweet potato and cucumbers are important crops.

All households also have a number of fruit trees providing important variation to the *sadza*-based diet and mango, lemon, tangerine, avocado and papaya trees are scattered across Honde's undulating hills. Ownership structures of these are complex, subject to shifting formations of tenure and the trees index symbolic and mnemonic features of the larger social and cosmological order. Besides what is grown, birds as well as mice, rats, water rats and other smaller mammals are hunted with slingshots or traps while larger animals are scarce. Whatever animals are consumed is strictly regulated by *mitupo* —a totemic clan membership indicating tabooed animal meats and parts (see also Huhn 2016). Sometimes to accompany the *sadza* small, dried fish of three to four centimeters in length and bought at local markets are prepared with salt and some oil, or the freshwater *musopo*, a large, oily catfish-like fish caught in rivers or reservoirs around Chimoio, is cooked.

This cursory introduction to rural foodstuffs may convey an impression that Honde and similarly rural Mozambican communities are oriented purely toward consuming their own produce but this, of course, is not entirely the case: Integral to local and regional economies and systems of trade for many centuries (Bhila 1982), the peasants' selling of agricultural produce in urban and peri-urban parts of town (*bairros*) is conditioned by historical patterns as well as shaped by current situations of dire poverty and structural violence. Importantly, however, such sale and trade is also circumscribed by notions of sorcery (*uroi*), as well as rumors of illicit and predatory forms of accumulation. As in the African continent more broadly, such rumors particularly affect how foodstuffs and cooking in households are conceived and thereby directly relate to the female domain of nurture which, in turn, is fundamental to sociality more generally (Berger 1995; Moore et al. 1999; Bertelsen 2011, 2014a). Crucially, such highly gendered traits emphasizing nurture extend beyond individual households and into wider society: Women will visit each other to provide foodstuffs, borrow utensils for cooking, make and distribute pottery for making foodstuffs, lend maize meal or exchange seeds and seedlings. And perhaps most important of all: When harvest is undertaken, women gather at each other's households to help peel the cobs or prepare various forms of food and (alcoholic and non-alcoholic) drinks from maize.

Counteracting a central aspect of sorcery (*uroi*) in this area—that which sees it as materializing as poison in foodstuffs (see also Bertelsen 2011)—the very act of preparation of *sadza* is a form of gendered social intimacy, effectively expansively propelling the household outward transgressing its erstwhile boundaries. Such a centripetal orientation premised upon and valorizing social proximity is also

practiced directly through how women (and sometimes men) upon departure will provide the guest with a number of foodstuffs (hens, bananas, maize—or foodstuff to be, like seeds and seedlings) to take home with him or her. Again, this directs the household's nurturing capacity outward, as is also seen on the paths which cut through bush, agricultural plot or urban *bairros* as veins of an expansive sociality: Often en route to markets with foodstuffs or homeward bound with goods, women embody and energize the important circuits that these paths represent and at the same time exchange pieces of news and stop to visit familiars and friends. A third example of this valorization and practicing of social relationality and generativity is found in the domain of collective labor: Also here women generally oversee and organize labor power so that it conforms to proper arrangements, such as in the institution of *djangano* which mobilizes neighbors and kin (*dzindza*) for specific labor-intensive tasks, for instance weeding a *matoro* or *machamba*. Increasingly as the task nears completion, the participants are given traditional maize or sorghum beer (*duro*) underlining a reciprocal ethos.[3]

In such a context, to clandestinely elicit the labor power from his or her fellows, as is the work of the sorcerer (*muroi*), effectively *negates* or *inverses* the reciprocal, collective mechanisms of *djangano*: By extracting labor power, foodstuffs or the very flesh of people, the *muroi* illicitly privatizes resources for consumption—epitomizing the nature of antisociality. In its most concrete sense, this involves sorcerously drugging someone to nocturnally or invisibly perform labor on your *machamba* or *matoro*, so-called *kurima no zwiphoko* (see also Bertelsen 2016: 173–174).

Notwithstanding the challenge from the *muroi*—to which we will turn below—generally these dimensions of women's practices imply that it is highly problematic to approach the household as a bounded productive, socioeconomic entity. The dimensions also ethnographically indicate how women are charged with a generative potential of the community's sociality and relationality as such. In this sense, women's practices are directly socially constitutive and, from the perspective of food and production, women may be seen to nurture society and vice versa (see also Carsten 2004). In other words, women occupy key positions not only as nurturers in a limited sense but as key practitioners in the formation of local community and social and reciprocal relations more generally.

This article will explore the particular form of generativity cursorily introduced above through presenting and analyzing two

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[3] See also Chapman (2010: 89–99) who provides a highly valuable and minute analysis of the gendered dimensions of labor in Gondola. Further, similar dynamics of *djangano* is well-documented from rural Zimbabwe where it is often spelt *jangano* (see e.g., Bourdillon 1987: 74).

ethnographic cases of so-called *zwidoma*—sorcerous creatures that relate intimately to women's practices and roles but which are oriented toward harnessing and increasing monetary wealth. As will be shown toward the end of the article in a comprehensive section drawing on these empirical cases, what may be understood by value in this context will be analyzed in relation to what will be shown to be the *zwidoma's* double-edged nature; it *both* generates wealth and its potential while, simultaneously, *also* subverts various registers of value. In undertaking such an analysis, notions of value creation or generation in capitalist circumstances will be juxtaposed with processes of generativity and subversion in the particular Mozambican context.

Two Cases of the *Zwidoma* Triptych

As already hinted, women's generative social capacities are circumscribed by cultural imaginaries of the *muroi* in its female guise. Although I have found no predominance of women believed to be or attacked as sorcerers statistically outnumbering men, certain characteristics nevertheless seem to indicate female generativity as prominent for sorcery. I will limit myself here to analyzing one fundamental materialization—or, rather, an embodiment—of such problematic generativity: The *zwidoma* (plural; *tchidoma* sing.).

Zwidoma are in almost all instances related exclusively to women and, importantly, also to problematizing the accumulation of pecuniary wealth. This becomes evident in this excerpt from an interview made with a prominent traditional healer (*n'anga*) in Chimoio.[4] The interview was carried out in a bar in 2007 and starts by the healer, "J", replying to my question about the nature of *zwidoma*:

> J: *Zwidoma* are a tiny couple which may be used in maneuvers to get rich. They are people that are around 40 centimeters tall. They may be used to take money out of the houses of people. One may use them to get rich in five years. After five years, you may die or become very ill but rich. They are people of sorcery [*uroi*], right?
>
> B: Yes …
>
> J: Therefore, they need to be treated well as it is they who do all the work. They do not eat anything but meat. The only thing they cannot eat, are vegetables. They need meat only! The mother of the family who does this maneuver [i.e., controls and sustains the *zwidoma*] needs to cook a large pot of meat each day because they eat a lot.

[4] The notion of *anapatch*, a chiSena term describing a phenomenon near identical to *zwidoma*, is also commonly used in Chimoio, Gondola and Honde. Its use there illustrates the way in which terms as well as different understandings of relations and processes related to *uroi* and, more broadly, cosmological horizons migrate and are constantly re-localized and appropriated. This point is also underscored by its appearance in the Shona-speaking areas in Zimbabwe across the border.

B: Are there many who have these in Chimoio?

J: *Chi*! Plenty of people have this.

B: And when you die after five years, what happens to the *zwidoma*?

J: They disappear. Another thing with this richness. A man called […] here became very ill when he became rich. I told him "let's go to the hospital" but he never wanted to go. He refused, really. And each time after he had finished being ill, a new car or minibus [for his transport company] came to him. Each time!

B: So, you need to become ill to become rich?

J: Yes, it demands a lot [i.e. costs and demands a lot, *custa muito*].

B: But these *zwidoma*, are they dangerous?

J: Yes, they might be. They may even kill your own children. It is dangerous to play with them. There was this man here who did that. He was in the traffic police in Chimoio and called […]. You have heard, haven't you? [Calls out to the woman running the bar]

Lady: Yes, I have. […] became very rich.

J: Yes, yes. Only when you do this maneuver, you cannot be unfaithful [literally "go outside," *andar fora*]. It is dangerous.

B: And he did this? Was unfaithful?

J: Yes! He was unfaithful and died. But his mother still has all the money.

B: So, the money does not disappear when you die?

J: No. Your family may be left with a lot of money.

In January 2016 I had the opportunity to follow the ebbs and flows of goods and people at a large, informal urban market in Gondola. Having discussed profits, trade, customers and strategies with a small group of middle-aged male stall owners (X, Y and Z), the conversation one day turned toward *zwidoma*:

X: [Pointing to a run-down house a few hundred meters away] Do you see that house over there — there in the distance? The one that looks derelict?

B: Yes …

X: That there is where a woman here tried this trick of the *zwidoma*.

[Y and Z affirming strongly and vocally this to be the case.]

X: What happened was this: There was a woman in the house that wanted to have these *zwidoma*, so she organized to get some from a *n'anga* [traditional healer]. These *zwidoma* worked well for her—food came into the house, money came into the house. *Zwidoma* can travel long distances; at night they can even take your car and come back with things. But they need a lot of food; always food with a lot of meat. And the woman and the man [that comprise the *zwidoma* couple] walk around naked and shit and piss everywhere in the room that they have. So, it is a lot of work for women and they become exhausted! [Pointing at the house] This one [woman] became mad and ran away.

B: Oh … And what happened then?

Y: The husband was alone in the house with the children and the *zwidoma*. The *zwidoma* are always very nervous [*zwidoma são sempre nervosos, maningue*]. And there are strong rules for the *zwidoma*, they need a woman—otherwise the *zwidoma* become mad [*chateados*]. So, they started abusing the children [sexually] when then the woman was gone. The man could not handle them—it was not his *zwidoma* and the woman had run away! So, he took the children and ran away. Now, no one goes near the house …

B: So, the house is dangerous still?

Z: Look, the *zwidoma* are still there. I see them sometimes when I pass in the afternoon. Then they walk around in the garden, naked, whistling. It is around 18.00 [dusk].

B: So, this house — no one wants to live there?

X: You cannot! No one will. There are other houses here that have *zwidoma* [pointing in two other directions and elaborating on their exact location, supported by the two others]. And there are many we do not know about. *Zwidoma*? Ah, many [*maningue*]!

