12 Commoning as a postcapitalist politics[1]

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Introduction

'The tragedy of the commons' is a well-known phrase that has captured people's imaginations for generations. Unfortunately these few but powerful words have been used to justify the enclosure and erasure of many well-functioning commons that benefit both people and the environment. Less well-known is Garrett Hardin's qualification in 1998 – some thirty years after he coined the original phrase – that:

> To judge from the critical literature, the weightiest mistake in my synthesizing paper was the omission of the modifying adjective 'unmanaged'.
>
> (Hardin 1998: 682)

What Hardin had presented in his original work was an open access and unmanaged pasture where there was no community that cared for the fields, took responsibility for them, organised herder access, negotiated grazing use and oversaw the distribution of benefit to community members (1968). It would be fair to say that Hardin's pasture bears little resemblance to the commons that researchers such as Elinor Ostrom (e.g. 1990) have meticulously documented, commons that have rules or protocols for access and use, and are cared for by a community which takes responsibility for the commons and distributes the benefits.

Today the planet faces a genuine tragedy of the unmanaged 'commons'. For decades an open access and unmanaged resource has been treated with the same sort of disregard as Hardin's pasture was treated. The planet's life-supporting atmosphere has been spoiled by ' "help yourself" or "feel free" attitudes' (Hardin 1998: 683). We are now faced with the seemingly impossible task of transforming an open access and unmanaged planetary resource into a commons which is managed and cared for. With the cause and impacts of global warming now beyond debate, we are being pressed to take responsibility and to act in new ways. But how are we to do this? What type of politics is called for?

In this chapter we explore how the process of commoning offers a politics for the Anthropocene. To reveal the political potential of commoning, however, we

need to step outside of the ways that the commons have generally been understood. One predominant framing positions the commons in relation to capitalism, as Kevin St Martin writes:

> It would seem that all of our stories of the commons revolve around a capitalist imaginary: capitalism's origin in the enclosure of the commons, capitalism's commodification of natural resources, capitalism's expansion and its penetration of common property regimes globally, and capitalism's most recent push to privatize remaining common property resources via neoliberal policies at a variety of scales.
>
> (St Martin 2005: 63)

We discuss this capitalocentric framing of the commons in the first section and raise concerns about how this framing limits the potential of commoning as a politics for the Anthropocene. In the second section, we discuss a second predominant framing of commons as a 'thing' that is associated with publically owned or open access property. Instead we argue that commons can be conceived of as a process – commoning – that is applicable to any form of property, whether private, or state-owned, or open access. We then turn to three examples from the past and the present that provide insights into ways of commoning the atmosphere. We reveal how a politics of commoning has been enacted through assemblages comprised of social movements, technological advances, institutional arrangements, and non-human 'others'. In the final section, we discuss the implications of this understanding of politics and particularly what it means for understanding how transformation occurs.

Commons and capital

The term capitalocentrism was coined by Gibson-Graham (1996) to extend the feminist theorisation of phallogocentrism to the field of economy. Capitalocentrism names the way that a diversity of economic relations are positioned as either the same as, a complement to, the opposite of, subordinate to, or contained within 'capitalism'. The commons have been drawn into a capitalocentric discourse in discussions of what has been called 'the new enclosures' (De Angelis 2010: 03/17). The new enclosures builds on Marx's influential historical account in *Capital* Volume 1 of the land enclosures that accompanied the rise of capitalist agriculture and industry in Britain. In Marx's writing the historical events of clearance, enclosure, and legal capture of common property are distilled and abstracted into the theory of primitive accumulation. Subsequent Marxists have noted the 'need' of the capitalist system to sustain its extensive growth by continually finding and enclosing new commons, thus advancing an added dimension to the theory of capital accumulation by showing how so-called primitive accumulation is ongoing (De Angelis 2010; Harvey 2003). Rather than a linear movement from primitive to capitalist accumulation, researchers now talk of 'a constant back-and-forth movement in which primitive accumulation continually reappears and coexists with capitalist production' (Hardt and Negri 2009: 138).

One strand of work has focused on the contemporary enclosure (via privatisation) of the material and biophysical commons (e.g. land, forests, waters, and fisheries); a second has focused on the enclosure of immaterial commons (e.g. knowledges, languages, images, and codes). This second strand, which we discuss here in order to demonstrate the capitalocentrism of commons research, is associated with Michael Hardt and Antonio Negri's influential book *Commonwealth* (2009). With the rise of the networked information economy, Hardt and Negri are keen to highlight the central role that this immaterial commons, or what they call 'the common', now plays in capitalist accumulation. Think, for example, of advances in scientific knowledge such as genetic coding or biopiracy (the patenting of traditional ecological knowledge). Unlike the commons, 'the common does not lend itself to a logic of scarcity' (Hardt and Negri 2009: 146). Productivity increases not when the common is controlled and privatised but when it is shared and added to. Thus there is a cycle 'from the existing common to a new common, which in turn serves in the next moment of expanding production' (Hardt and Negri 2009: 145). For Hardt and Negri the seeds of liberation are to be found in this necessity for capital to share the common in order to increase productivity, while simultaneously also needing to enclose the common. In a later piece, Hardt describes this tension as providing 'the conditions and weapons for a communist project', one in which capital 'is creating its own gravediggers' (2010: 355). Massimo De Angelis and David Harvie similarly draw attention to this tension which they describe as: '[t]he "ambiguity" between commons-within-and-for-capital and commoning-beyond-capital' (2013: 291). For them, this is politically 'a razor edge that both capital and social movements must attempt to negotiate' (De Angelis and Harvie 2013: 291).

