Eleven Antitheses on Cities and States: Challenging the Mindscape of Chronology and Chorography in Anthropogenic Climate Change

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Abstract

Our basic argument is that we should be thinking in trans-modern ways when considering how to react to anthropogenic climate change. Showing that mainstream approaches to climate change theory and policymaking are overtly modern, we identify this as a mindscape inherently constrained by its particular chronology and chorography. Our contribution to necessary trans-modern thinking is a presentation of eleven basic and widely accepted theses on modern chronology and chorography that we contest through antitheses, which we argue are more suited to engaging with anthropogenic climate change. These support a

consumption argument for urban demand being the crucial generator of climate for 8,000 years in direct contradiction to the production argument that greenhouse gases are the crucial generator of climate change for 200 years. The modern policymaking focus on curbing carbon emissions is thus fundamentally flawed - merely feeding energy for continuing an accelerating global consumption in a different way that is only marginally more climate-friendly. Reflecting on the antitheses, we conclude by discussing the difficulties of translating trans-modern ideas into political action.

> I believe we need to "unthink" nineteenth-century social science, because many of its presumptions – which in my view are misleading and constrictive – still have far too strong a hold on our mentalities. These presumptions, once considered liberating of the spirit, serve today as the central intellectual barrier to useful analysis of the social world. (Wallerstein 1991, 1)

Introduction: a thoroughly modern discourse

Climate change science and policymaking is so uncritically modern. Whereas future scenarios - posited, projected or predicted - take humanity into uncharted waters (literally for many!), mainstream thinking about both how we got into this predicament and how we might get out of it have been severely constrained by an embedded modern mindscape. We critically address this situation by challenging conventional theses on times and spaces of human activities with plausible antitheses that point towards a trans-modern understanding of anthropogenic climate change.

In a companion paper (Taylor, O'Brien & O'Keefe 2015b; see also Taylor, O'Brien & O'Keefe 2015a), we have presented a trans-modern narrative covering 8,000 years that combines Ruddiman's (2003, 2010, 2013) early (i.e. pre-industrial revolution) anthropogenic effect on climate with Jacobs' (1969; Soja 2000) argument for early (i.e. pre-agricultural revolution) city origins. The contention is that bringing the 'pre-modern' into play is necessary to understand the possibilities of a 'post-modern'. In this paper we provide support for this position by spelling out the basic change in mindscape we are advocating. In terms of chronology it requires a break from the modern progress myth and its concomitant faith in technology framing a safe future. For chorography[1] it requires a break from the mosaic world created by modern states that frames economic and cultural, as well as political, activities. Thus the progress/technology faith is joined by a mosaic

[1] Although Soja (1989) famously argued for 'reasserting' the role of space from its dominance by time in modern thinking, we follow Agnew (1994) in seeing space, less overtly but just as definitively, forming the modern mindscape.

mindscape of trust in the state(s) to find a safe future. We view both dimensions of conventional thinking to be severely problematic.

The mainstream in climate science and policymaking is represented most publicly by the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Climate Change Conferences (known as COP from 'Conference of the Parties' to the 1992 UN Framework Convention on Climate Change; the meeting in Paris in 2015 is COP 21) respectively. Quite overtly, these two remarkable global institutions epitomize state-framing in both the science and the policymaking: states select their national scientists for the IPCC whose work and publications, required to be 'policy-neutral', provide the main knowledge input to the COPs where national policies are negotiated to combat global climate change. This modern chorographical basis of contemporary climate science and policymaking begets its twin modern chronological root of progress through technology. This is reflected in the different treatments of production and consumption: in the very instrumentalist conception of the state being employed in climate science and policymaking, the emphasis is upon managing supply rather than demand (O'Keefe et al 2010). COPs are all about negotiating carbon emissions. The IPCC supports this focus through skewing the knowledge input in the direction of production over consumption. This explicit productionist bias is very clearly illustrated in Table 1 where the search results for selected words are listed from the IPCC's key 'state of the art' pronouncements, their five Assessment Reports since 1990. Here, 'production' beats 'consumption' at a ratio of 2:1, but lower down the lists the differences become overwhelming: in terms of economic sectors, references to 'industry' and 'manufacturing' far outstrip 'retail' and 'shopping', and in terms of policy approaches, technology is out of sight compared to rationing which is effectively off the radar (policy neutral?). These reports do not say much about the nature of the society that is creating climate change but there is a stark difference in use of the two abstract descriptions of that society in Table 1: it appears that 'industrialization' is an accepted part of the texts, 'consumerism' simply is not. The latter's frequency of just two within the hundreds of thousands words by several thousand IPCC authors is simply astounding to anyone vaguely versed in debates on the human contribution to climate change.