The characteristics of the *zwidoma* in these ethnographic excerpts seem to resemble the sacrificial logic well-described for sorcery in Mozambique (West 2005; Bertelsen 2009b, 2016). For instance, both cases show how *zwidoma* exhibit the features of zombification in which one's bodily energy is slowly sucked dry through engagement with sorcery, although here such engagement is complicit. The presence of *zwidoma* also instantiates what we may term an antisocial centripetality, with its epicenter being a specter of violence in the domain of the intimate: One's children could potentially die or, as was clear in the 2016 case, be socially, physically and mentally destroyed through (sexual) abuse. Such antisocial violence attacks the centrifugal form of sociality and relationality inherent in the female domain of the household. Clearly, violence in this format and directed towards such intimate domains, comprises a sacrifice of either self or others reflecting the almost perennially double-edged character of sorcery (see, for instance, Kapferer 2002). As in almost all accounts of what we define as sorcery, its transgressive character is precisely what imbues it with power. Here, this is indicated by the grotesque paradox of the *zwidoma* being corporally miniscule while simultaneously devouring an obscenely large diet of almost pure meat. Both the carnivorous consumption and the miniscule shape stand out in this excruciatingly poor area where most inhabitants taste meat perhaps merely once month—barring birds, smaller mammals and dried fish—as also alluded to above when elaborating a generally protein-poor

diet (which also results in high rates of malnutrition and child mortality).[5]

An ethnographic analysis from nearby Manyikaland, Zimbabwe, on the *zwidoma* may here help elucidate, complement and contrast some of the features that have emerged in the two Mozambican cases. In her study, Jacobson-Widding interestingly points out direct relations between women, cooking and sorcery, labeling the *zwidoma* couple as crucial to the female sorcerer. The sorcerer is "recognized by her dripping or ulcerous nipples. She is constantly suckling small creatures, her familiars, who are called *zwidoma*. Typically, her activities are sexual in nature. She rides a white hyena at night" (Jacobson-Widding 1990: 57; italics in original). Further, the *zwidoma* are "dwarfish" and are thought to inhabit "the ground under a woman's cooking hut" (Jacobson-Widding 1999: 303). Jacobson-Widding's ethnographic characteristics complement mine in also allocating agency and control to childbearing women and in emphasizing the *zwidoma's* relations to cooking and food (i.e. cooking hut and meat lust), to extractive capacities (milk from "ulcerous nipples" and illness) and, finally, to a sexualized orientation. Also here we see that the triangulation of the *muroi* and the *zwidoma* embody transgression, where the woman's engagement is conceived in sexual terms involving the figure of the hyena (which, counterintuitively, is white, a very rare color for this animal).

Jacobson-Widding's thorough ethnographic work from the Shona-speaking context in Zimbabwe exemplifies common cosmological themes in rural Southern Africa, as also shown by P. Miller (1979: 263) as one of the few other published pieces mentioning the *zwidoma*.[6] However, the centrality of gendered generativity should be evident in Jacobson-Widding's case and this also resonates with my interlocutors in Gondola, Honde and Chimoio: Time and again it was underlined that it is "the mothers" (as *mães*, in Portuguese), i.e. women who have reached or surpassed the childrearing age, that sustain and control the *zwidoma*. While, as in the first case, the *zwidoma* and woman constellation may, ultimately, benefit both men and women in the marketplace or in economic activities more broadly, women are nonetheless exclusively identified as the genitors for such illicit accruement of value, as their bodies sustain sorcerous creatures

[5] See also Pfeiffer (1997), Kalofonos (2008) or Schuetze (2010: 404–409) for additional excellent analyses of food, nutrition, gender and household dynamics in the region.

[6] Reflecting a more generic approach to the wider Shona cosmological framework is Bucher's (1980: 111) short comment about what he also calls the zwidoma where these are, simply, various sorcerous animals appearing in households and being "a witch's familiars (zwidoma) whom she has sent there to hide her dangerous 'medicine' in and around the houses where it will cause harm to both man and beast." Bucher seems not to have grasped the miniature couple–woman constellation integral to the assemblage that is so prevalent in Manica and Sofala provinces in Mozambique and also across the Zimbabwean border in Manicaland Province.

at a high cost—in monetary, corporal and social terms. Metaphorically, the reproductive and nurturing female capacity of women as central to household food production are expressed by female custodianship of the *zwidoma*.

The risky nature of such a nefarious, antisocial and subversive form of generativity emerges when the woman ceases to be part of the assemblage—when the triptych becomes a diptych: Fueled by their destructive orientation when not nurtured and placated, the *zwidoma* will then vengefully attack kin and family, as in the second case where the remaining husband and offspring were targeted. The antisocial and anti-generative expanse of the *zwidoma* laid bare is no longer contained by the parasitic and predatory, yet generative, relation to a woman: The *zwidoma* radiate destructively and centripetally, grotesquely inverting and mimicking the expansive centrifugal sociality of households. As such, their destruction also provides an empirical instance of how sorcery may be emplaced centrally within the household and how it remains an unequally distributed potential among its female members.

Value and Subversion: The *Zwidoma*–Woman Triptych Analyzed

At first glance, the *zwidoma*–woman triptych conforms to the well-rehearsed argument of commoditization effected by capitalism—a particular instance of how value may be addressed, we might say—leading to what John and Jean Comaroff famously term "occult economies." Providing an imaginative and rewarding framework to probe relations between sorcery, wealth and accumulation, they propose such a dynamic to have a global reach (Comaroff and Comaroff 2001: 19). Crucial to their argument are processes integral to capitalism itself—shifts, for instance, from production to consumption and from material to immaterial labor (Comaroff and Comaroff 1999) which have also been argued by others (Hardt and Negri 2000; Pignarre and Stengers 2011; Harvey 2014). Given the worldwide economic crisis and the emergence of increasingly elusive, non-transparent formations of capital and the reaping of its values by a class of seemingly unscrupulous capitalists (Piketty 2015), the term "occult economy" seems more apt than ever to describe these bleak circumstances. Moreover, the vision of occult economies encompassing worldwide productive, consumptive and exclusionary relations provides a powerful critique of the unfulfilled promises of ongoing neoliberal transformations of capitalism and the state (Kapferer and Bertelsen 2009; Sassen 2014). Such global dynamics also correspond with critical analyses of corrupt accumulation and the asymmetric patterns of Mozambique's economic growth (Cunguara and Hanlon 2012; Castel-Branco 2014; Mozambique News Reports and Clippings

2016) which have fueled several large-scale, violent political protests (Bertelsen 2014b). However, the idea of "occult economies" and related approaches nevertheless may be seen to problematically subsume ethnographically situated and highly complex values external to the capitalist system within its analytical purview. In other words, it fails to provide an in-depth analysis of peri-capitalist zones that recognizes those aspects relating to domains encompassing social, cosmological, corporal and gendered aspects—such as, in this case, the value of generativity.[7]

One way in which to avoid such an impasse in the case of the *zwidoma*-woman triptych—to attempt to locate its value, so to speak—is to begin by situating its emergence and perpetuation as the outcome of specific historical trajectories of economy, gender and the social order. Such Mozambican trajectories cannot be understood without taking into account the severe impact violence has had on both urban and rural livelihoods and economies in the last decades: Embroiled first in a war of independence from the repressive Portuguese colonial rule (1964–1975) followed by a devastating civil war with international ramifications and local dynamics (1976–1992), ordinary Mozambicans have suffered from long-term destruction on a scale almost unimaginable (Nordstrom 1997; Lubkemann 2008). Manica Province and the rural areas around its capital Chimoio were no exception and severely affected by the civil war, many of its inhabitants therefore seeking refuge in urban areas. However, while generally living in squalid and marginal conditions during war, the situation nevertheless still afforded opportunities for some, especially women. Chingono (2015), for instance, contends that women seized economic opportunities provided by the onslaught of war through establishing themselves as, for example, traders.[8] More broadly, this particular region of Mozambique is one where an argument about "gendered entrepreneurship" as an (after-)effect of the turmoil occasioned by war could be made. My own material, elaborated

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[7] For three other empirically founded critiques of the notion of occult economies in Mozambique, see Bertelsen (2009b), Israel (2009) and Sumich (2010).

[8] Whether market liberalization, commodification or deregulation is viewed as beneficial or detrimental to women as a group is often based on whether these processes are analyzed as emancipatory of structural constraints inherent in existing sociopolitical or economic orders, or whether the transformations they represent entail a further marginalization and/or loss of position(s). For three views based on Mozambican material, see Monteiro (2002) as arguing for further marginalization of Mozambican urban women, Sender et al. (2006) and Sheldon (2002) arguing for these processes having differentiated outcomes, while the before-mentioned Chingono, contrarily, argues for new opportunities afforded to Mozambican women by war and deregulation (1996, 2015). More recent material, for instance from Paulo et al. (2011), seems to indicate that as a general pattern especially urban female-headed households experience a sharper drop in poverty rates than non-female-headed ones.

elsewhere (Bertelsen 2016), also points to similar processes entailing the reassertion of control by rural women in Honde over productive and reproductive forces. While there is no space to go into such processes here, it underlines the non-static dimensions of relations between nurturing, production and sociality—a fluidity essential to analyses of rural and peri-urban society in Mozambique.

And here we are, of course, at a larger point regarding categorization and, thereby, universalization: In this text, I have consistently used the term "woman" and "man" as rather static and fixed analytical categories. However, as the material on the *zwidoma*-woman triptych has shown, the very category of mankind we usually call "woman" is rather unstable, open and forgeable—much as were Chingono's post-war women (Chingono 1996, 2015). In her brilliant and recently translated incisive text "Who Knows What a Woman Is," Annemarie Mol (2015: 73) adroitly deconstructs the category of "woman," writing:

> …every unit to which you might ascribe a definition of woman or female may itself be subdivided into smaller units that each do something slightly different. There is no uniformly used category of woman or female within a century, a culture, a place, or even the institute that presents itself as the apogee of coherence: science.

Mol's trenchant and important critique might also be levied against how the category of "woman" (and "man") is used in this article. However, through showing the very exposure of "woman" in these circumstances as potentially being part of triptychs, of assemblages involving multiple, extensive and expandable bodies, I hope these cases will rather contribute to questioning an aspect Mol also is concerned with, namely this: Where does the body end and begin? Such fluidity of multiple points of connectivity and unstable and fleeting multi-corporality, are, of course, traits integral to the very dynamic of the *zwidoma*-woman triptych itself. Here, the accruement of economic value seems to rest on a circulation of substances through bodies or substances being reworked by bodies—accentuated by the female body nurturing the creatures. This nebulous road to accruement of value is, further, predicated upon the appropriation of a subservient married couple—both serving and being nurtured by the market woman's corporal self.

As Geschiere (2013) has established in his overview of witchcraft in both Europe and Africa, its appearance is frequent within the domain of intimacy—the family, relationships between neighbors and other forms of social proximity. Geschiere's argument is generally also valid here as the very substance on which the *zwidoma* feed is a corporalization of intimacy, relationality and sociality—the female body. Nevertheless, the *zwidoma* comprise more than merely being an

expression of the ambivalence of intimacy in relation to witchcraft as their existence embodies a skewing and transmogrification of also the idealized married couple—a miniature but with grossly exaggerated features. The exaggeration is, of course, a staple feature not only of cosmologies of sorcery but also of wider sociocultural understandings of consumption (including eating), production and predation. As with notions of the carnivalesque, the grotesque of a double figure—the *zwidoma* are after all a pair, a duality onto itself—constitutes a twin ultra-consumer of precious foods, gorging itself on meat, as well as devouring the very origins of generativity, a woman with childbearing capacity.[9]

In a sense one may therefore understand the double figure of the *zwidoma* and its relation to a woman as an intensified version of generativity—a triptych also of diabolical proportions, if one is biblically inclined. However, in more analytical terms there is also an element here of realization of potential for the accruement of value that needs to be understood—a realization that remains unconstrained or uncontained by the economic sphere alone, by manuals prescribing market liberalization, by common descriptions of African informal economies. In order not to merely tag such dynamics with terms such as "occult economy," one way to approach what I have termed "generativity" is through the Deleuzian (2006 [1977]) notions of "the actual" and "the virtual"—both aspects of what one normally describes as components of the real: As I have described more fully elsewhere (Bertelsen 2016), the domain of what can be termed the traditional as an integral part of social ontology encompasses a vast range of outlooks, repertoires and logics as well as institutions and other physical set-ups in time-space. While often relegated to the role as modernity's Other or being presented as a result of colonial processes of ordering (e.g. Hobsbawm and Ranger 1992 [1983]), this is instead approached as a realm that produces virtual realities. Crucially, *virtual* here does not signify "virtual realities" or simulacra of the empirical in the sense of being individual personal fantasies or other insular forms of the imagination. Rather, "virtual" is a vastly broader concept launched to helpfully encompass a non-actualized reality where "actual" describes the tangible "state of affairs"—for example observable social processes (Deleuze and Guattari 1994

[9] Inspired by Bakhtinian readings of Rabelais, Mbembe (1992: 4) has famously argued for the domains of the grotesque and the obscene as inroads into understanding the nature of power in postcolonies: "…as a means of resistance to the dominant culture, and as a refuge from it, obscenity and the grotesque are parodies that undermine officialdom by showing how arbitrary and vulnerable is its officialese and by turning it all into an object of ridicule." While I will not go into it in detail here, Mbembe's argument about the postcolony might also be extended to Mozambican sociopolitical order where figures such as the *zwidoma* may be seen to interfere with predominant hierarchies of gender, power and the ideologies of the market and its logics.