In these discussions of 'the new enclosures', we see practices of commoning drawn into a discourse that places capital at the gravitational centre of meaning making.[2] On the one hand there is much to commend in these strong formulations – not least being the sense of outrage that the enclosure analysis elicits and the elusive hopes of an emergent communism that the gravedigger account kindles. While the political sentiments of present outrage and hopes for future emancipation clearly retain mobilising force, we question the relevance of this mode of politics for the Anthropocene. Critical thinkers are suggesting that the scale of the climate crisis demands a different way of thinking about humans and human activity. The historian Dipesh Chakrabarty, for example, proposes that rather than thinking in terms of the history of capitalism and modernisation we need to take a deep history approach and consider ourselves as not just a species within the multi-species community of life on this planet but a species whose existence depends on other species (2009). Similarly, the philosopher Val Plumwood counselled that if our species is to survive the Anthropocene we need 'to imagine and work out new ways to live with the earth, to rework ourselves'; in other words we need to 'go onwards in a different mode of humanity, or not at all' (Plumwood 2007: 1). A politics grounded in capitalocentrism seems to offer little in the way of helping us to

reposition ourselves for living on a climate changing planet. Might thinking about the commons and a politics of the commons outside the confines and strictures of capitalocentrism help us reimagine our ways of living on this planetary home?

Commons, commoning, and communities

Another way of thinking about commons has been to focus on it as a verb, as commoning. This formulation was explicitly introduced by Peter Linebaugh in his book, *The Magna Carta Manifesto: Liberties and Commons for All* (2008). He writes,

> To speak of the commons as if it were a natural resource is misleading at best and dangerous at worst – the commons is an activity and, if anything, it expresses relationships in society that are inseparable from relations to nature. It might be better to keep the word as a verb, an activity, rather than as a noun, a substantive.

(Linebaugh 2008: 279)

We are drawn to Linebaugh's formulation of commons and commoning as expressing relationships between humans, and between humans and the world around.[3] In our recent book *Take Back the Economy: An Ethical Guide to Transforming our Communities* (2013), we characterise commoning as a relational process – or more often a struggle – of negotiating access, use, benefit, care, and responsibility (see Table 12.1). Commoning thus involves establishing rules or protocols for access and use, taking caring of and accepting responsibility for a resource, and distributing the benefits in ways that take into account the well-being of others. When these relationships are in place, what results are any number of commons including biophysical commons (e.g. soil, water, air, plant, and animal ecologies), cultural commons (e.g. language, musical heritage, sacred symbols, and artworks), social commons (e.g. educational, health, and political systems), and knowledge commons (e.g. Indigenous ecological knowledge, scientific, and technical knowledge). The resulting commons may also be of varying and overlapping scales from the household and family to the national and international; from the micro (such as a microclimate) to the macro (such as the planet's atmosphere).

Table 12.1 Commons negotiations

Access	Use	Benefit	Care	Responsibility	Property
Shared and wide	Managed by a community	Widely distributed to a community and beyond	Performed by community members	Assumed by a community	Any form of ownership (private, state, open access)

Adapted from Gibson-Graham *et al.* (2013).

One implication of this focus on commoning as a relational process is that it emphasises the role of communities in commoning. Listen, for example, to the anthropologist Stephen Gudeman who observes that '[w]ithout a commons, there is no community; without a community, there is no commons'; and that '[t]aking away the commons destroys community, and destroying a complex of relationships demolishes a commons' (Gudeman 2001: 27). For some, this idea of community is so tainted with nostalgia and romanticism that it is if not a dangerous concept then at least a naive one. But the community that commons is not pregiven; rather, communities are constituted through the process of commoning. As the geographer Amanda Huron puts it, '[t]here appears to be a dialectical relationship between commons formation and community formations: one does not necessarily precede the other' (Huron 2015: 370). This is not a straightforward or easy process. In line with the complexity of the task of commoning in the twenty-first century, the community that is assembled does not share an essence and may indeed comprise those who in other situations are locked in antagonistic relationships. For example, in *Take Back the Economy* we discuss a community that has gathered to create a commons to protect the endangered bridled nailtail wallaby (Gibson-Graham *et al.* 2013: 139–42). This community includes the unlikely mix of family farmers, concerned conservationists, sporting shooters, academic researchers, government rangers, beef cattle, a particular species of wallaby, and brigalow scrub (a form of remnant wooded grassland in western Queensland). All that this multi-species community shares is what Jean-Luc Nancy calls 'being-in-common, or being-with' (Nancy 1991: 2).