Table 1. Search results from the five IPCC Assessment Reports

Terms largely related to production		Terms largely related to consumption	
Term	Frequency	Term	Frequency
Production	49,500	Consumption	24,800
Industry	44,000	Consumers	3,840
Technology	39,100	Consuming	1,120
Producing	6,120	Customers	596
Producers	5,220	Retail	357
Manufacturing	4,950	Shopping	75
Manufacture	1.290	Rationing	9
Industrialization	728	Consumerism	2

Produced from http://www.ipcc.ch/search/searchassessmentreports.shtml (accessed 10/11/15)

Obviously supply and demand, production and consumption, are related pairings of single processes – you cannot have one without the other. The question is, for both theory and practice, how is each part of the pairing handled in terms of balance? Table 1 suggests a severe imbalance in mainstream scientific input into policymaking. This may well be a realist acceptance of the politics; more consumption will likely create more support for ruling governments, so it is production that has to be made more climate-friendly, leaving consumption to carry on regardless. But whatever the reason(s), this situation is of particular relevance to our work because the narrative we have developed strongly suggests that it is the generation of demand that is key for understanding anthropogenic climate change (Taylor, O'Brien and O'Keefe 2015a & b). Specifically, we identify urban demand as the vital mechanism of macro-social change so that cities, from their ancient origins to today's mega proportions, are directly implicated in generating exceptional levels of consumptions, thereby inducing climate changes. In this 8,000-year story, the commercial mindscape of cities in spaces of flows is considered more important than the modern political mosaic mindscape. This complements our promotion of a new temporal mindscape that escapes the fixation on the industrial revolution as modern lodestar.

Exploring this alternative chronology and chorography requires a root and branch critical assault on modern thinking that states can solve an unfortunate and unexpected consequence of the industrial revolution. We identify eleven conventional theses underpinning this modern mindscape against which we pit antitheses that provide arguments to help us think in a completely different way, a trans-modern way towards a discourse that travels across the modern to encompass pasts, presents and futures. The main substance of this paper consists of presentations and explications of these eleven theses/antitheses. This unusual, multi-millennial, multi-scale, critical exercise is followed by a concluding section

that reflects on what our trans-modern argument contributes to developing a progressive politics for engaging with anthropogenic climate change.

Thesis/Antithesis

This specific adversarial format has been chosen to demonstrate our critical thinking because it emphasizes an unremitting change of course from the spacings and timings of the modern mindscape. The variety of positions we take covers a lot of scholarly ground; most of the arguments are to be found in existing literature and we provide these contrarian sources so that particular arguments can be followed up in more detail than we can provide here. Our contribution is to bring them together as a sustained critique. We have ordered them in a sequence that provides a coherent stream of thought; in no sense does this indicate a ranking of relative importance. We begin with three arguments that provide the basis for a new way of presenting macro social change; this leads to four arguments introducing alternative chronologies and chorographies; and these are brought together as four arguments engaging with climate change science and policy.

Each of the arguments is presented in the same manner to aid comparison and ease combination. After stating each conventional thesis and our antithesis there is an explication where we justify our position and link to its origin and to debates in the literature. Each thesis is treated as a 'given' in the sense of being conventional thinking within the modern mindscape, not uncontested but widely accepted. This allows the focus of the discussion to be on the less accepted minority idea, the antithesis opposing the convention mindscape. The explications are followed by selected ramifications that point towards the next thesis/antithesis.

MACRO-SOCIAL CHANGE

I

Modern thesis. Transformative material change is engineered through states because they are the prime units of collective human activity

Antithesis. Collective human activity is generated in and through cities and therefore they are the critical entities that create transformative material change

Explication. The contrast here is very basic in terms of both time and space: what constitutes vital change, and how is the agency of that change spatially organized?

To answer the first question we use Braudel's (1972) concepts of time where he contrasts short-term history focusing on political events (*histoire événementielle*) with long-term history focusing on social structures (*longue durée*). Modern history has been dominated by the former with discourses about states, their successes and demises, the rise and fall of empires, all pivoting on successions of key dates. This largely describes political change, which Jacobs (1992) understands as 'guardian' agency where its zero-sum games create volatile geopolitical worlds of shifting winners and losers. From a long-term perspective,

such inter-state relations create international configurations that are historically ephemeral, important for the elites changing places, but not for everyday lives of the majority of the population that continue much as before (i.e. *longue durée*) under varying masters.

For the spatial organization, we use Castells' (1996) concepts of social space where he contrasts spaces of places with spaces of flows. Geopolitics is about territorial competition, altering spaces of places that are states. In contrast, spaces of flows are focused in and through cities where long structural change is enabled through commerce in its broadest sense encompassing production, consumption and distribution (Jacobs 1992). It is the long-term effects of Schumpeter's (1975) 'creative destructions' in cities not the immediate military destructions by states that define transformative material change (Jacobs 1984). Hence, cities are much more resilient than states as reflected in the fact that most cities across the world are very much older than the states that currently encompass them.