[1991]: 155). Contrary to this realm of the tangibly empirical, Deleuze posits and accords a reality to *the virtual* and is adamant in his critique of philosophers (as Leibniz) who frequently conflate the virtual with the possible in a process where "[t]he possible is opposed to the real; the process undergone by the possible is therefore a realisation. By contrast, the virtual is not opposed to the real; it possesses a full reality by itself" (Deleuze 2004 [1968]: 263).

Deleuze's position is radical in both an ontological and epistemological sense by according a reality to the virtual which normally is represented as a bleak reflection of a universal and mono-empirical starting point—the real. Crucial for us here is that this composite reality of actual and virtual captures the bringing into the realm of the socioeconomic order an element normally seen to lie outside it. In a very concrete sense, the virtual of the domain of women's generativity is actualized to the effect of an accruement of value in defiance of conventional understandings of value and valuation in relation to commodities and the working of the market.

There are, however, additionally significant dimensions here to ponder: For one, the *zwidoma*-woman assemblage embodies, literally speaking, the actualization of productive flows, food and the female body that, crucially, also challenge gendered, hierarchical social orders. Taking this into consideration, it becomes reductive to label it as solely oriented toward the accruement of value in economic terms—also as the assemblage's potentiality lies precisely in elements and structures that are frequently antagonist to or outside market economies and social systems alike. Clearly, and deriving from the transgressions entailed by enlisting the *zwidoma* couple, such processes of valorization are precisely actualized through upsetting the domains of the social and the economic. In turn this entails that the concern with, if we may use terms derived from economy, accumulation by illicit and sorcerous means to increase profits—as the cases above underline—transcends the supposedly present moment of "millennial capitalism" or a globalized "occult economy." For one, this is so as the *zwidoma*-woman triptych is fueled by and amplifies visions of gendered *fertility*, notions of an extensive sociality and, not least, the sociocultural value placed on the production of maize flour and cooking. However, such dimensions are, again, irreducible to a formalist approach to capitalism as the *zwidoma*-woman triptych transcends the locale of the urban marketplace—and the present historical moment—by being a long-standing sorcerous configuration reflecting rural and peri-urban concerns with generativity, sociality and fertility. In sum, therefore, the auto-fertilization inherent in the *zwidoma* feeding off women's bodies

both recognizes *and* subversively thwarts this valorization of the intimate and key relations between food and women's bodies.[10]

This concern with generativity and multiple African worlds and modalities of production, corporality and food is not unique to Mozambique, of course. Parker Shipton (2014: S57) has pointed this out in a beautifully written account of long-term Luo relations of animal sacrifice and reproduction, noting that "[s]ome of these forms of value—indeed most of them—defy calculation, like a life, breath, or heart pulse offered up—or the life expected to be given safeguarded in return." Following Shipton's argument about recognizing locally produced and contextually sensitive forms of value, if we are to approach its accruement in such rural and peri-urban African contexts (and elsewhere) we need to acknowledge the *longue durée* character of such concerns which in Mozambique encompasses at least the era from late colonialism onward.

More broadly, the two Mozambican cases and the supplementary Zimbabwean material comprise, I argue, one ethnographic answer to the question regarding how societies deal with multiple value systems in a way that does not lead to the total domination of one system by another (see also Otto and Willerslev 2013). Crucially, the *zwidoma*–woman triptych may not only be approached as an actualization of the virtual component of reality—as I argued above—but also highlights a feature of human dynamics and transformation more profoundly: Creativity. As Castoriadis has so eloquently established, the human being is in the last instance oriented toward his or her own human self-reinvention (Castoriadis 2007 [1999]: 16; see also Kirtsoglou 2010: 3):

> *Anthrōpos* posits himself as *anthrōpos*; the essence of *anthrōpos* is self-creation. This phrase is to be understood in two senses: *anthrōpos* creates his essence, and this essence is in itself creation and self-creation. *Anthrōpos* creates himself as a creator…

Famously coining such a pan-human creative capacity as *vis formandi*, Castoriadis proposed the notion of *social imaginary* (Castoriadis 1987 [1975]) as capturing the unceasing oscillation between chaos/flux (*instituting social imaginary)* and stasis/stability (*instituted social imaginary*)—the latter being an ossified structure perpetually challenged by, precisely, *vis formandi* (for a related argument, see also Wagner 1981 [1975]). Castoriadis's approach may be seen to theoretically reflect precisely the value of generativity not only in its positive and constitutive sense—but also in its capacities for inversion,

[10] The money gained in the market by women is, in my research, often kept by them rather than handed over to the men in the household. In this way my material contrasts a point made by Signe Arnfred (2011: 241) for Northern Mozambique, arguing that there "[i]n general, women control the food and men control the money resulting from cash crops, even where women participate in the actual production."

subversion and mutation. By foregrounding human-centered generativity, it thereby presents us with a helpful expansion of a Deleuzian optic of virtuality and actuality that may be seen to *infuse* human beings, rather than to be *generated* in full by these, as Castoriadis would argue.

Such a vision of a human being as herself the creator of a total world with the capacity also to transcend the confines of social orders resonates with how a reservoir of potentialities are actualized in line with regular market logics of value and its production—and sometimes subversive of the same. In this case the *zwidoma*-woman assemblage historically emerges and reemerges in the context of the marketplace and elsewhere to encompass, destabilize and subversively question the accruement of pecuniary value and accumulation.

Value and Valorization, Creativity and Subversion

Above some attempts have been made at exploring a particular assemblage constituted by a woman and a miniscule couple (*zwidoma*) engaged in a nefarious form of generating wealth. As I have established, this sorcerous triptych is well-known within urban, peri-urban and rural central Mozambican environments for generating money in the marketplace. If approached from a perspective of exchange-value, one might see such an assemblage as merely reflecting a desire for the accruement of monetary value. However, by focusing specifically on the emergence, dynamics and flows of substances—corporal, spiritual, alimentary and material— the article has sought to reframe understandings of wealth and accumulation as represented fully by a capital-centric view. Although helpful in terms of decentering capital as a monosemic and universal entity indexing monetary worth, it is here suggested that a singular notion of capitalism as understood within economic parameters has become a template that, paradoxically, universalizes and expands a narrow understanding of production, (re-)distribution and consumption. This particular analytical flattening does not, thereby, take into consideration the gendered dynamics inherent in the production and generativity characterizing economic life, social orders and cosmological horizons. Drawing on the empirical cases, it seems clear that any understanding of the nature of markets and its produce—including processes of alternative valuations—needs to recognize potential and possible realities that comprise, effectively, a *subversion* of the (hegemonic) fiction of market logics and values—a subversion also through existing outside its domain and tentative reach, in its peripheries.

But how are we, then, to understand the notion of "value"—a term with a protracted history in anthropology (see, e.g., Peacock and McFadden 2015 [2001] for an overview)? As D. Miller (2008) recognizes, there is no shortage of theories of value in anthropology—

including conceiving of value in terms of encompassment, hierarchical systems and supremacy in Dumont's sense (Dumont 1970 [1966]; see also Rio and Smedal 2008). Further, anthropological approaches to value have variously encompassed emphasizing a cultural schema approach, deployed a sociological reading or conceived it in an historical–materialist fashion as reflective of economic configurations —as related to exchange, as related to worldviews or as a synthesis between the two, as summarized by Otto and Willerslev (2013: 3). Reflecting such diverse readings, it seems safe to assume that it has become more commonplace to apply a more dynamic understanding of the notion—within anthropology (Ortiz 2013, 2014) and without (Doganova and Muniesa 2015). Exemplifying such a comprehensive approach melding perspectives from various societal, economic and political domains, Narotzky and Besnier's (2014: S4) recent definition is helpful, seeing value as "…a terrain where people negotiate the boundaries defining worth, operating at the intersections of institutional top-down normative frameworks and collective bottom-up meanings and obligations." Their approach pries open the notion of value to see it as integral both to contexts of conjunctures and plural regimes, as well as forms of conflict and ambivalence. Moreover, they see "economy" not only in terms of "…making a living without privileging a particular domain of activity (exchange), a particular intentionality of action (gain), or a particular valuation process (calculation)" (2014: S6) but also, in a rather self-proclaimed neo-substantivist vein, as oriented toward "…sustaining life across generations" (ibid.; see also Gudeman 2012). Emphasizing cyclicity/life and duration/temporality, Narotzky and Besnier's (2014: S14) approach is rewarding as it fleshes out an anthropological vision of value in relation to the economy based on the "…struggles and stabilization around the worth of people and how to make life worth living."

However, Narotzky and Besnier's take nevertheless seems to privilege a capital-centric or econo-centric basis by introducing notions of hierarchical relations of asymmetry—a bottom comprised of social organizations, cultural orders and everyday lives (the domain of the humans) versus a top layer of generalized laws, political institutions and normativity. Contrarily, as for instance Ortiz (2013, 2014) has shown, the notion of monetary value—even in the context of the financial industry—cannot be seen as autonomous or as having an a priori existence as it is always already embedded in plural regimes of human (non-monetary) values (Ortiz 2013: 66). In line with Ortiz, I therefore find that Narotzky and Besnier's emphasis, although dynamic and abrasive, on negotiation, transactionalism or sociality needs to be complemented as "value" needs to be approached beyond notions of capitalist-produced relations of asymmetry and hierarchy.

In an interesting work, Graeber (2001) seems to argue for such a dynamic and composite notion of the term. For him (2001: xii), value is best approached "as the way in which actions become meaningful to the actor by being incorporated in some larger, social totality—even if in many cases the totality in question exists primarily in the actor's imagination." If employing such a reading of value to the *zwidoma*-woman triptych, the woman must be seen as inherently engaged in "meaningful action" within an order not fully regulated by market logics of valorization but rather expressing a reality of the generative potential of the social—also of the subversive kind undercutting dominant economic dynamics as these are commonly understood. After all, as Graeber (2001: 259) points out in a manner resembling both Deleuze and Castoriadis: "However elusive, creative potential is everything."