A second implication of this formulation vis-à-vis other formulations of the commons is that when we frame commons as an activity, or process, or practice rather than as a category we find that commoning can take place with any form of property, from privately owned property to open access property. As we summarise in Table 12.2, enclosed and unmanaged resources can be commoned not by changing ownership but by changing how access, use, benefit, care, and responsibility occur. In other words, ownership of property is largely a legal matter and need not deter resources from being commoned; or as Linebaugh puts it: 'Commoners think first not of title deeds, but of human deeds' (Linebaugh 2008: 45). As an example, the resources that are commoned to create a protected area for the bridled nailtail wallaby are based around the privately owned land of a farming family who have entered into a voluntary conservation agreement with the state government to protect one-fifth of their property from development, in perpetuity. But it also includes, for instance, the privately owned guns and bullets of the sporting shooters who kill the feral predators that threaten the wallabies, the state-owned cars and clipboards used by the government rangers to monitor the health of the wallabies; the collectively owned computers and open access internet used by the conservation groups who broadcast online to help protect the wallabies. What was an enclosed privately owned property (a portion of a family-owned farm) has been combined with a host of other resources of varying ownership to become a commons. Simultaneously, what we call a 'commoning-community' has been constituted and this community negotiates

Table 12.2 Ways of commoning

	Access	Use	Benefit	Care	Responsibility	Ownership
Commoning enclosed resources	Narrow	Restricted by owner	Private	Performed by owner or employee	Assumed by owner	Private individual Private collective State
Maintaining commons or creating new commons	Shared and wide	Managed by a community	Widely distributed to a community and beyond	Performed by community members	Assumed by a community	Private individual Private collective State Open access
Commoning unmanaged resources	Unrestricted	Open and unregulated	Finders keepers	None	None	Open access State

Adapted from Gibson-Graham *et al.* (2013).

access to the commons, determines how the commons are used and who bene-
fits, and accepts care and responsibility (Table 12.2: row 1). Other instances of
commoning enclosed property include the urban commons that are being created
in central Dublin by communities who are using strategies such as fundraisers to
pay rent for privately owned property so they can create what Bresnihan and
Byrne describe as 'independent spaces' (2015: 36). Against the seeming tide of
enclosures there is work to be done to understand more about how enclosed
resources are being commoned. There is also work to be done to understand how
unmanaged resources are being commoned (Table 12.2: row 3). This is where
we turn our attention in the next section as we explore the tentative ways in
which communities have engaged in commoning an unmanaged resource, the
atmosphere.

But before we do this, it is worth returning for a moment to capitalocentric
formulations of the commons, which have a tendency to characterise commons
as principally a form of property. One expression of this is the homology in
which private property is to capitalism, as state-owned property is to socialism,
as common property is to primitive and future forms of communism (e.g. Hardt
2010: 346, 355). This thinking strategy privileges formal and abstract legalities
at the expense of actual practices of maintaining or creating commons, or com-
moning enclosed or unmanaged resources. In contrast, an anti-capitalocentric
approach attends to the diversity of practices for commoning different types of
property and focuses on 'the suppressed praxis of the commons in its manifold
particularities' (Linebaugh 2008: 19). Whether commons are shrinking or
growing becomes an empirical question, not something that is derived from the
narrative of capital's need and ability to enclose material and immaterial
resources. As we grapple with ways of living on this planet, and particularly
with ways of managing an open access resource that has been degraded to the
extent that all life on the planet is imperilled, this anti-capitalocentric approach
of reading the commons for difference perhaps offers a way of expanding the
political options that might be open to us to imagine and enact other possible
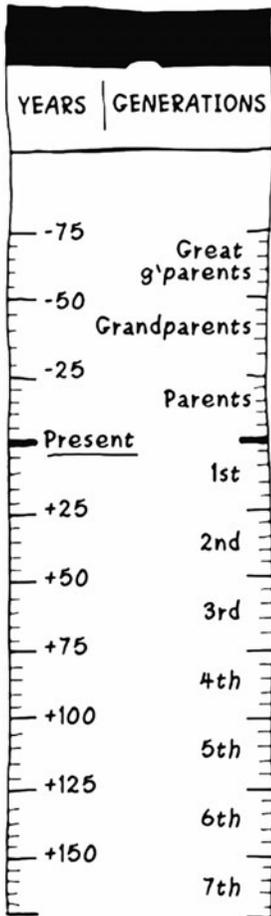worlds in the here and now.

Constituting an atmospheric commoning-community

Living in Australia it is easy to despair about the state of climate politics. With the
election of a conservative government in September 2013, Australia's carbon
pricing mechanism (introduced some two years earlier by a Labor government)
was not going to last long. When it was repealed in July 2014, the deputy leader of
the Greens Party, Adam Bandt, described it as 'the Australian Parliament's asbes-
tos moment, our tobacco moment – when we knew what we were doing was
harmful, but went ahead and did it anyway' (cited in Baird 2014). A few months
earlier at a talk to the Royal Academy, Copenhagen, Bruno Latour had famously
referred to the 'Australian strategy of voluntary sleepwalking toward catastrophe'
(Latour 2014: 1). When we condense the course of political change to the ups and
downs of the election cycle or to the ups and downs of international negotiations

on levels of greenhouse gas emissions (GGEs), it is difficult to discern that progress towards constituting an atmospheric commoning-community is being made. By using a different temporality, however, a sense of not only possibility but momentum comes to the fore.