Braudel (1972) emphasizes that both the histories identified above are important for understanding a full picture of change. Furthermore, Jacobs (1992) argues that both guardian and commerce agency is required for the reproduction of society. Following in the same vein of those assertions, Castells (1999) belatedly realizes that both spaces of places and spaces of flows are complementary components of social spatial organization, to which we would add cities and states as both integral spatial units for our thinking. Therefore, it is not a matter of which is right and which is wrong in these conceptual pairings, rather it is a pragmatic choice dependent upon the purpose of the chronology and chorography being created. The conventional thesis emphasizing events, guardians, spaces of places and states has served modern needs for good and ill over the last few centuries. It is our contention that its antithesis combining structure, commerce, spaces of flows and cities is required for trans-modern thinking.

We contend that in terms of anthropogenic climate change, the modern chronology and chorography ultimately leads to a negative sum game, yielding only losers and further losers. Cities are the prime unit of human activity for countering this existential predicament.

Ramification. This antithetical argument has provided the conceptual toolkit we use for understanding chronology and chorography and specifically identifies the critical importance of cities. Practically, it specifically directs us towards the need to focus on relations between cities and states in building alternative chronology and chorography for a trans-modern mindscape.

II

Modern thesis. The state evolved out of chiefdoms, as the latter became increasing complex they generated additional political functions that culminated in state formation

Antithesis. The dense peopling of cities generated conflict and the consequent demand for order was satisfied by inventing city-states, warfare amongst the latter created multi-city states (larger territorial states, empires) by conquest

Explication. The thesis is an archetypal modern chronological argument that posits a simple evolutionary sequence. Building on the scientific reputation of Darwin, the idea of change as evolution has diffused beyond its knowledge field to be an easy means of designating causal relations. Thus, an existing social institution is traced backwards to find less complex social forms until a simple origin is found. Initial Social Darwinism with its racist overtones was severely critiqued in the early twentieth century but the methodology survived particularly in archaeology wherein Gamble (2007) has provided a powerful critique.

In contrast, we argue that states, as demonstrated by their origins, are indelibly linked to cities. The conventional argument of political evolution of states from class-less societies through increasing complex class relations in 'chiefdoms' to finally create states has been contested by Smith (2003) and dismissed in detail by Yoffee (2005). The counter argument illustrates cities as generators of transformative material change: states are invented in cities. The coming together of peoples for reasons of commerce produces a dense and varied demography in which social relations inevitably become fraught. State-making in cities is the solution to this conflict. Accordingly, city-state is the initial state form and is indexed by the building of city walls: there are typically a number of centuries between commercial city origins and conversion to state-rule (Taylor 2013). War-making between city-states produces winners and losers, thus creating traditional empires - states encompassing many cities - in a geopolitics continuing into the modern era.

What we are doing here is replacing a simple evolution theory by a demand theory of state origins: states were constructed to solve an urban need for order. The result is a new governance structure based upon coercion; pacification of large territorial spaces involves the 'taming of cities', often indexed by the dismantling of walls of conquered cities. The key effect is relative loss of city autonomy so that the fruits of its commercial activities are taxed to pay for its own military subjugation. However, within territorial pacification, cities can still carve out their spaces of flows, often prospering by supplying the exorbitant demand emanating from imperial capital cities, grown large on tribute, they became the mega-cities of the pre-modern. This unequal city/state relation is typical before the modern period (Taylor 2013).

Ramifications. City/state relations are paradoxical. The awesome power of cities as world-changing institutions is illustrated by the invention of states but which then impinges on that power. We continue by exploring the inherent power of cities in macro-social change before returning to city/state relations under conditions of modernity in thesis/antithesis V.

III

Modern thesis. Cities are outcomes of general social forces that have created places of dense activity we call urbanization

Antithesis. Cities are process, constellations of myriad urban networks that are the general social forces

Explication. In most modern scholarship, cities are products, specific places created by more fundamental processes. Typically, industrialization is considered in some way to have 'caused', or at least led to, modernity's historically unprecedented levels of urbanization. This is particularly explicit in a Marxist approach with its class-based historiography encompassing the previous chiefdom/state thesis. This leads to a focus on cities as product, prioritizing supply/production over demand/consumption. However, Harvey (2014) has recently moved towards our antithesis with an emphasis on circulation for the realisation of surplus value through property that suggests, at long last, geography is searching for a theory of demand to underpin people's consumption.[2]

But cities have not always been considered as simply outcomes; in our argument they are themselves processes, myriad networks creating dynamic mechanisms of change. Here we follow Jacobs (1969) and Castells (1996) who independently both insist on cities as process. This position is much clearer in a trans-modern argument where cities are closely linked to civilizations.

Although in the modern perspective cities are viewed as subordinate to states (urban places within national territories), changing the context to civilizations elevates the role of cities. Because cities and civilization are indelibly linked – a civilization presumes existence of cities - we are confronted with a chicken and egg conundrum. By thinking of cities as process they become prioritized as the 'egg' in incubation of civilization. Civilizations are a consequence of cities as places of multiple innovations including their invention of states as empires. This is an affirmation of the previous antitheses: again we find that cities turn out to be very demanding, this time in the making and remaking of historical civilizations. In modern parlance, cities are development (Jacobs 1969).