Nevertheless, Graeber's actor-centered creativity needs, I believe, to be tempered by the inherently collective character of value—a feature usefully pointed out generally by Helgesson and Muniesa (2013). Uzendoski's (2004) eloquent analysis of beer, meat and hunting among the Napo Runa in Ecuador may provide a case in point, albeit from a clearly totalizing anthropological point of view: Outlining how various forms of substances from animals and plants are transformed through labor and gendered complementarity, Uzendoski identifies sites for production of value where this is "…a perspective deriving from the totality of reproduction, the configurations by which society reproduces itself through the co-ordination of parts and wholes" (2004: 884). Uzendoski's analysis also seems to correspond to the two crucial components from Narotzky and Besnier, namely duration/temporality and life/cyclicity.

Informed by these latter perspectives from Narotzky and Besnier (2014), Graeber (2001) and Uzendoski (2004), values—and the value of generativity in this case—may be assumed neither to be stable and passive, as slots or categories in a cultural schema, nor as merely being the residue of sociological circumstances. Nor must they be understood representationally, as various metaphors of the market and transactions or as terrains upon which worth is ascertained and unidimensional and monosemic hierarchical indexes are systematized and generated. Away from such stale culturalism or tit for tat econo-centric transactionalism we need to understand value as continuously created (and not uniformly replicated/repeated): A potential that reverberates and mutates to encompass and forge various domains, shape practices and give trajectories to cosmological horizons of thought and understanding reflecting, again, duration, temporality, life and cyclicity. This means that when I propose the term "alternative valuations" here, it is an attempt to move away from, especially, such econo-centric notions of values that too often impinge on readings of ethnographic material—despite the fact, as Ortiz (2014: 39) and others

have asserted, that dominant financial concepts clearly entail meanings transcending the technical to encompass also, for instance, theological, political and moral dimensions.

A comparative case to bring out more clearly what I mean by alternative valuations is provided by Anna Tsing's (2015) recent and important work analyzing matsutake mushrooms and the worlds these and various other species co-create at what she identifies as the edges of capitalism. Tsing argues that market value thinking may be thought to have been spawned from the notion of the plantation; a controlled capitalist world of goods and labor and from whence was born the utilitarianist idea of scalability and market (Tsing 2015: 40). Tsing, therefore, professes that it is in the peri-capitalist zones—empirical domains not under the total command of a market economy—that we can both seek to anthropologically understand the world, asses its worth(s) and question capitalism (and, I will add, its hegemonic systems of valorization): "Pericapitalist economic forms can be sites for rethinking the unquestioned authority of capitalism in our lives" (Tsing 2015: 65).

Inspired by Tsing's approach to peri-capitalism, I will suggest that the *zwidoma*-woman triptych may precisely emerge in such a peri-capitalist zone in Mozambique. Here, the dimensions of market transactions and consumerism is inextricably entangled with a value of generativity that affords multiple avenues to condensing material objects—of pecuniary and non-pecuniary value. Further, analyzing a peri-capitalist zone also strikes one as an ideal site for testing various notions of value more generally; both the notions of accruement of value internal to capitalist thought and alternative valuations, such as generativity, as a structuring yet dynamic and changing element of social formation, cosmological horizons and everyday practices. Put differently, in these peri-capitalist zones the prevalence of the *zwidoma*-woman triptych exemplifies particularly strongly how human generativity is in no sense wholly contained, shaped and codified by long-term, multifarious capitalist impulses (see also D. Miller 2008).

A Final Note on Capitalist and Non-Capitalist Triptychs—and Alternative Valuations

Reading the above analysis, one might have received the impression that capitalist forms of creating and generating value are non-complex. This is, of course, not the case: As mentioned above, Ortiz (2013) has pointed out that within financial markets, value is a thoroughly human creation and, further, that it is embedded within and generated by traders drawing on a range of political, theological, moral and social registers. Similarly, in their intriguing analysis of the emergence of business models as an increasingly important device for valuation and, thereby, also capitalization, Doganova and Muniesa (2015) show that

value and valuation in such models stand in opposition to formal approaches to strategy and business decision-making processes. As opposed to flawed essentialist or functionalist critiques of business models, Doganova and Muniesa approach business models as multifarious assemblages that, crucially, rely on various modalities of performance, namely in the sense of an act or a narrative that convinces: in the sense of its scalability and projection toward the future; and lastly, in the sense of their reproducibility (2015: 111f). Crucial to these traits of the business model is therefore its plasticity and the multiple ways in which it, through performance, enrolls those within its reach to generate value through (expectations of) future capitalization. Again, not reflective of a technical or resource-oriented approach to value and growth, these dimensions to business modeling resemble, in some ways, the generativity of the *zwidoma*-woman triptych. In the business models in Doganova and Muniesa (2015) one may also argue for a triangulation (or triptychization) as central to value creation: Here, the business models facilitate highly beneficial configurations of investors, assets and entrepreneurs that work generatively and, indeed, Doganova and Muniesa's work demonstrates how such assemblages under the aegis of new business models generate a renewal of markets, exemplified through the businesses of Google and Genentech. Moreover, they also show clearly how business models as capitalization devices revolve around "asset-becoming" and futurity more generally.

In order to be brought out more fully, the correlations between the triptychs of the *zvidoma*-woman and the investor-asset-entrepreneur only hinted at here would require a comprehensive and comparative analysis that transcends the scope of this article. However, most crucially, one may ascertain that both are future-oriented and do not necessarily reflect technical and formal approaches to monetary or other conventional forms of resources. Moreover, both are plastic and pliable—in the Mozambican case the model of the *zwidoma*-woman travel both in space and time and from the rural to the urban, while for the business models this "mutatability" is inherent in its very configuration. Also, the logic of enrollment is clear—in the Mozambican case seen by how the power of the triptych dominated a range of discussions over accumulation and market business; and in the business model case the success of the businesses demonstrates its potential to enroll.

However, there are limits to comparing the two configurations of triptychs and one, which I would like to emphasize, is the implicit approach to value as inherently and universally generative in a positive sense evident in the business model triptych—an approach both Ortiz (2013, 2014) and Doganova and Muniesa (2015) seem to subscribe to more generally. While this article seeks to move away from such a view, it should be noted, however, that I do not support an argument

in the vein of a local population heroically upholding a singular, culturally determined, historically stable and alternative value in the face of the flattening pecuniary beams of global capitalism. Such arguments would be absurd in a region that has been exposed for a number of centuries to various forms of capitalist ventures from slavery, trade with Arabs and gold mining to plantations, concession companies deploying forced labor and markets as sites of exchange (Bhila 1982; Rennie 1984; Allina 2012). Rather, the *zwidoma*–woman triptych may be seen to index ongoing reshapings in a peri-capitalist zone revolving around the value of generativity that despite centuries of capitalist ventures, is still not yet subsumed by the inflexible market logic of pecuniary valorization nor is it purely positively generative.

More generally, Tsing's matsutake mushrooms and the *zwidoma*–woman triptych instead exemplify two instances of peri-capitalist zones that may be much more prevalent than hitherto thought, at least if, wrongly, taking the total command of a capitalist system of values as a point of departure. Put differently, alternative systems of valorization spring forth, mutate and become integral to sociopolitical orders and cosmological infrastructures and impede practices, testifying to the fact that woman (and man) is not yet always already a *Homo Economicus*. Emphasizing creativity, generativity and subversion in peri-capitalist zones opens up, then, to seeing "value" in two complementary ways: First, as meaning pecuniary value, goods, commodities and material structures that are already recognized as internal to a capitalist system (money) or as potentially convertible within it; second, and this is what has concerned me here, as an index of valorization irreducible to capitalism where the eventual economic outcome is predicated upon virtual potentialities that are irreducible to market logics. Specifically, while I have approached the value of generativity akin, in a sense, to Uzendoski—namely as a life-affirming and regenerative orientation toward sustaining and reproducing (social) life and the cosmological order and its specific gendered dimensions—I have emphasized value as necessarily open-ended, fluid and as containing within it possibilities for both its subversion and its intensification. The woman–*zwidoma* triptych has here been seen as such an instance emerging from the value of generativity but one that is grotesquely intensified, expanded and revolving toward the inverse —caving in on itself.

The latter and open-ended meaning to value is also informed by the pitfalls of anthropological and other disciplines' metaphorization and substitution of situated understandings—as also powerfully argued by Rane Willerslev in his call for a guerrilla anthropology that destabilizes other disciplinary approaches to value (see Otto and Willerslev 2013). A similar point to Willerslev's, and one empirically founded, is made by Bonelli (2014) in his analysis of hemic feasting and the consumption and exchange of blood among Pehuenche where he

shows that it is analytically highly problematic to reduce such empirical complexes to metaphors of relationality or material symbolism. Drawing on Lévi-Strauss (1955), Bonelli (2014: 108) writes that such an analytical move would in "…Lévi-Strauss' terms [entail] a destruction of the object of our attachment and its replacement with another that might be homonymous but pragmatically behaves quite differently."

I concur with Bonelli's and Willerslev's general critique and for this reason also found it problematic to endorse the applicability of a notion of the "occult" in the Comaroffian vein as it relegates to the shadows, to the margins, to the domain of effects, to the flip side of the coin of capital, that which is a key engine of social formation: the domain of the virtual and its potential to actualize novel forms of accumulation (also capitalist but not exclusively so). This article has been an attempt to flesh out alternative ways to conceive of value's multiplicity other than rendering instances such as the *zwidoma* to a functional category of "the occult."

The triptych of the *zwidoma* couple and the woman congeal key aspects of the valorization and problematic commodification of certain substances that move between agricultural fields and the market or household, almost invariably mediated through the female body. Although indexing a universal collective and relational impulse, rather than instantiating a case of "intersubjective participation" (Sahlins 2013), the predatory and sorcerous flipside to the value of generativity —drawing on potential domains of reality and limitless human creativity only tempered by broader cosmological horizons—makes the imagery of the triptych apt. For the triptych provides the possibility of shifting between one, two or three persons—revealing, concealing and embodying the space of a gendered economy of substance, generation and accruement of value at the peri-capitalist fringe. The notion of "alternative valuations" does not only thereby include—in a dichotomous fashion—a singular set of other values in contradiction to a singular hegemonic or other consistent and finite system. Rather "alternative valuations" must also recognize the possibilities of values that contain within it the potential for its obverse—such as the *zwidoma*-woman triptych emerging from the value of generativity.

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Carbon Valuation: Alternatives, Alternations and Lateral Measures?

Steffen Dalsgaard

Abstract

This article refers to carbon valuation as the practice of ascribing value to, and assessing the value of, actions and objects in terms of carbon emissions. Due to the pervasiveness of carbon emissions in the actions and objects of everyday lives of human beings, the making of carbon offsets and credits offers almost unlimited repertoires of alternatives to be inc6767luded in contemporary carbon valuation schemes. Consequently, the article unpacks how discussions of carbon valuation are interpreted through different registers of alternatives —as the commensuration and substitution of variants on the one hand, and the confrontational comparison of radical difference on the other. Through the reading of a wide selection of the social science literature on carbon markets and trading, the article argues that the value of carbon emissions itself depends on the construction of alternative, hypothetical scenarios, and that emissions have become both a moral and a virtual measure pitting diverse forms of actualised actions or objects against each other or against corresponding non-actions and non-objects as alternatives.