One way of tracking the trajectory of change is to use an intergenerational Commons Yardstick (see Figure 12.1). This simple device helps us to record our relationships to commons over a time period that places our present in the kind of temporal context that climate change requires us to consider (Gibson-Graham *et al.*

Figure 12.1 A commons yardstick.

Source: Adapted from Gibson-Graham *et al.* (2013).

2013: 138–9). On it we can record the actions of enclosure or commoning or neglect that have, in previous generations, contributed to current levels of well-being for some and disadvantage for others. And we can look forward, not just to our children's life span but that of seven generations hence, guided by the planning philosophy practised by many Indigenous societies. Taking a generation to be twenty-five years, we can locate commoning (and uncommoning) activities in the past and present, and attempt to forecast 150 years into the future.

This strategy of looking to the past may seem out-of-step with commentators such as Plumwood (2007) who propose that if humans are to survive the Anthropocene we need a different mode of humanity. In an introduction to a special issue on socioecological transformation, the geographer Bruce Braun suggests that 'in the Anthropocene the shape of things to come is increasingly seen to be nonanalogous with what existed in the past' (2015: 239). Braun throws into question the long-standing and strongly-held assumption that 'by understanding the past we might be able to anticipate and shape the future' (Braun 2015: 239). But what if we look to the past with fresh eyes? What if we were to take seriously De Angelis and Harvie's (2013: 292) suggestion that commons may be 'part of a different historical trajectory' than capitalism? This would mean seeing the commons not as subject to the gravitational pull of capitalism nor aligned with a particular form of property. In this section, we use the Commons Yardstick to help identify some of the faltering ways that communities in Australia have, in the past and today, managed to common the atmosphere, working at varying scales and using different strategies. These communities are forging ways of acting as a multi-species planetary community of those who, while they seem to have nothing in common, share the bodily need for clean and coolish air to thrive. The examples we discuss are but one glimpse into practices of commoning that an anti-capitalocentric formulation of the commons brings to visibility. Taken together these examples give insight into a politics appropriate for these climate changing times.

Commoning a city's air

Since being established in 1804, the industrial city of Newcastle, north of Sydney, has relied on large reserves of black coal, initially mined from the immediate city area and more recently from its hinterland. For around 125 years or five generations, dust and smoke-laden air was not just tolerated but embraced as a symbol of the city's fortunes (Bridgman and Cushing 2015: 46). From the late 1930s, however, residents began to express concerns about air pollution and the impacts on their health and the urban environment more generally. People were starting to experience air pollution as something that negatively impacted their lives and well-being. Both white collar and blue collar workers were, in Bruno Latour's terms, 'learning to be affected' by the quality of the air around them (Latour 2004); they were learning that the polluted air was impacting their lungs, their sinuses, their bloodstreams, and they were no longer willing to trade-off their health for economic advancement. At the same time, in 1938, the small local councils of the

area were amalgamated into the Council of the City of Greater Newcastle and this meant there was now an authority 'with a much wider geographical brief and sufficient substance to stand up to the large industries' (Bridgman and Cushing 2015: 58). In 1947, in the aftermath of the Second World War, the council established a Smoke Abatement Panel, the first of its kind in Australia (Bridgman and Cushing 2015: 61). The larger council, with its ability to capitalise on advances in technology, installed a network of new dust deposition gauges similar to those that had been used in several British and North American cities. This not only provided a way of quantifying and monitoring what people were experiencing but, because the devices were being used overseas, it enabled comparison with air pollution levels elsewhere. The devices provided 'hard evidence of the extent of the problem' and as a result 'pollution could be less easily ignored' (Bridgman and Cushing 2015: 66). Other developments beyond the city also played a role. Following London's deadly smog of 1952, and the 12,000 deaths that have been associated with the event (Bell and Davis 2001), the New South Wales state government formed a Smoke Abatement Committee in 1955 and introduced the *Clean Air Act* in 1961. These state-level changes combined with the ongoing efforts of the Council and resident groups, supported by local media, meant that by the end of the 1960s, or within one generation of the Council's Smoke Abatement Panel being formed, the average dust fall was reduced from 40.34 tons per square mile per month to 11.47 tons. Newcastle's atmosphere had been commoned and 'the once smoke-obscured cityscape was coming back into focus' (Bridgman and Cushing 2015: 75).

The commoning action involved residents, across class lines, learning to be affected and acknowledging the impact of the embodied experience of living in a highly polluted environment. It also involved shifts in institutional arrangements and the mobilisation of technological advances. It drew on developments locally and those further afield. As a result, a loose community emerged who were able to take responsibility and care for Newcastle's atmosphere, to manage how the atmosphere was being used, and to ensure that there was access to clean air and that this benefit was shared across the city. Air pollution had been a feature of life in Newcastle from the first days of white settlement, and it had been experienced for around five generations before a commoning action was initiated. Once the Second World War had passed, it took only one generation before there was substantial improvement in the air quality. Of course, this is not to say that commoning actions stopped in the 1960s. The struggle to maintain and improve air quality in Newcastle has continued. Most recently it has focused on the health effects of using open coal trains to transport coal from the Hunter Valley to the Port of Newcastle, one of the world's largest coal export ports (to say nothing of the health effects for the planet of burning the coal that is exported from the port).