Ramifications. Because cities-as-process is so demanding its world-making potential requires a materialist rethinking of chronologies and chorographies.

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[2] See especially, Harvey's (2015) intervention in the Book Review Symposium on Harvey (2014) which he considers to be his 'most dangerous book'.

Specifically, major societal changes commonly labeled as 'revolutionary' in modern discourse need fresh investigations.

ALTERNATIVE CHRONOLOGIES AND CHOROGRAPHIES

IV

Modern thesis. First there was an agricultural revolution and when this evolved sufficiently to create material surplus to support city work, there was a consequent urban revolution

Antithesis. Cities are very demanding not least for food, and agriculture was developed to meet this demand

Explication. These adversarial positions represent the most keenly contested and controversial part of our argument (Smith et al 2014; Taylor 2014). Archaeology as a discipline has pursued an evolutionary approach to settlement changes linking the process to increasing supply of food. Explicitly codified by Childe (1950) into two revolutions, first 'agricultural' and then 'urban', the earliest cities are deemed to have been created about 5,000 years ago in Mesopotamia consequent upon new higher levels of agricultural productivity. Over the years this position has become normative rather than empirical, and thereby uncritically accepted including into the sustainability literature (Steel 2008). The problem for this thesis is that evidence keeps appearing for much earlier urbanizations - cities in the wrong place at the wrong time (Taylor 2012a, 2013).

The antithesis is Jacobs' (1969) controversial 'cities-first' argument, long denigrated and dismissed by archaeologists but with growing support by urban scholars (Soja 1990, 2010; Taylor 2012a, 2013). Early indications of urbanizations are found millennia before conventionally expected across the world; the celebrated example, used by Jacobs, is Çatalhöyük in Anatolia from about 8,000 years ago. Deriving from a combination of trading networks with new production practices, these initial cities not only preceded agriculture, they were the reason for agriculture. As successful cities grew, the hunter/gathering means of supplying food became increasingly inadequate and consequently, agriculture was invented to solve the problem. Hence the massive contrast between the orthodox supply theory of urban origins and this demand theory of agricultural beginnings. It is a key example of cities generating transformative material change.

Ramifications. Bringing cities into the questioning of conventional views on a key early chronology opens up the possibility of extending this thinking to modern rapid societal change. This returns us to the paradoxical relations between cities and states, but as now developed in the modern world.

V

Modern thesis. Starting in late eighteenth century Britain, and diffusing across parts of Europe and North America in the nineteenth century, industrialization created new national societies that are the first modern and/or capitalist societies.

Antithesis. As an economic formation capitalism is transnational in space and trans-industrial in time; a transition to a capitalist world-economy[3] occurred in the 'long sixteenth century' (c. 1450-1650) to create the modern world-system in which we still live today.

Explication. This is about the meaning of the 'industrial revolution', the conceptual precursor to the agricultural and urban revolutions in thesis/antithesis IV. There are two entwined debates involved. First there is the challenge to state-centric thinking most explicitly expressed in world-systems analysis since the 1970s (Wallerstein 1974, 1979, 2004). As such it attacks both Marxist and liberal acceptance of economic process coinciding with sovereign political territories and advocates a systemic approach to capitalism that transcends political boundaries. In its embryonic form, this transnational formation was predicated on cities (Braudel 1982, 1984) and this has more recently been strongly supported empirically (Taylor et al 2010). The chronological effect of this revisionist thinking has been to trace capitalism and modernity back to before the so-called industrial revolution, specifically to the beginning of European expansion some two centuries earlier. In geography, this move has been thoroughly endorsed by Jason Moore (2014) on environmental grounds; it involves movement of flora and fauna (including diseases) between continents in what Crosby (2004) has termed 'ecological imperialism'.

Second, there is the recent conceptual delinking of 'industrial' from both 'modern' and 'capitalist'. For nineteenth century scholars experiencing a new industrial world based upon rapid technology advances defining human 'progress', it all came together as industrial being synonymous both modern and capitalism. For instance, industrial society *was* modern society (within a modern state), to be contrasted with non-industrial and therefore 'unmodern' societies. For the latter to become modern, they would have to become industrial, which is how 'development' policies were framed in the second half of the twentieth century. But when the original modern countries began to de-industrialize and remained rich while industrialization became a feature of poorer countries, the conventional link between modern and industrial was unequivocally severed. Combine this with the

[3] The use of 'world' in relation to 'economy' (and 'system') does not translate into 'world-wide' or global. Rather it indicates the scope of society to which it refers as used historically with, for instance, the 'Roman world' or the 'Inca world'. Thus in this case it originally refers to a distinctive 'Atlantic world' linking Europe and the Americas. However it did become world-wide by the late nineteenth century and has been generally referred to as global from the late twentieth century.

world-systems critique and the concept of modern (and capitalism) becomes perforce trans-industrial.