Key words: carbon credits; value; alternative; commensuration; climate change; market

Introduction

What does toasting 70 slices of bread have in common with heating 23 meals in the microwave? Allegedly the energy consumed by either of these actions emits as much CO_2 as the difference between choosing to drive 10 km in a car instead of travelling the same distance by bus in Denmark. These were the figures communicated in a 2012 advertising campaign called 'Become world saviour', which was conducted by the Danish bus company Midttrafik.[1]

[1] In Danish: *bliv verdensredder.*

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These rather innocent comparisons of mundane actions in terms of their quantified emissions appear frequently in explanations of how measurements and control of CO_2—or 'carbon' as it is often referred to in everyday English usage—is central to achieving greenhouse gas (GHG) emission reductions. As such, the comparisons point to the pervasiveness of what I here refer to as 'carbon valuation'. I take this to be the economic and moral assessment and ascription of value to objects and actions based on their impact on the global climate measured in terms of carbon emissions,[2] and the purpose of this article is to study how such comparisons constructed by carbon valuation are interpreted through different registers of *alternatives*. The bus company uses emission comparisons that are recognisable to Danish citizens as a marketing ploy, and it is exactly their recognisability that demonstrates how pervasive carbon valuation can be, when everyday actions can be assessed in terms of a universal emissions denominator. The question is: what is performed by the comparison and which logic is behind the operation? My argument is that even though the intention of the bus company is one of illustrating the climate costs of some actions compared to others, it exemplifies how the logic of carbon valuation builds upon the potentiality of substituting different alternative actions for each other. In this way, it addresses one of the central operations behind carbon valuation, namely an alternation between actions and non-actions, objects and non-objects, actual and potential that simultaneously plays on commensuration and differentiation of these alternatives (Dalsgaard 2014).

To approach the topic of carbon valuation, I look at two different understandings of alternative that can be discerned in the social science debates about carbon markets and credits and their potential for commensuration. These are alternative in the sense of being a variant of the same kind, where one can substitute for the other, and alternative in the sense of being an option that promises to be a radically different and incommensurable alternative to something. The meaning of the notion of 'alternative' is that it always requires a distinction of two realities, one deemed altered and the other unaltered, one chosen and the other not chosen. They are in principle mutually exclusive. For carbon valuation, however, there is a process of alternation between the altered and the unaltered (the 'business as usual'), where at times they are brought to be commensurable and at other times not depending on the circumstances and the actors involved.

This substitution of emissions finds its most visible form in carbon markets and carbon credits, which refer to one actor's purchase of emission permits, constructed from another actor's 'promises' not to emit. Promises refer to alternative intended reality of actions or

[2] This is measured as 'global warming potential' with the base unit being one tonne of carbon dioxide equivalent (tCO2e).

material forms that do not yet exist (and may never come into existence). In order for them to reduce emissions, they must be somehow actualised. This means that the virtual emissions (established by a contract or other 'certified promises' of action or non-action) and the actual emissions are not only compared; their value is also made commensurate via trading with the consequence that the virtual and the potential impacts on the actual and the real (see Lohmann 2011). One could argue that promises always do that, although rarely in a linear and directly exchangeable way (cf. Beckert 2016). That is nonetheless the case when carbon valuation allows for the trade of actual with 'hypothetical' future emissions and ascribes value to potential scenarios at par with actual scenarios across global space and time. This way of dealing in alternatives results in carbon being identified and measured in all the material forms within which this atom might be embedded (in the ground, in forests, etc.), and in the actions that affect these material forms. Carbon valuation thus offers endless opportunities for discovering alternatives between carbon-emitting actions, and it relies on breaking down any ontological separation between the actual and the virtual.

In what follows, I approach the topic of alternatives with inspiration from Bill Maurer's (2005) notion of lateral reasoning and his discussion of alternative currencies. Laterality refers to how ethnographic work (but also other forms of social–scientific activity such as the making of carbon credits) may not provide a meta-perspective, but lies 'alongside' the social world and the relation between representation and 'reality' that it tries to analyse. Maurer demonstrates this by focusing on attempts by individuals and institutions to employ alternative currencies to forge anew an 'adequate' connection between monetary and economic value on the one hand and the social reality this value aims to represent on the other. The article is thus largely a scholarly commentary, where different positions on carbon trading are discussed in light of carbon valuation and the creation of alternatives. I will begin by outlining how the topic of alternatives can be approached with inspiration from Maurer. This inspiration will lead to a look at the limits to alternatives (around notions of incommensurability), then to the importance of certifications and materiality for establishing the commensuration or conversely the separation of the actual and the virtual, and lastly to how carbon credits are thus a matter of 'adequate' representations.

Lateral Reasoning and Alternatives

Since any conception of an alternative necessarily depends on its being different from what it is an alternative to, it also has to rely on a discussion of 'difference'. This is one of the underlying themes of Maurer's (2005) book, which draws upon the way that anthropology

(and North American anthropology in particular) has relied on 'otherness' or difference as one of its main tropes, although to Maurer it is a matter of what constitutes currencies as 'different' from each other. Anthropological discussions in the 1980s and 1990s tried to strip cultural difference of any sort of essentialism and avoid taking its boundaries for granted in ethnographic descriptions and analyses. Still, anthropologists have had difficulties escaping the view of cultures in plural as radically different and incommensurable since is difficult to identify a neutral and non-partial vantage point, when the researchers themselves are in a position characterised by difference from what they investigate. Much anthropology relies on cultural phenomena as a multiplicity of differences (there are different cultures, different values, etc., each with its own history and context), which implies that the phenomena that are different are of one kind (e.g. they are all cultures). Difference thus becomes a matter of degree, and the phenomena are to some extent 'complementary' (see Maurer 2005: 25); variants of an otherwise homologous type. Instead of getting entangled in debating cultural relativism, Maurer's approach is first and foremost empirical—to understand the expressions of difference in the many voices and views of his material. Yet, to do this he also proposes in line with a tradition of thinking from Bergson and Deleuze to locate difference 'within the realm of the potential' (ibid.: 12). If one considers difference as having a temporal and emergent character—as difference being in kind as a virtual and continuous multiplicity—then difference points to a multiplicity of reality that becomes non-essential and non-static. 'Virtual reality' can be distinguished from 'possible reality', where 'the latter [is] always taking the form of the real while the former's actualization puts into question that prefiguration as it continually multiplies' (ibid.: 13). Difference is thus not a matter of comparing distinct and enumerable entities (a static number of 'different cultures') but allows Maurer to think 'laterally' alongside his interlocutors. This move involves sensitivity to the way a research approach is intertwined with that of the interlocutors, where difference and sameness 'alternates' (in the sense of 'oscillation' or 'circulation'), and it allows one to think of a non-static potential 'alternative to' (which implies the question of whether the phenomenon being studied is adequately conceptualised as a matter of for example 'culture' or 'value').

Thinking alongside but also 'across' to *radical* difference—letting carbon valuation circulate or alternate between oppositions—can in turn help us question the meanings of 'alternative' under specific circumstances (Maurer 2005: 16). The notion of radical difference implies incommensurability and irreducibility, whereas alternative in the sense of variant implies substitutability. Both of those meanings—and the relationship between them—are important to take into consideration in order to take lateral reasoning about carbon valuation

seriously. How do carbon valuation practices and the actions they value become commensurate and thus substitutable variants? How do alternatives become radically different? The calculative techniques and measurements behind the making of credits, offsets, or actions that need to be offset, are supposed to impose commensurability and thus alternation in the sense of substitutability across a wide range of carbon-emitting actions and processes. For example, the comparisons in the beginning of the introduction are contained within the reasoning of a system of market-based carbon valuation—that different forms of emissions become commensurable and substitutable for one another across space and time (cf. Knox-Hayes 2010, 2013)[3]—even if it is unclear to what extent actions relating to cooking and transport really substitute for each other in anyone's everyday life.

Carbon Markets and Commensuration of Difference

Carbon trading and carbon markets basically come in two types. Compliance markets are created from national, regional or international regulations that impose caps or limits on emissions from industry. In order to avoid fines, industrial actors covered by these regulations can trade for extra credits, or they can sell their own excess credits. Voluntary markets are driven by demand from corporations with marketing strategies of corporate social responsibility but also from private consumers wanting to reduce their carbon footprints.

Both types of markets rely upon alternatives at different conceptual scales and parameters, and they promise to put into place several alternative futures: global warming mitigation, 'green' or 'clean' capitalism, revaluation of nature, human action, energy and so on (e.g. Bridge 2010; Newell and Paterson 2010; Newell et al. 2012). These are alternatives in the sense that they articulate possible trajectories that are considered as significantly different from the path undertaken by reality if left unaltered. Emission markets are first and foremost the outcome and performance of economic politics and it has been argued that, as such, they displace conflict and shift focus from pollution and responsibility to the technical rules of an incentives mechanism. Carbon trading might prove not very successful in fighting climate change, but as argued by Donald MacKenzie it is successful in 'technicizing' the politics of allocation and valuation of emission allowances (MacKenzie 2008: 6). The economic logic behind carbon markets builds on the assumption that GHGs affect the earth's climate equally no matter where the emission takes place (e.g. Grubb 2003:

[3] In fact, 'emissions reductions have neither real space nor real time because the emission never occurs. The reduction is rather a mere reflection of the counterfactual, of what might have otherwise occurred. Both its space and time must be constructed' (Knox-Hayes 2010: 956).

146; Victor and House 2004: 56; Yamin 2005: xxix).[4] This reduces the problem of climate change to the problem of how to value and price carbon emissions (and other GHGs) correctly (see Grubb 2003; Stern 2006). More importantly for my argument, it enables alternation to operate through a global substitutability of a carbon credit for that which has to be offset or credited; of one tonne of CO_2 for any other (or for an amount of CH_4 or another GHG that can be calculated to have the same effect on the climate as one tonne of CO_2).

When emissions trading is based on this logic of substitution, then one actual action in one part of the world is both in theory and in economic practice made commensurable with, and alternative to, some other action, which emits, reduces or promises not to emit an equivalent amount of GHG. Both the operations behind the mundane substitutions mentioned in the introduction, and the alternative 'environmentally friendly' capitalism that they entail, are often seen as condemning nature to be valued in economic terms, which excludes other forms of value that may be incommensurable with economic logic (Dalsgaard 2013). That is, valuing actions in this way does encounter resistance, because these actions are carried out by actors who value what they do for reasons (socially or culturally) that are not always reducible to a single measure of worth—they can be alternatives to each other in ways that rather express radical difference. To examine the depths of such critiques, I will briefly discuss how they as alternatives relate to the notion of commensuration in the sense of a process or 'a system for discarding information and organising what remains into new forms' (Espeland and Stevens 1998: 317).