Commoning the global ozone layer

In addition to this example of a city-level action to common the atmosphere we can also turn to a global-level action. For almost three generations, from the

1930s to the 1970s, chlorofluorocarbons (CFCs) and other ozone-depleting chemicals (ODCs) were manufactured and used without concerns being raised. Then in 1974, in a paper published in *Nature*, two scientists hypothesised that CFCs were migrating into the upper atmosphere and significantly depleting the ozone layer. Public officials in the USA responded and within a few years CFCs were banned in the USA. Once 'the hole' (as it became known) in the ozone layer over Antarctica was detected in 1985 the Montreal Protocol on Substances that Deplete the Ozone Layer was agreed to and a worldwide phase-out of ODCs became a reality. The Montreal Protocol represents, in essence, a national and international community that was constituted to common an unmanaged resource, the ozone layer of the atmosphere. Through the Protocol nations accept responsibility to care for and manage use of ozone so that all species on the planet have access to and benefit from an intact and protected atmosphere (to express the activities of the community in terms of Tables 12.1 and 12.2). The Protocol has been remarkably successful. By 2005 all 191 countries that ratified the Protocol had cut the production and consumption of ODCs by 95 per cent. ODCs have an atmospheric lifetime of 50–100 years so it will still take few generations to repair the damage. Nevertheless the Montreal Protocol has been dubbed not just 'the world's most successful environmental agreement' but also 'the world's most effective climate treaty', given that it has also reduced greenhouse gas emissions 'by the equivalent of approximately 11 gigatons of carbon dioxide a year between 1990 and 2010 … thereby delaying the onset of climate change by up to 12 years' (Grabiel 2007: 20).

Behind this story of successful regulation are multiple stories of the struggle to constitute a community that commons. When we narrate these histories what emerges is a more heterogenous community than that of the nation states and their public officials who were able to formulate an international agreement. Instead we gain insight into the processes of constituting the diverse human and more-than-human community that was needed to common something the scale of the planet's ozone layer. In what follows we can only narrate a few of the factors that played a role in that process, enough, we hope, to provide some understanding of what might be involved in a politics of commoning the atmosphere in the face of the climate crisis.[4]

One factor is that key people were 'learning to be affected'. This is evident from the moment that Professor F. Sherwood Rowland and his postdoctoral fellow Mario J. Molina published their hypothesis in *Nature*. The chemical industry immediately questioned the scientific validity of the research. Du Pont, the world's largest manufacturer of CFCs, even ran a one-page ad in the *New York Times* to make their position public. Rowland and Molina were not dissuaded. Rowland is reported to have said to his wife: 'The work is going well. But it looks like the end of the world' (cited in Roan 2012). This concern drove him (and Molina) to continue with their research and to speak-out publically to raise the alarm. We could say that Rowland and Molina were learning to be affected by the chemical reaction that occurs when CFCs reach the stratosphere and break down to release chlorine atoms. Politicians and policy-makers in the

USA were also learning to be affected and they responded to the call by taking early action well before the science of ozone depletion was settled. From 1977 these public officials tried to persuade other nations to take action to ban CFCs with little success until a breakthrough in 1985.

This breakthrough was the result of a second factor that played a role in constituting a commoning-community – the contribution of technological advances. It took two research teams using both long-standing and new technologies to make the breakthrough. Scientists from the British Antarctic Survey had detected ozone depletion in Antarctica using ground-based instruments such as the Dobson Ozone Spectrophotometer (a device developed in the mid-1920s). They reported their findings in *Nature* in May 1985. At the same time, NASA scientists had been tracking ozone in the atmosphere using satellite-based sensors and they were able to verify the extent of ozone depletion, and produce the first visual images of the so-called hole in the ozone layer. These images were presented in August 1985 at a conference in Prague by NASA scientist Dr Pawan Bhartia who recounts, 'All hell broke loose, particularly in the media. People were scared and thought this could be a real disaster that could kill us, give us cancer' (Hansen 2012). One result was that nations reacted quickly with the Montreal Protocol being agreed to within two years, in September 1987 (and coming into force from January 1989).

Australia's geographic proximity to the ozone hole was a third factor that helped to constitute a commoning-community. Its geographic proximity to the ozone hole means that it is particularly vulnerable. Ozone depleted air travels from Antarctica to Southern Chile and Southern Argentina, New Zealand and Australia. The main human effect is that by letting in more ultraviolet B (UV-B) radiation there is an increase in skin cancers and cataracts, a particular concern in Australia which has the world's highest rate of skin cancer.[5] Since the early 1980s public health authorities had been raising awareness of the importance of sun protection. When the images of the hole in the ozone layer were presented in 1985 the Australian public were primed to react. Thanks to the sun protection campaigns they were already learning to be affected by UV radiation. A hole in the ozone layer that would increase their vulnerability was unacceptable and they urged their government to act (Andersen and Sarma 2002: 208). This pressure contributed to the Australian government playing an influential role in formulating the terms of the Montreal Protocol. In particular Australia 'often served as a bridge between the concerns of developed and developing countries' (Andersen and Tope 2002: 255), and this helped with what are generally acknowledged as two of the most important features of the Protocol: the different deadlines for phase-out for developed and developing countries, and funding support to help developing countries meet their compliance targets.[6]