Finally, the transition to modernity (and capitalism) alters the paradoxical relation between cities and states. With multiple states rather than an over-arching world-empire, economic elites were able to engage in a more equal relation with political elites and this enabled cities to prosper as economic development moved from northern Italy to north-west Europe in the 'long sixteenth century (c. 1450-1650). But increasingly these multiple modern states accrue many more functions than traditional imperial states, starting with borrowing mercantilist policies as pioneered by cities. We know the end-result is modern urbanization on a scale totally different from anything that went before.

Ramifications. We have problematized the idea of industrialization being the foundational turning point in making the modern world, which is in keeping with our prioritizing demand over supply, and *longue durée* process over 'revolution' tending towards *histoire événementielle* thinking. However, this position appears out of sync with climate change discourses that emphasize the importance of the industrial phase of modernity. This is addressed in thesis/antithesis VIII in the climate change section.

VI

Modern thesis. Worldwide, subsistence agriculture has been the foremost form of food production both historically and in many poorer countries up to the present

Antithesis. Farming to exchange through urban hinterlands or networks has always been the primary form of agriculture; farming for subsistence represents a regression consequent upon urban decay

Explication. Local subsistence agriculture seems a natural starting point for evolutionary interpretations from rudimentary methods (slash and burn) for self-consumption to increasingly intensive and productive methods for wider consumption. The cities-first theory completely overturns this since agriculture is invented in order for its products to be exchanged. Therefore subsistence agriculture is not positioned as 'not yet commercial' but rather as formerly commercial.

As a product of urban demand, agriculture prospers or declines with its market in cities. In the limiting case of the demise of cities, agricultural villages will lose their raison d'être; they will be incomplete fragments of a past economic world. Jacobs' (1969) calls them 'orphaned settlements'. Agricultural skills are not immediately lost but the work has to be re-orientated, to fall back on the only surviving consumption, that of agricultural workers and their families. It is not just the unavoidable reduction in quantity of production: there is also a crucial loss of urban opportunities for development creating an inevitable stagnation. For Jacobs (1969), they become 'by-passed places'.

Strangely, this part of Jacobs' cities-first theory has not been subject to discussion in the literature. However, there is one intriguing corollary of this interpretation: regions of widespread subsistence agriculture become obvious sites for searching for, or expecting where others will find, early 'lost cities' (e.g. Mann's (2011) 'humanized landscapes' in pre-1492 Americas; see also Clement et al 2015).

Ramification. This is a beginning for developing a new chorography based upon urban-based demand. Problematizing the separateness of agricultural places and landscapes leads to questioning of the very idea of 'rural'.

VII

Modern thesis. There is a critical division between urban and rural as a theoretical and practical distinction deriving from contrasting land uses that have created very different sorts of places

Antithesis. The city process incorporates both urban and rural places in a singular dynamic

Explication. The idea that urban and rural are fundamentally different social realms long precedes modernity but with the latter's massive urbanization, the rural has taken on a distinctive conservative role. In modern politics, 'nations' are defined by their rural places (e.g. English countryside, American frontier) irrespective of the degree of urbanization. But this does not mean that radical scholars have not used this chorography, Raymond Williams' (1973) *The Country and the City* being only the most explicit example. Generally such work reinforces Childe's chronology, and in geography prioritizes place-content (settlement type, land use) over integrative process. Globally this resulted in an urban studies focused in the 'Global North' (urban systems research), with rural land use studies dominating 'Global South' research (development planning).

This spatial separatism has been challenged in different ways: for instance, Cronon (1991) challenged this empirically, and Amin and Thrift (2002) questioned this separatism more theoretically. Most recently, Brenner (2014a, 2014b), through his planetary urbanization initiative, has argued that the urban is everywhere as a global functioning complex. This is an application of our previous argument considering city as process rather than place. It follows that the widespread reporting of global population passing the 50% urban threshold misses the point: the vast majority of the world's population have long been organized to meet the demands of cities. More generally, all urbanization is reliant on populations beyond cities to supply in-migrants. This urban-rural functional link has been crucial historically because concentrating people creates unhealthy places where death rates exceed birth rates; the nineteenth century public health policies cut this link but the immensely increased global urbanization since then has continued to be supplied largely through rural-urban migration, most notably in China since 1980.

In addition, the process of city demand for food further undermines Childe's political language of revolutions ('industrial' as well as 'agricultural' and 'urban'). The enormous increase in large city populations by the end of the nineteenth century – Weber's (1899) new world of great cities – should not be deemed simply 'industrial' social change, rather our cities approach reinforces Brooke's (2014, 480) argument that the key environmental trigger is immensely heightened urban demand becoming worldwide. For instance, the great urban expansion includes explosive city growth in the frontiers settled by English-speaking peoples as described by Belich (2009; Taylor et al 2010). The movements of people between and within continents generating growing trade in commodities such as sugar, tobacco, coffee and tea may appear superficially as workers moving between 'rural' places but they were actually caught up in a single urban dynamic.