Maurer does not explicitly mention commensuration, but it is nonetheless inherent to his work through discussions of for instance equivalence. Commensuration is for Wendy Espeland and Mitchell Stevens (1998) regarded as a form of valuation that creates relations between objects that are compared but also has the power to transform that to which it is compared (see also Muniesa 2012: 26). It can turn qualities into quantities and difference into magnitude (Espeland and Stevens 1998: 317). It has been argued that operations of commensuration of the carbon markets can translate into 'making things the same' (MacKenzie 2009). Radical difference is discarded when a specific action becomes stripped of context and represented in quantified form as an amount of carbon emitted—a new form where initial difference is no longer recognised.

Radical difference implies incommensurability, but its definition and its process of creation still depends upon a reference to its

[4] Location (horizontally or vertically in the atmosphere) and timing (e.g. season) of emissions actually do matter for the global warming potential in specific chemical, physical and meteorological environments, which is something designers of carbon markets have tended to ignore (Berntsen et al. 2006).

opposite terms—and, therefore, a relation towards that to which it claims to be incommensurable. Drawing upon the work of Vivian Zelizer, Espeland and Stevens argue that:

> the importance of incommensurable categories […] depends […] on the relative status of their oppositional form, commensuration. The extension of commensuration into more spheres of life may make incommensurable categories more meaningful, their defense more necessary. This extension may produce paradoxical effects, as when pricing children in law, labour and insurance shifted the terms of their value from primarily economic to moral and emotional. Children became priceless. (Espeland and Stevens 1998: 327)

It is difficult to say, for carbon trading, whether claims to pricelessness are strategic forms of political resistance (as in the critiques mentioned above) or inherently tied to the pricing of emissions. When emissions are priced and traded in voluntary markets for instance, one can suppose the existence of actors who prefer paying for credits rather than reducing their emissions. These 'preferences' may include private habits or routines that are deemed unavoidable or difficult to put a price on, but which can be preserved by pricing emissions instead.

This discussion of alternatives as either commensurable or not opens for a nuanced understanding of the carbon trading schemes as valuations in several different ways by making 'use of contrasts and differences, to gain insights from incomparability and inadequacy' (Schmidt 2008: 357). Part of what becomes clear from this lateral alternation is that valuation is as much created *in* the conversion or *in* the comparison of alternatives. It is not solely discernible as an ascribed quality stemming from how people consider it (e.g. its social and symbolic value), or a matter of the inherent affordances of the object valued (such as its material properties), which has been the two main positions in the debates about the value of currencies (see Maurer 2005). Value stems from the act of considering and valuing. That is, the focus shifts to valuation as a performed action or practice (Muniesa 2012). Exemplary here is how Heather Lovell (2014) draws upon Espeland and Stevens and other sociological literature on standards to discuss the process of making financial accounting standards for emission allowances in the UK. Problems with the work of commensuration and standardisation appeared in this sector because there was no certain ideal or normal mode of valuing the emission allowances (ibid.: 8–9). Some of Lovell's respondents aimed at a stabilisation of the emission categories, while others expected the categories to constantly evolve and sought what was practically feasible in the specific local embeddedness of markets. It is easy to think that another part of the reason for the difficulty is that the measurement of emissions affords an almost unlimited process of substituting alternative actions for one another, which I will return to in the next section.

Carbon valuation encounters resistance when exposed in this way to entities that are difficult to quantify, or refuse to be reduced to an emission value at all, when quantity itself becomes a quality of things (Maurer 2006: 25), or where the commensuration is fraught either morally or in terms of what is accounted for. As Elizabeth Povinelli has noted about language use, 'incommensurability refers to a state in which two phenomena (or worlds) cannot be compared by a third without producing serious distortion' (2001: 320). Indeed Janelle Knox-Hayes has noted about the effects of carbon valuation schemes that 'the assumptions and frames of accounting have a significant and often distorting influence on the evaluation of greenhouse gas impact.' (Knox-Hayes 2013: 122), because 'the markets account for neither information complexity nor spatial scale and temporal duration under which environmental systems operate' (ibid.: 125; see also MacKenzie 2009; Bastian 2012). Knox-Hayes's overall point is that the financialisation of carbon emissions is a form of time–space compression, which divorces the use value of resources associated with the carbon emitted from the exchange value of the financial instruments (credits). This entails a separation of exchange value from its material context (nature), which creates distortions and demands for accelerated rates of resource production out of line with the natural processes underwriting production—even if carbon trading was meant to solve the discrepancy between human economic activity and build-up of GHGs in the atmosphere.

In the following sections, I will pursue some of these themes in more detail and discuss how they relate to carbon valuation as alternatives. This includes valuation from making commensurability between credits but also the defence of the incommensurability of actions and practices associated with or represented by carbon emissions. As a result, the discussion will begin with the exploration of carbon valuation's limits through the markets.

Carbon Markets and Limits to Substitutions?

Marketisation of carbon emissions would avert global warming by making it profitable not to emit GHGs. This has been the position of liberal economists like Nicholas Stern, who argue that climate change is the result of a market failure and of the failure of taking into account the full (environmental–economic) costs of human activity and impact on climate (Stern 2006). A starting point for economic thinking is then to consider what it could mean to take into account the 'full' costs. Is it necessary or even possible to think about full commensuration? And would this deny any space for alternatives to economic carbon valuations? Carbon (the atom) is so pervasive—it is the basis for life itself, and all human (and many non-human) actions emit carbon—that it may be just as important to explore the *limits* to carbon valuation, and ask what it is *not* an alternative to. Since every

human action requires energy, which then causes the emission of various amounts of CO_2, it could be difficult to identify the limits of what should count as carbon emissions. In the end it seems like a practical problem of what is measurable and at what aggregate scale of significance. What one makes of carbon (as a credit, as a form of value or a form of valuation) depends on what scale and what comparison one mobilises when trying to describe it and understand it (Simons et al. 2014).

The permeability of carbon allows for the construction of the global scale needed for carbon trading to work in the liberal economist's rhetoric about climate change. Where emissions circulate in the atmosphere, the markets promise an equal circulation of carbon in the form of credits. It seems pertinent to take the dual permeability of carbon seriously and follow emissions—laterally—across as many social and natural divides as possible to identify where and how carbon valuation happens, and in what way alternatives are generated and juxtaposed. When economists insist that carbon trading should be global, because 'from an atmospheric standpoint' carbon emissions know no boundaries and location of emissions do not matter (despite the scientific evidence to the contrary[5]), then neither should our analysis be deterred by the differentiation enacted by boundaries, but should rather pay attention to how carbon valuation both constructs and deconstructs them, and how the two different meanings of alternative emerge in the process.

Marxist-inspired scholarship has been especially critical of the economics of carbon valuation and has stressed especially the social limits to its scope. It has discussed how carbon has been incorporated into the capitalist world system, which has revealed the contradictory aspects of the alternatives created through these processes (see especially McMichael 2009; Lohmann 2010). For example, when the carbon credit is objectified as the means of finding alternative ways of organising the economy in order to mitigate global warming, it is presented as an alternative to accepting the current economic conditions that lead to climate change, and it is a way of perceiving the curbing of emissions through market-driven procedures as an alternative to state-organised taxation or command-and-control mechanisms (see Bumpus and Liverman 2008: 131). Yet with carbon valuation being at the centre of climate capitalism (Newell and Paterson 2010), it is embedded in an alternative *variant of* the contemporary economic system rather than proposing an alternative *to* it (e.g. Lohmann 2010; Dalsgaard 2013).[6]

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[5] See n. 4 (Berntsen et al. 2006).

[6] One could argue that Marxists generally have propagated visions of society based on radical and revolutionary alternatives rather than accepting mere variants.

Carbon valuation offers to make everything commensurable in its own terms (Dalsgaard 2013), but what about other terms? That is exactly the problem that emerges from positing carbon as an alternative valuation; it has been criticised by some scholars (e.g. Lohmann 2010) as posing as a quasi or even a pseudo-alternative—an alternative 'green' capitalism perhaps, but not an alternative to capitalism; carbon valuation schemes rely on one meaning but not the other. These critical scholars stress how carbon trading embodies the characteristics of uncertainty markets and risky financial products such as derivatives (Cooper 2010; Lohmann 2010; Spash 2010); it permits societies in the global north to maintain luxurious lifestyles and to rely upon fossil fuel-based unlimited growth rather than turning them towards the 'true' alternatives of recycling and renewable energy (Lohmann 2009a, 2010; see also McMichael 2009); it turns nature into an object that can generate profit (e.g. Knox-Hayes 2010), and comparing 'old and new carbon economies […] redraws the boundary of the "carbon problem": climate change becomes no longer an emission problem or a sequestration problem, but one of carbon throughput' (Bridge 2010: 822), or one of managing fluctuation within the climate as much as within the economy (Cooper 2010).

Both the view of carbon valuation as posing quasi- or pseudo-alternatives and the challenge with the emphasis on fluctuation or throughput become even clearer when it comes to the potential substitution of different mundane actions based on their cost in carbon emissions. Comparing the use of a microwave oven with the use of public transport is a pseudo- rather than a quasi-substitution. It is merely illustrative of the scale of emissions, and it is probably only intended as such; but by comparing the two it is also implied that one can make up for one's transport-based emissions by dropping some other—meaningful—activity. But who would—in his or her everyday life—be confronted with the choice of exchanging or sacrificing the use of a microwave for the privilege of driving a car rather than using public transport? Carbon valuation and in particular the carbon credit here exemplifies a scheme, which enforces connection, commensuration and pricing of 'events, states or goods that are not commensurated or priced in everyday life' (e.g. Lohmann 2009b: 522). Everyday actions like these are meaningful in relation to multiple cultural or social concerns and networks; they are often (radically) different without being substitutable.

If all carbon emissions according to economic discourse are commensurable and replaceable (any quantified emission negated is equal to any other emission of the same type and quantity), the question is how to identify the relationship between this understanding of carbon as generic (and universal) and the actualised and specific understandings of carbon emitting actions valued in different contexts and networks or being transformed as it crosses boundaries. Maurer's

exploration of money as a parallel also notes how one line of thought (e.g. Georg Simmel) sees money as homogenising 'acid' that erodes human values, whereas others (such as Vivian Zelizer) 'draw attention to the myriad kinds and multiple effects of money' (Maurer 2005: 103). That is, if we see and expect to see carbon emissions and thus carbon valuation everywhere, the danger is that we easily end up glossing over the incongruent and incommensurable capacities that may emerge when exchanging different discursive or biological carbon compounds one for another. When these carbon compounds correspond to or represent each their own set of mundane actions, one then trades a congealed or contractual form of the actions or activities in question, when trading credits. However, trading actions in this congealed form as carbon offsets or credits illustrates how the moral values, which are associated with carbon reductions in one location (consumers or corporations eager for good conscience or PR), become 'disentangled' from their local context, when they are turned into a delimited commodity (see Thomas 1991). This is not to imply in a simple manner that some actions are moral and others not, but merely to state there may be multiple moralities attached to or detached from actions at any given time, and they shift through processes of exchange or commoditisation. The carbon markets have, nonetheless, brought about what seems to many observers to be bizarre emission reduction schemes. When the reduction for instance is based in rural India on the substitution of manually operated treadle water pumps for diesel-driven ones, then the abstracted substitution of emissions is accused of transmuting into a morally problematic discursive guise of 'luxury emissions' versus 'survival emissions' as Agarwal and Narain (1991) famously named it, or as 'bearing the white man's burden' as an Indian newspaper stated (Blok 2010: 20). Other examples include carbon funding for hydropower dams that destroy sustainable and low-emission local systems of water control and irrigation (Lohmann 2009a: 1070–1071), or oil palm plantations or similar mono-cropping that replaces rainforest based on the view that palm trees also absorb carbon from the atmosphere (Creagh 2010).