The concerns expressed by the Australian public as they were learning to be affected also helped to create a context in which others were prepared to take action. For example, the Australian Plumbers and Gasfitters Employees Union, prompted by public concern, refused to install new firefighting systems based on halon (one of the ODCs) when alternatives were available. They also agreed to

maintain existing halon-based systems only under certain conditions (Andersen and Tope 2002). The debate that ensued resulted in the fire protection industry in Australia, in 1989, abandoning its strong opposition to controls on halon, and internationally had the effect of prompting the industry to be pro-active in developing alternatives. This type of action helped to pressure the chemical industry (including Du Pont) to devise non-ozone destroying substitutes.

What we can see happening is that a number of factors came together to give impetus to the formation of a community. There is no doubt that scientific and technological advances, especially in satellite-based remote sensing and computer firepower, helped to identify the problem. That there was 'a hole' in the ozone that could be captured in a media-grabbing image and phrase meant that the problem could be easily and powerfully communicated. Indeed, we could even say that it was fortuitous that the chemical reaction occurs seasonally and variably over Antarctica; each Southern Hemisphere spring there is intense media reporting about the size of the hole in the ozone. Is it getting bigger? Is it getting smaller? This cyclical event makes headlines. A more steady and uniform thinning would perhaps be less newsworthy. Alongside these factors, people were learning to be affected by the chemical reaction in various ways and this helped contribute to a successful international institutional agreement. As a result the community that formed to common the ozone layer through the Montreal Protocol included more than nation states and their public officials. It included scientists, unionists, multinational firms, and media reporters, and it included more-than-human elements such as chemical compounds and reactions, satellites and scientific instruments, and media images and maps – to name just some of the elements that entangled as part of the community that commons.

There seems to be a huge gap between the slow progress of negotiations under the United Nations Framework Convention on Climate Change and the achievements of the Montreal Protocol. Might thinking about the process of constituting the heterogeneous community that commons help us find grounds for hope?

Creating a solar commons

Despite all that is known about greenhouse gas emissions and global warming, Australia continues to voraciously export and burn black and brown coal which, by the geological luck of the draw, it has in copious quantities. During the twentieth century, national development was built on the provision of cheap coal-fired electricity delivered to business and residential consumers by state government owned monopolies (Gibson 2001). But as we move into the twenty-first century there are indications that change is afoot and that a nascent community that commons is starting to form with the energy of the sun at its centre.

Along with coal, Australia is also blessed with abundant sunlight. Australian researchers have been at the forefront of developing solar technologies for three to four generations, starting with solar water heaters in 1950s and photovoltaics in the 1970s. Research teams such as those in the School of Photovoltaic and

Renewable Energy Engineering at the University of New South Wales have been responsible for breakthroughs in photovoltaic technology and for training several generations of solar innovators who are now based in Australia and overseas.[7] From the 2000s, or within the current generation, there has been a massive uptake of these solar technologies at the household level, including in low-income households (Green Energy Trading 2014). As at August 2015, there were over 1.4 million small-scale solar panel systems installed on Australian rooftops and a further 935,000 solar hot water systems (Australian Government Clean Energy Regulator 2015).[8] The Australian Energy Market Operator (2011: 9–2) has been reporting that the rapid uptake of solar at the household level is leading to an unprecedented reduction in electricity demand. Their prediction is that with consumers increasingly keen to minimise their environmental footprint the current electricity generation industry is being confronted not with incremental change but with 'an abrupt "step change"' (2011: 9–1). This grass-roots movement at the household level is reshaping the energy sector, and making it not inconceivable that the coal-fired power stations and the poles and wires of the electricity grid will be obsolete in the not too distant future.

The uptake of household solar has been driven by a number of motivations and incentives. As the Australian Energy Market Operator has identified, people are keen to minimise their environmental footprint. We could say that this is a result of people learning to be affected by the impacts of climate change; in Australia this means being affected by the embodied experience of hotter and drier summers, and more extreme climate events such as cyclones (see also Cameron 2011). Such experiences are prompting citizens to consider how their everyday practices come to bear on these changes and how, through the adoption of technologies such as solar power, they can play a role in slowing the future that is pressing in. In previous research we also found that frustration with the lack of concerted government action on climate change (such as Australia's refusal to ratify the Kyoto Protocol until the election of a Labor Federal Government in 2007) provided impetus for citizens to take action in various ways including, for example, by participating in a community-run scheme for the bulk purchase and installation of household solar panels via a cooperative solar business (Cameron and Hicks 2014). Such motivations have been helpfully realised by financial incentives such as the federal government's cash rebate of up to $8,000 for the installation of solar panels (through the Solar Homes and Communities Programme, 2000–09) and up to $1,600 for the installation of solar water heaters (through the Energy Efficient Homes Package, 2009–10).[9] State-based feed-in tariffs offer income generating opportunities for households producing excess power from their solar panels. There are also financial innovations, including solar leasing and power purchase agreements, that are experimenting with financing small-scale and distributed systems rather than the centralised arrangements of old.