Ramification. Given a singular urban dynamic of social change, cities should be central to climate change science. For climate change policy this implies a change of emphasis from state supply-based solutions to interventions in urban demand.

ANTHROPOGENIC CLIMATE CHANGE SCIENCE

VIII

Modern thesis. Anthropogenic climate change started with the industrial revolution about 200 years ago resulting from continuous increasing use of carbon fuels in production

Antithesis. Anthropogenic climate change has been happening for 8000 years and was initially the result of land cover removal for agriculture to feed cities

Explication. There is little doubt about how mainstream treatment of anthropogenic climate change considers the 'industrial revolution': it is by far the key historical concept in this conventional thinking. We would surmise that it is the main reason for the productionist bias discussed in the introduction (Table 1). It is fundamental to the modern chronology because it specifies the beginning of anthropogenic climate change.

Ruddiman's (2003, 2010, 2013) research on the constituents of climate change, specifically the changing levels of greenhouse gases, has resulted in a serious challenge to the industrial revolution starting point. His method is to chart changes in greenhouse gases as multiple cycles over many ice ages – 'nature in control' - and then search out anomalies in the period since the last ice age, which he attributes to 'humans in control'. His findings show an anomalous rise in carbon 8,000 years ago and an anomalous rise in methane 5,000 years ago. Combining these, he produces a new chronology for anthropogenic climate change involving two processes: a slow increase in greenhouse gases starting 8,000 years ago and a rapid increase in greenhouse gases over the last two hundred years. Although the early rise is slow, he argues that it should not be under-estimated because of its longevity relative to the recent rise: he uses the tortoise and hare analogy. The

human side of Ruddiman's chronology is conventional: he accepts that the recent rapid increase is a result of the 'industrial revolution'; the early slow increase is explained as caused by the 'agricultural revolution', specifically the removal of land cover.

The most basic critique of Ruddiman's thesis is an empirical one: early populations were not large enough to have made the impact he posits. He counters this by citing increased estimates of both population totals (Gignoux et al 2011) and the need for extensively large clearances in early agricultural (Ruddiman and Ellis 2009; Kaplan et al 2010). However, this debate is by no means settled and our introduction of cities into the argument can substantially augment Ruddiman's position. By focusing on urban demand for food rather than rudimentary subsistence agriculture we provide a completely different chorography, a geographical imagination of city hinterlands and networks as an alternative to simple demographic counts. Caused by the urban demand for increased production, land clearances are now predicated on a much more complex demography and economy. In this argument discoveries of ancient land cover removal for agriculture represents an initial urban ecological footprint. Thus linking Ruddiman's position to Jacobs (1969) cities-first argument generates a credible case for initial anthropogenic climate change being a consequence of early city process (Taylor, O'Brien and O'Keefe 2015a). The initial land cover clearances required for provisioning cities by dry-land cereal production is implicated in the rise of carbon emissions; subsequent wetland cereals production to provision ever-growing cities is implicated in the later methane emissions.

There are two important chronological questions that arise through bringing Ruddiman into our argument. First, an intriguing implication of Ruddiman's (2010, 95-105) research is that although we think of anthropogenic climate change as a bad thing, this is only so for the phase of rapid rise. The long slow human effect of global warming before 1800 had been immensely positive for humans. It prevented the return of another ice age and thereby provided a unique climatic window of opportunity: a long period of stable environmental conditions that suited human material development. Second, his slow/fast anthropogenic climate change division does coincide with conventional identification with the 'industrial revolution' rather than our 'long sixteenth century' transition to modernity/capitalism. Why the delay? Well, in the beginning the modern transition was in no sense global; its new urban demands were limited with respect to contemporaneous larger traditional empires, notably China. Additionally, the expansion into the Americas created a massive pandemic from 1500 to 1800 that Ruddiman (2010, 132-3) recognizes as actually lessening human impact on climate; in our argument this is crucial because the decimation of urban hinterlands and networks across the Americas (Mann 2011) countered the effects of urban growth elsewhere, thereby delaying a potential climate effect.

Ramification. There are two initial consequences of this merging of contrarian arguments: first, there is an urgent research need for modeling the early urban landscape to estimate increased greenhouse gas emissions; and second, through refuting the modern thesis we provide a direct challenge to the foundation of climate policymaking as currently conducted. Here we focus on the latter.