While substitutable on paper, not all emission reductions are attractive to western consumers and corporations, when what they want is to save the rainforest and its biodiversity, or improve health in the global south by introducing fuel-efficient 'clean cookstoves' to poor households so they need less firewood and the housewives do not inhale as much smoke from firewood (see Peters-Stanley and Gonzalez 2014: xiv). Where both of these examples play with the avoidance of negative alternative futures (no more rainforest; deterioration of poor people's health—disregarding the likelihood that such futures may occur anyhow), carbon trading here poses another level of alternative by being juxtaposed to and substituting for exchange relations between global north and global south in the field of development.

Climate change mitigation and environmental policy is deeply integrated in this field today, where 'non-carbon benefits' was in focus at least prior to COP21 in Paris in December 2015. In fact, carbon offsetting does not appear to be much about the carbon but all about the other values that carbon-reducing projects realise or actualise (such as the relationship between humans and nature or living a 'green' consumer lifestyle). Attachment to such 'other values' is one of the parameters, which differentiates alternate types of carbon units or credits from each other (see Dalsgaard 2014).

While the use of carbon valuation for alternative ends thus seems abundant, debates about policies and market structures still only address a limited view of the alternative forms which emerge from the carbon valuation schemes. My argument is that when shifting focus to the actual and practical construction of carbon credits or emission allowances, it becomes clear that they rely on the manipulation of 'alternatives' at another more technical and sometimes material level—that of the credit itself.

Carbon Valuation and Certification: What is the Materiality of Credits?

The value and alleged reality of carbon emission reductions expressed through carbon credits depends to a high extent on the work of certification. This section will go into some detail with this work, since the topic touches upon the way the 'reality' and commensurate potential of carbon is ensured through either its informational or its material forms, and whether these forms are regarded as substitutable or not. This paves the way for a discussion of effects and adequacy of credits valuation in the final section.

An important aspect of carbon valuation is the distinction between different kinds of credits. While all credits on paper are the same and nominally refer to an emission reduction of one tonne of CO_2e, some credits are more highly regarded than others, because it is deemed more likely (in part due to more rigorous certifications) that they adequately represent this. Different credit types can thus be seen as variants of the same kind, ideally substitutable for one another, but in practice they are valued differently and even carry different prices, which again means that commensuration is not straightforward or meets resistance even within the system of market valuation.

The categorisation made in financial accounting is one way of establishing the relation between credits, their degree of sameness or difference, and whether they can be substituted for each other or not, or through which factor of conversion (see Lovell 2014). Certification methodologies lie behind how the credits are made in practice. Certification not only claims to guarantee that a credit refers to a 'real' emission reduction, it also establishes differentiation between the different types of credits that all depend on different relationships as to

how their reductions have come about, and how likely are their 'realities'. Where for instance the credits named Certified Emission Reductions (CERs) have to live up to standards ensuring that it is appropriate for trading in the strictly regulated compliance markets, Verified Emission Reductions, or Voluntary Emission Reductions (VERs) as they are also called, are made for voluntary markets, where there are fewer requirements.

The difference between voluntary and compliance markets and their respective credits has been reviewed extensively in the literature, including discussions of the different types of emission reducing projects and the making of standards (e.g. Bumpus and Liverman 2008; Corbera et al. 2009; Lovell et al. 2009; Lovell and Liverman 2010; Lovell 2014). The main point for my case is that the valuation employs different but comparable knowledge-making practices that make different claims about the relationship between carbon credits and reduced emissions. Heather Lovell and Diana Liverman (2010) have argued that credits for the compliance markets are largely constructed from the calculative practices of accounting with little or no trace of the conditions by which they are produced (cf. MacKenzie 2009), whereas credits in the voluntary markets often retain a link across the supply chain to the site of production in order to allow narratives to promote the buyer's ethical profile (see Lovell et al. 2009). Examples of the latter are credits referring to clean cookstoves or forest carbon sinks, which are popular because they appear tangible and are easy to communicate to the buyer (Stephan 2012).

Consequently, some scholars have argued that all types of carbon credits are constructed as commodities *purely from information* (e.g. Knox-Hayes 2013: 122). The underlying reason for this is that the carbon credit is not a physical or material commodity, but a representation of an event or action that affects materiality. The credit is thus a certificate that documents that this has happened, or rather has not happened, and that 'something equivalent' is allowed to happen. Carbon credits claim to be a reflection or representation of emission reductions, or non-existing emissions. As such they have no physical manifestation except in infrastructures as for example exchange platforms or registries, where they can be identified by a unique serial number (Knox-Hayes 2010: 957–958). In this regard, the certified credit has parallels to legal contracts as mentioned in the introduction and in the previous section (that is, an exchange of conditional actions materialised or congealed in information such as ledgers, formulations and signatures), and legal scholars have been active in interpreting the frameworks for the carbon markets and their products (e.g. Hepburn 2007).

Carbon credit information consists of the mapping of an alleged physical reality that affects the amount and value of the credits. It is for instance well documented how carbon emitters such as

corporations (e.g. Lippert 2012, 2015) and carbon reduction projects (e.g. Ehrenstein and Muniesa 2013) basically claim to construct carbon emissions based on information about material assets and their use. This can be information that accounts for the polluting activities of a corporation that seeks to offset its emissions, or it can be information based or on the mapping of rainforest 'carbon sinks' (e.g. Stephan 2012; Ehrenstein and Muniesa 2013). However, even for credits referring to a clear image of a material reality, it is rather the counterfactual labour or actions that are done or not done to this material reality, which generates the value of the credits, which is why information (calculation as well as narratives) is so important (see Muniesa 2012; Lippert 2015).

Different types of markets and credits demand different forms of information, which in turn informs different modes of carbon valuation. Lovell and Liverman argue that 'information and knowledge about how the offset is produced—where and using what technology—is crucial within the voluntary offset market, in stark contrast to the compliance market where this type of information is actively dissociated from the credit' (2010: 260). The work to represent the reality of emission reductions within the voluntary markets includes attempts to present it in an almost customised form as 'boutique offsets' to consumers in the global north who are presented with and demanding ethical narratives of the good that offsets do even if misrepresenting the realities of how the credits are produced (Lovell et al. 2009; see also Ehrenstein and Muniesa 2013: 179). Apart from the different carbon 'units' (e.g. credits such as the CER or VER) subject to individual rules depending on which market the carbon is traded in (e.g. Button 2008: 573–574), there were besides that in 2009 at least 18 different standards[7] for offsets, each claiming to guarantee the value of a unit and integrating its own gamut of social and environmental benefits, land use or forestry (Newell and Paterson 2010: 120–121; Descheneau 2012: 605). The voluntary markets are less strict in terms of certifications, but 'the offset narratives and technologies also act to reassure consumers about what it is they are buying, given the absence of both a tangible product and regulatory standards' (Lovell et al. 2009: 2358). In other words, adequacy may here refer to detailed stories rather than to accuracy in the methodologies behind the measurement of emissions.

The requirements and thereby the information needed to certify or verify a tonne of carbon usually focus on the capacity of *projects* to produce or store carbon. Focus is on the technical drafting of a project

[7] This is not the same as the different emissions units such as AAUs (Assigned Amount Units), ERUs (Emission Reduction Units) and CERs (see e.g. Hepburn 2007: 380; Yamin 2005). There are today at least nine different standards for offsets (see http://www.carbonneutral.com/resource-hub/carbon-offsetting-explained/carbon-offset-standards, accessed April 4 2016).

design document (PDD) which delineates (spatially as well as temporally) the project aimed at carrying out the reduction changes, calculates credible baselines or 'reference scenarios' to which the project will be compared, and estimates the carbon credits to be produced (Ehrenstein and Muniesa 2013). This work is done in order to argue and to make it plausible that the reduction is *additional* to a certain 'business as usual' scenario; in other words, what would emissions be like in the absence of the project? In this respect, the project design introduces the agency of some human individual or group, which earns the credits by changing a course of action, and it is the promise of this *alternative* course of action that provides both the reality and the value of the carbon credit. Note that project designers claim that additionality refers to 'alternative' in the sense of 'radically different' by promising a singular future that would otherwise not have come about rather than merely substituting one course of action for another.

The notion of additionality as an 'estimate of expected emission reductions' (Hepburn 2007: 381) provides food for thought here, because it stretches carbon valuation conceptually to both temporal and spatial limits. Additionality is very difficult to prove, and it is largely hypothetical in its reference to a business as usual scenario (e.g. Bumpus and Liverman 2008: 135–136); a calculation projected forward in time for the duration of the project based on known conditions of the past and comparisons to similarly contemporary scenarios. Critics would argue that the counterfactual alternative is thus often inadequate if not directly spurious, even if it is treated as having the same epistemic status as actual histories of emissions (e.g. Lohmann 2011). For a forest carbon project the expected growth rate of the relevant species of trees combined with vegetation density, soil nutrients, hours of sunlight and many other factors must be known or estimated for the specific location of the project (cf. Stephan 2012). The valuation itself is furthermore delicate, because the carbon credit is what occurs in excess of the natural absorption of atmospheric carbon by vegetation and soil, or it must be demonstrated that the project actively ensures a growth process that otherwise would be averted (Gutiérrez 2012: 53). It must also be guaranteed that the activities or processes that emit carbon are indeed averted and not just relocated, outsourced or exported. In the carbon project jargon this is called 'leakage' (Gutiérrez 2012: 54, see also Davis and Caldeira 2010). In other words, what is valuable is not any existing carbon, but would-be carbon; carbon that would or should have been emitted but was not. In some cases it exists in the mapping of carbon sinks—the storage of carbon—which is compared to the counterfactual and imagined alternative event that it will be released and would have been emitted unless some developer paid to conserve it. Emission reductions here become a virtual resource; not 'not-real' but not actualised either.

It is always implied (if not always demonstrated) that carbon credits correspond to a substantial and material reality—both spatially and temporally present at a given duration in time for reversing emissions already done or for offsetting potential emissions in the future (see Bumpus 2012). The 'hot air' mentioned above is one example, though, where the materiality and reality of reductions is questioned, and the value of these credits is derived from an intergovernmental agreement. But also for other credits there can be doubt. Some of the more ideological positions on the US dollar lament that its value is no longer being fixed to and backed by the 'reality' of gold (Maurer 2005: 89), and similarly the centrality of the work of auditors and verifiers could indicate that the value of carbon credits depends on the social or socio-technical production of trust and signification rather than on actual material carbon (cf. Lovell 2014: 266). Indeed a patch of forest can be converted into potential carbon credits through documentation, so the materiality is not unimportant for adequacy of the representation and it functions as a persuasive aesthetic in the marketing of credits; but it is often far removed from what is being traded.