The movement Solar Citizens is one public face of the rapidly growing number of solar households. With a membership of over 70,000, Solar Citizens aims to be a voice for 'solar owners and supporters' (see www.solarcitizens.org.

au/about_us). Its current 'Stand up for solar' campaign includes lobbying for 50 per cent of Australia's energy to come from renewable sources by 2030; a solar ombudsman; and a national programme to help low-income households and renters to install solar power. But behind this public face lies the million plus households who are consumer-producers or 'prosumers' of solar power and solar hot water, and who are increasingly seen as a political force to be reckoned with. 'The solar vote' has become a feature in all recent elections and by-elections: there are interactive maps by electorate showing the number and proportion of homes with solar energy; lobby groups produce 'solar scorecards' for voters with information on the solar policies of the major political parties; and there is analysis of how the solar vote is likely to affect outcomes. A new political constituency of solar prosumers and solar supporters is emerging.

A community that is commoning the energy of the sun is being created. In turn this community is contributing to a larger community that is commoning the atmosphere by finding ways of reducing and managing GGEs. In terms of the Ways of Commoning diagram (Table 12.2), this community is not so much commoning an unmanaged resource as creating and commoning a resource, solar power, out of something whose potential has not been realised, the sun. This community is helping to share and widen access to solar power, and through the care of initiatives such as Solar Citizens and their campaign for a solar ombudsman to ensure that the 'industry' operates in a well-managed and responsible way so that the benefits of solar power can be realized. Solar Citizens is one human face of this emerging community, but it is a heterogeneous community that includes the existing and emerging technologies of solar capture and storage, the roofs of houses, the household smart meters that help monitor and manage energy use; new financing arrangements; and a market that has been constituted partly by the intervention of government subsidies and feed-in tariffs. This combination of factors has had cascading effects helping create an opening for solar power and driving further technical innovation, reducing the price, and increasing the efficiency of solar technologies, making the technology more widespread – and the current coal-based system of electricity generation more obsolete.[10] This emerging solar commoning-community is but one example of an energy-based commons. In Australia there is also a new commoning-community emerging in the area of community-owned wind farms (Cameron and Hicks 2014).[11] When we look overseas there is likewise a proliferation of energy-commoning-communities. It may be that these initiatives, as much as international agreements, are key to action on climate change.

The practice of commoning as a postcapitalist politics

The current and pressing need for rapid social and ecological transformation calls for unprecedented action at all scales. In this chapter we have proposed that commoning might become the focus of a politics for our times. We have shown how, over almost four generations, different commoning-communities have formed to care for the atmosphere in different ways. The question is, can we accelerate action

to cool our warming atmosphere in just one generation? And what role could we as social scientists play in 'transformations for sustainability'?[12]

We have argued that the current debate about commons and commoning is still largely beholden to a capitalocentric discourse and that this framing stands in the way of a more concerted application of transformative commoning strategies. In the capitalocentric framing, the politics that emerges remains linked to an abstract and vague multitude – the coming community of commoners. When this framing is linked to the understanding of commons as a form of property then politics focuses on struggles against enclosure and privatisation. This is not to say that these struggles are not important; however, our concern is with a mode of politics that can respond now to calls for a different mode of humanity. In this new mode, humans might take their place as only one in a multi-species community of life on this planet, abandoning illusions of mastery to become 'team players' with non-human earth others. Might the anti-capitalocentric understanding of commoning that we have presented in this chapter be the basis for this type of politics? This would be a transformative politics not located in an elusive future, nor in a combative anti-privatisation struggle focused narrowly on property rights; instead it would be a postcapitalist and posthuman politics located in the shared present – in the becoming of a commoning-community in the here and now.

To help build this politics we have taken seriously the suggestion that the commons might be part of a different historical trajectory. We have identified moments when commoning has been successful and unpicked some of the constituents of those commoning-communities that have effected change on city, national, and global scales. Our re-narrativisation has expanded our understanding of the community that commons and produced a sense of the diverse temporalities of transformation.

What we have learnt is that the commoning-community is more-than-human. The agent of change, the commoner, is no longer (and perhaps never was) a person or a category such as the working class but an assemblage.[13] Certainly these assemblages include humans, but they also include non-humans; they may include class but also non-class alignments; they may include social movements and grass-roots organisations but also governments, institutions, and firms; they may include non-market mechanisms but also markets; they may include animate beings who have nothing in common except breathing and living, but also inanimate entities that share an existence on this planet. As social scientists we have a role to play in helping to identify the human and more-than-human actants of the commoning-community. This may involve working with technologists, scientists, biota, and so on to enrol members of the commoning-community. Our work is to help forge connections between things (as we've done in the three examples in this chapter).

We have also learnt that the commoning-community is not always recognisable as a community, even to itself. The community that commons is perhaps more easy to detect in retrospect. Thus, in a climate changing world, where the window for meaningful action is rapidly diminishing, as social scientists our work is to seek out those nascent connections and associations that will help

construct emerging commoning-communities. This is not a matter of making more visible something that pre-exists discourse, but of proposing and performing commoning-communities as a means of strengthening embryonic communities and engendering more. We know, for example, that there are a multitude of energy-based commoning-communities already operating across the globe. Might these endeavours be further mobilised by making the commoning assemblage they are part of more apparent and encouraging this decentralised punctiform place-based politics to mesh as a global network? The work of this assemblage is already being done – it is creating energy resilience, and markets are already communicating via pricing signals that a new mode of care for the air has arrived. What is lacking is a name for this politics; perhaps 'commoning' is one that could enrol a wide spectrum of support.