IX

Modern thesis. Anthropogenic climate change as a relatively recent phenomenon can be tackled by states through negotiations on reducing carbon emissions

Antithesis. The starting point for tackling anthropogenic climate change is to understand that both early and late transformative alterations in climate have been generated by demand through cities

Explication. What the 8,000-year chronology provides is an understanding of the power of cities: initially a long, slow growth of global urban demand followed by a rapid acceleration of that demand. The latter is continuing and quickening which means that the situation is becoming more and more urgent. But this does not lessen the need for a historical interpretation of the problem because how we think about it, especially its origins, provides the necessary understanding for resolving the situation (Moore 2015, 4; Angus 2015). Therefore, to concentrate our scholarship exclusively on 'carboniferous capitalism', as the recent burst of economic growth has been commonly called, is misguided. It is not the 'carboniferous' that it the root concern, it is 'capitalism' as ceaseless accumulation, as the modern economic system that can only exist through continuously growing consumption.

The conventional modern chronology of only 200 years of anthropogenic climate change fits neatly with Thesis I, the preeminence of the state. The result has been deployment of an elementary instrumental theory of the state that generates a simplification of a complex subject so that governments are able to do something practical (Scott 1998). The focus of governments on carbon emissions makes short-term sense – 'keeping the lights on' – buttressed by neo-liberal economic ideology with its market short-termism. There are minor concessions to thinking longer-term in terms of government subsidies for non-carbon energy sources and carbon trading to effect territorial carbon budgets, but the politics and international relations remain trapped in a modern mindscape that cannot handle the complexity of the global predicament. This misconstruction premised on supply is clearly illustrated by the UK government's aptly named policy instrument, the 'Department of Energy and Climate Change'.

Back to basics: energy is produced as supply and consumed through demand. At best, policy that privileges supply is dealing with only half the energy system but in our argument it is much worse than this: it misses out the crucial part of the system which is demand for energy predicated upon the wider material demand generated through cities. Further, it lacks the links to the demand that cities

are placing in terms of the 'rural' responding to climate change (O'Brien et al 2009). This understanding comes from the 8,000-year chronology integrated with chorography of city-centred flows. Territorial state energy budgets can only make sense in strict autarky where supply and demand are contained together. Any porosity through boundaries constitutes outsourcing of energy and other material flow. Thus, measuring territorial environmental footprints is fraught with misunderstanding: a product consumed in state A constituted by inputs from states B, C, D, etc. etc. violates the spatial integrity of any bounded measure in a myriad complexity of flows (see Wiedmann et al (2015) on consumption-based material footprints). In complete contrast, cities mindscape is constituted by flows, paths, routes, connections, chains, links, circuits, etc. with boundaries having only a cursory presence as obstacles. Instead of territorial footprints there is an urgent need to research city 'net-prints', the demand power and scope of cities, as a basis for policymaking (Taylor and Derudder 2015). This is broadly cognizant with current descriptions of planetary urbanization (Brenner 2014a) that are going beyond territory literally by including the oceans. In terms of our urban dynamic argument, this is represented by city net-prints covering ocean fishing for food; for instance, fish from the North Atlantic to feed the workers in the cities of northern Europe in the new industrial era, and earlier supplying for religious needs in medieval cities across all of Europe.

Ramification. Prioritizing urban demand will necessarily problematize place-based policy initiatives and join with current environmental concerns for material flows. Going further, by bringing cities to centre stage we are forcing complexity on to the agenda; engaging with cities should always respect these settlements as the most complex of all human artifacts. But bringing cities into the argument has not always been accompanied by complexity.

X

Modern thesis. As specifically dense places cities are the most sustainable of settlements and their remodeling as smart green cities is the urban way of tackling anthropogenic climate change

Antithesis. Anthropogenic climate change has to be addressed as the result of cities as process; it is a matter of consumption, collective material demands through myriad urban networks

Explication. These positions identify two key themes in our argument: in terms of chorography the difference between city as place and city as process, and in terms of chronology alternative views of technology in society.

Recent years have seen a surge of interest in green, eco, sustainable, compact, etc., cities. 'Green Cities', for example Masdar, have been designed and built from new. Others, such as Alborg, have had the existing built environment refurbished along with new 'sustainable' developments (Joss, 2015). The underlying assumption is that we can build/refurbish cities as our way of 'solving'

the climate problem. But this fails to recognise that cities are vitally processes, material networks at multiple scales leading to concentrated consumption, today at mega levels. Simply focusing on design of place diverts attention from our current lifestyle embedded in an economy of continuous growth. Such arguments are based on a belief that technology will find the solutions needed to address climate change. Certainly there is little to suggest that technology, in particular technology transfer, has addressed energy poverty in poorer countries (O'Brien et al 2007)

The basic problem with relying on technology is that it cannot be separated from the society in which it is created. Modern technology is first and foremost modern. Treated as separate, as saviour, it prevents transcending a modernity that is inherently consumerist. In an economic system that requires ever more consumption, technology is used to yield ever more products. This logic generates built-in obsolescence accompanied by ever-changing fashions, both generating new needs to fuel demand created by sophisticated marketing campaigns enabling corporations to keep producing more and more stuff. But the reality is that we need an approach that requires us to have less and less stuff, which requires a completely different economic logic. A sustainable approach to cities and a mega-consumerist economy are incompatible. Planning one city at a time creates a landscape dotted with green cities, which is simply is an inadequate response. We need to think in a more sophisticated way, a chorography based upon a holistic urban approach to changing behaviour and greening the economy (O'Brien and O'Keefe, 2014).