Having said that, from the perspective of 'social studies of finance' (see MacKenzie 2008), materiality is more important than usually imagined by those arguing that the value of carbon credits is purely informational or government fiat. Materiality in this view is not so much the 'reality' of the carbon-materiality that the credits strive to represent, or how the credits are embedded in an imaginary of the fluctuation of atoms and molecules in and out of the atmosphere. For the everyday practices of the actors involved, the point is more importantly how carbon (credits as much as emissions) is located materially in socio-technical infrastructures or objects that do not simply 'represent' a market, but is a constitutive part of economic action (ibid.: 3). Markets and their actors have materiality—physicality, corporeality and technicality—and both prices and credits take physical form. Credits are located and must be stored and moved through writing and electronic signals (ibid.: 2). These include online carbon calculators (Lovell et al. 2009) or spreadsheets for corporate carbon accounting, which constructs carbon emissions in need of offsetting (Lippert 2012, 2015). On the credit side, they include windmills that generate power (cf. Phadke 2012), and oil or coal that contain potential emissions (cf. Mitchell 2011), but also the technological infrastructures or 'datascapes' (Lippert 2015) that enable calculations and trading. These can be PDDs, registries and other digital and technological means of exchanging the credits with speed and efficiency, which keeps track of the lifecycle of the credit including origin, trading history and expiry (Knox-Hayes 2013: 124). Knox-Hayes emphasises the problem of how to locate the 'reality' and the value of carbon, though, in that 'the markets seem to instantly create

global scale and tremendous value, because they create value for events absent space and time, and it is therefore difficult if not impossible to ascertain the place and scale at which the value actually exists' (Knox-Hayes 2013: 124). Valuation, and the adequacy of that valuation, is thus distributed upon a diversity of materialities and actions as much as virtualities and non-actions, which means that both the actualisation of its 'reality' and value is constantly emerging and changing, and difficult to locate.

What this section has demonstrated is that alternations between materialisations of carbon and information about carbon exist in a complex but mutually reinforcing relationship of potential alternatives, and that carbon is difficult to 'locate' as its status and hence location can be mobile in the physical as much as the socio-technical world. Along with socio-technical infrastructures, certification work with its focus on additionality and counterfactuals in project design provides attempts to stabilise the alternation, to ensure the process of substitutability between alternatives (such as different types of credits). Yet it is argued by critics to contain a spurious assumption of actual and virtual emissions being equivalent, due to the uncertainties of what counts as 'additional' or what reality can be ascribed to a counterfactual. This brings us to the question of 'adequacy' of the representation of the alternative and virtual scenarios potentially substituted through the carbon credit. This is an aspect of carbon valuation, where Maurer's work on the adequacy of alternative currencies provides a useful starting point.

Debating the Adequacy and the Effect of Carbon Valuation

Maurer's project is to study alternatives to modern money and finance as they are envisioned and made in practice by a wide range of actors. His analysis is intertwined with reasoning and 'everyday understandings of money among people who are forging their own modes of finance through Islamic banking and non-state-based alternative currencies' (2005: xiii); people who have been active in trying to rediscover in practice the relation of money to 'reality', so it can be 're-grounded' and (again) conform to social order whether it be faith, community or law (Maurer 2005: 6–7). Not disregarding the difficult philosophical problem of how to approach or discuss what reality 'is', I take inspiration from Maurer's lateral way of addressing it, which is to focus on how the carbon value debate is concerned with the practical 'adequacy' of the representation; how to bring 'one's concepts in accord with reality' (ibid.: xiii).

How adequacy is an empirical matter of debate for this topic is exemplified by the discussions over the establishment of standards for carbon credits in the financial accounting mentioned above (Lovell

2014). The desire to make value 'real' and to make 'the real' valuable has a parallel in carbon valuation. To be valuable, a carbon credit must be certified as representing one tonne of CO_2e—a carbon reduction that is 'real, measurable and additional' (Hepburn 2007: 381), which I touched on in the previous section. Suffice it to say here that the carbon emissions represented by a credit should exist as an *effect* somewhere 'in the real world', outside the circulation of finance with its credits, allowances and offset units on paper. Such references to reality should be taken seriously *as empirical phenomena* that have an effect in themselves. Whether and how this carbon and its effect 'out there' exists is an ongoing debate, which has generated an industry of carbon auditors doing calculations, measurements, risk assessments, certification, verification, monitoring and reporting of practices in terms of their alleged emissions or non-emissions.

A fundamental insight here is to appreciate that carbon valuation schemes, like other economic schemes, in Donald MacKenzie's (2006) terms operate as 'engines' rather than as 'cameras'. Economic theory assumes that economic models depict or represent a detached reality. A more adequate perspective here would be to say that the valuation schemes are implicated in this reality; they form it and bring its shifting meanings into being (see also Maurer 2005: 53). This perspective allows for the dual meaning of 'alternative', and the effort of connecting value and 'reality' is shared by those multiple actors trying to figure out how to appreciate carbon in whatever form it appears in their everyday lives whether on paper, in trees, in energy consumption or something else. Frequently this relation is highly uncertain and disputed. Carbon valuation schemes involve attempts by multiple social actors to understand, interpret and value the world they live in, as much as it is an academic exercise based upon multiple forms of (disciplinary) knowledge including law, accounting, economics, biology, sociology and much more. In such a case and with such an object of study, the anthropologist can work laterally alongside the interpretations and social constructs of both scholars and lay people. The anthropologist investigates their explorations of carbon valuation to evoke the relevant meaning-making efforts, and to show how these efforts give rise to the tensions between different understandings of alternative.

The problem of how to value carbon credits, and conversely what carbon credits value, thus touches upon similar processes of valuation as the alternative currencies described by Maurer, and several scholars have attempted to make this comparison (e.g. Victor and House 2004; Button 2008; Descheneau 2012; Dalsgaard 2013). In what ways are carbon credits 'adequate' as signs in relation to the value backing them; whether value largely stems from government fiat and signification (as in compliance markets), from market demand or 'desire' (when traded as offsets in voluntary markets), or from material

existence in nature and in the affordances of the substance in question (industrial emission measurements, storages in vegetation or in soil or certified reductions from development projects)? While critiques of carbon credits' efficiency in addressing climate change mostly comes from Marxist-inspired scholars, environmental activists and supporters of renewables (e.g. Lohmann 2010), the question of what is 'really' valued with a carbon credit does occupy the entire carbon trading industry. Where Maurer notes that 'scholars across the disciplines are continuously surprised to discover that money is 'just' meaning, or that finance is fiction' (2005: xiv), the problem seems to be the opposite for carbon. Policymakers, journalists and scholars alike have at least during the early days of carbon markets questioned both the soundness and the effects of carbon trading with metaphorical references to how carbon credits' value came out of 'thin air' due to the uncertainty of the definitions and measurements that back them up (Gutiérrez 2012), or that it was the trading of 'hot air'. 'Hot air' has referred either to an oversupply of dubious claims to reductions from projects in the global south (Michaelowa 2005: 298) or more frequently to the inflated allocations of emission allowances given for free to industries in Eastern Europe and the former Soviet Union as part of the 1997 Kyoto Protocol (Anderson and Bradley 2005; see also Grubb 2003: 166–167; Button 2008: 584–585; Spash 2010: 179).

Many of those involved, however, do believe in the work that is being done, and in other instances (the making of counterfactual baselines and modelling for estimating forest carbon) valuation practices have become naturalised and are by now taken for granted in many circles (Stephan 2012). Judging from the amount of work that goes into discussions for instance among financial accountants trying to identify standards for carbon credits (Lovell 2014), it may be that carbon trading in general has become an accepted policy and practice for adequately dealing with climate change in many circles; but the making of credits and how to deal with them remains a challenging and constantly evolving issue, because of the problematic and sometimes inadequate relationship between effect (in emissions) and representation of that effect (in credits).

Conclusion

This article has discussed how carbon valuation and its comparisons are interpreted through different registers of alternatives, and how this means that potential or virtual scenarios for emissions come to be valued as equal to actual and real emissions (including the actions and objects causing them). Contestations over carbon's value revolve around interpretations of these claims to alternatives as either substitutions or as radical differences. Carbon valuation provides alternative imaginaries in many respects (an alternative capitalism,

alternative ideals for consumption, etc.), and as a market system it commodifies and trades in alternatives (alternative nature, alternative counterfactual reality, etc.), which can be interpreted either as genuinely different courses of action that avoid emissions or as mere substitutions of speculative courses of action for real emissions. When pushing the alternatives to their limits, it becomes clear how practices that emit carbon sometimes become construed as alternatives across what claim to be incommensurable criteria and along imaginaries that are detached from cultural practices of everyday life.

The alignment of alternatives is both the most promising aspect of carbon valuation as a way for a social scientist to understand how carbon markets are presented as solutions to climate change and the most problematic—socially as much as technically—for the actors involved in reaching any such solutions. As with discussions of commensuration (Espeland and Stevens 1998) it is promising because it allows for comparisons and exchanges, and is problematic because those comparisons and exchanges gloss over differences that cannot be transferred without distortion. Also the potential for carbon markets to produce new alternatives has been debated by academics from different disciplines. Some have thought that putting a price on carbon emissions would spur on entrepreneurs to innovate in order to earn money on selling carbon credits through better and 'greener' technology; but critics have argued that carbon trading provided incentives not to develop innovation and alternatives amid those industries that can just pay their way out – those energy industries where it may be needed most (Lohmann 2009b: 507).

Much of the criticism of carbon valuation schemes has been levelled at commensuration as a common metric of quantification (e.g. MacKenzie 2009). It may not be the quantification as such that is the problem, though, but that carbon valuation quantifies actions, rights and objects that emerge as incommensurable and perhaps even 'priceless'. For example, one could speculate that carbon valuation ignores how human actions can be tied closely to preservation of the self, with identities, and that the practices that are valued in terms of carbon emissions can be perceived as 'inalienable' to individuals and groups (see Weiner 1992; Godelier 1999). This does not work for all actions, of course, but many are so habitually ingrained to a sense of self that they are hard to exchange for some alternative. Carbon trading also potentially values carbon emissions morally as part of 'nature'. Carbon is at the centre of conflicting ideas about 'the nature of nature'—in particular nature as object versus nature as (sacred) subject to which can be ascribed a certain inalienability that emerges as an *effect* of the commodification of nature. Then the alternative becomes one of resistance or one that engenders resistance. By constructing alternatives, carbon valuation does not only make

potential substitutions—it also creates alternatives as radically different.

The discussions of carbon valuation are not likely to close any time soon despite apparent failures of the carbon markets to mitigate climate change (Stephan and Lane 2014). Perhaps there is little point, though, in assuming that the actors involved are trying to build an alternative 'perfect market' or construct an alternative global currency out of carbon credits (cf. Button 2008). It may be more important to recognise along the lines of valuation analysed by Bill Maurer (2005) how these actors strive to create 'adequacy' between the (carbon) valuation schemes, and the environmental costs of the activities in which we as humans are engaged, even if that is also in their view in some ways an impossible and never-ending endeavour. Achieving complete fungibility of carbon credits would break down radical differences, but it seems that other actors in response are trying to place boundaries around the relevant markets by 'stipulating zones of the incommensurable through social institutions, laws and informal practices' (Gudeman 2008: 161). Numerous actors have vested interests in valuing carbon, and instead of assuming that the discussions will reach an end point, they may entail an ever-expanding set of markets as new forms of carbon valuation are invented through laterally circulating experiments with nature, climate and the environment.

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