This form of language politics could be one contribution to helping sustain the emerging solar commons. Here it is important to recognise that this language politics also involves renaming or reframing. For example, financial capital is involved in solar commoning through the development of financial instruments that enable small-scale and decentralised power generation; productive capital is involved through the development of the technology. The temptation is to read this as simply the expansion of capital-centred activities and the colonisation of new areas of social and economic life. However, we might also reframe these activities by saying that capitalist activities are being drawn into, perhaps even co-opted, as part of the postcapitalist politics of commoning. In other words, the postcapitalist project is not necessarily anti-capitalist. In the same way that James Ferguson argues that neoliberal ideas and techniques do not have to result in neoliberal outcomes and that any governmental technique is accompanied by 'radical political indeterminacy' (2015: 31), so too capitalist economic activities do not have to result in capitalism as we know it as the outcome (see also Gibson-Graham 1996, 2006). Capitalist economic activities are accompanied by 'radical economic indeterminacy'. Furthermore, as part of a commoning assemblage, financial and productive capital also play a role in helping to sustain the emerging solar commons for as the financial instruments and technologies become embedded and integrated into the solar commons they help to make the assemblage more durable.

Finally, we have learnt that commoning, while it might be ever present, marches to an irregular beat. Commoning is a messy and fragmented process in which transformation takes place with different rhythms over a long timeframe. Some things seems to happen very quickly such as the rapid take up of solar energy in Australia in the last few years or the two years that it took to get the Montreal Protocol signed. But if we focus only on these moments we miss the work that can go on for generations to help create the conditions for what seems like rapid transformation. This is not to say that change happens in a linear or predictable way. The process of change emerges out of any number of things coming together and entangling to create the conditions for shifts to occur. Only with an inter-generational perspective can we begin to see the multiple temporalities at work and by which change takes place. Our work is to interrogate and listen differently so we might see how to

accelerate the pace of change while also being attentive to ways of working with different temporalities, including those of the more-than-human world. At present we are confronted with a ticking climate time bomb; we need to become acquainted with the ways that society can change suddenly without wishing upon ourselves the equivalent of more 'readjustment events' such as the Lisbon earthquake of 1755 (Connolly 2013), the Sumatra-Andaman earthquake of 2004 (Clark 2011), or the Christchurch earthquake of 2011 to prompt radical transformation. Our efforts in this chapter are one step towards strengthening our ability to see ourselves as part of a commoning-community assemblage that acts, and that must keep acting to care for, take responsibility for, and ultimately share the benefits of life with all earth others.

Notes

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2 As we have discussed elsewhere, the effect of this widespread mode of theorising denies forms of economic difference any independent identity, effectivity, or dynamism (e.g. Gibson-Graham 1996, 2006).

3 We also acknowledge that Linebaugh identifies that commoning can be co-opted by, in his words, 'capitalists and the World Bank' (2008: 279).

4 Examples of more comprehensive accounts of the process of formulating the Montreal Protocol include Andersen and Sarma (2002) and Grundmann (2001).

5 Other effects include diminished yields from agricultural crops and loss of phytoplankton with implications for the health of entire marine ecosystems.

6 For example, halons were phased out in developed countries by 1993 and by 2010 in developing countries; CFCs were phased out by 1995 in developed countries and by 2010 in developing countries.

7 The alumni include Andrew Birch, co-founder and CEO of Sungevity Inc. based in the USA, and Shi Zhenrong, founder of Suntech Power, based in China.

8 This is in a country with approximately 9.1 million dwellings (Australian Bureau of Statistics 2013). It is also worth noting that just ten years ago in 2005 there were only around 3,500 small-scale solar panel systems and 125,000 solar hot water systems (Clean Energy Regulator 2015).

9 The Energy Efficient Homes Package was part of the Nation Building Economic Stimulus Plan, the federal government's initiative to address the global financial crises.

10 The cost of the average installed solar PV system in 2012 was around one quarter of the cost in 2002. In that ten-year period the cost dropped from around $13 per watt to $3 per watt (Flannery and Sahajwalla 2013: 23).

11 Anecdotally, there is evidence that comments in early 2015 by the then Australian Prime Minister and Treasurer about the ugliness of wind turbines and the launch of a parliamentary inquiry into the health effects of wind farms (while at the same time the conservative federal government supported and defended coal mining) had the effect of increasing public support for wind energy and invigorating people's interest in the potential of community-owned wind farms.

12 Our use of this phrase deliberately echoes the name of the International Council of Social Sciences programme which has social scientists as the lead scientists in cross-disciplinary teams that are researching ways of accelerating social change to address problems of global change and sustainability.

13 This is an area of key thinking in the Community Economies Collective. For example, see Gibson-Graham and Miller (2015), Hill (2015), Roelvink (2013), and Roelvink *et al.* (2015).

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