It should be noted that this position is not an anti-technology argument: better use of energy will be a necessary part of any holistic approach to tackling climate change but it cannot be sufficient. But, operating as the latest manifestation of the modern progress myth, technology is positively dangerous (viz. geotechnology!).

Ramification. It is not just a matter of focusing on cities; it is how cities are understood that matters. Our continuing message is that cities are much more than a type of place; they are a process and moreover, one with world-changing powers. In our current climate predicament this should be a good thing.

XI

Modern thesis. There are new polycentric city-regional formations that are the necessary framework for global policymaking to engage with both economic competition and making a sustainable world

Antithesis. Polycentric city-regions are historically ubiquitous and, having been central to operation of city process as economic cooperation, are crucial for a necessary global transition

Explication. Building on Gottmann's (1961) megalopolis concept linking US eastern seaboard cities from Boston to Washington, DC, there has been a plethora of findings of such mega-polycentric urban regions across the world (Choe 1998; Faludi 2002; Hall and Pain 2006; Harrison and Hoyler 2015) that now feature in

planetary urbanization (Brenner 2014a). This globalization of Gottmann's concept can sometimes appear as a celebration of size – better to compete, better to sustain - with implications of evolutionary inevitability. Its chorography can also be quite problematic with an acute concern for spatial delimitations that betrays a territorial emphasis, sometimes with state-like easy simplifications. Despite the emphasis on planning in this literature, it can appear that we are advancing towards an urban dystopia, a new mosaic world of urban behemoths (Petrella 1995).

Of course, cities have commonly clustered in successful regions of economic development, both cooperating and competing in dynamic innovative cultures. Historically, modernity has been built upon three such multi-nodal urban regions: Holland in the seventeenth century, northern Britain in the eighteenth/nineteenth century, and the US 'manufacturing belt' in the nineteenth/twentieth century. Pre-modern, stretching at least from the Mesopotamian urban blossoming 5,000 years ago to the late-medieval northern Italian urban region, this is how city process has operated most successfully (Taylor 2013). And this process, modern and pre-modern, has been very much a bottom-up mechanism through communities and businesses taking advantage of agglomeration and connectivity advantages to alter their worlds, usually in small ways, sometimes amassing into material transformative change. Intimations of this dynamism can be gleaned in the contemporary city process, for example in Lang's (2003) rich 'edgeless cities' but the innovatory behaviours in Neuwirth's (2006) poor 'shadow cities' are probably more relevant for the transformative change that is now required. The key point is that in our uniquely 'urban century' city process is both more potent and most needed than ever as the locus for tackling anthropogenic climate change. Satisfying urban demand locally through no-growth development (i.e. Jacobs' (1969) import replacement mechanism as localization) provides initial hints towards realizing a utopian vision of green networks of cities (Taylor 2012b, Taylor and Derudder 2015).

One final point, this evocation of bottom-up process is not simply the inverse of dependence on top-down state negotiated policies, it is also the reverse of urban top-down politics: if mayors ruled the world (i.e. back to city-states) we would definitely be travelling to another simple urban dystopia.

Ramification. This brings us back to the paradox of city/state relations. Our *longue durée* arguments are confronted by a current urgency. Certainly the bottom-up process we have described requires a bottom-up politics through which change is debated and navigated. Transition politics will necessarily be very different from modern politics but it will still need operational political instruments. What might they be?

Reflections

A thesis/antithesis mode of argument is expected to conclude with a synthesis. In one sense, this has been produced in the companion paper as a trans-modern narrative on cities being so demanding. In that argument we relate Soja's (2000) three urban revolutions to Ruddiman's revision of anthropogenic climate change: from 8,000 years ago early urbanization and rise in carbon emissions, from 5,000 years ago first large cities and rise of methane emissions, and from 200 years ago industrial cities and greenhouse gases 'take off' culminating in today's global über-consumption (Taylor, O'Brien and O'Keefe 2015b). Self-evidently, this is a 'big picture' approach (with associated 'grand narrative') that is not always seen as legitimate in critical thinking; our defence is simply that anthropogenic climate change is a big picture topic. However, as Braudel's (1982, 1984) work has bequeathed to us, long history plus large geography does not have to neglect agents of social change, hence our bottom-up ending to thesis/antithesis XI. But we cannot end our argument here. The eleven critical takes on conventional modern thinking are not intended as a set of academic exercises for rearranging social science research on cities and states; rather they are intended to contribute to a fundamental mindscape break required for the immense, urgent human task of tackling anthropogenic climate change. Following thesis/antithesis XI, our reflections focus briefly on political implications, on the hugely difficult task of bridging what Castree (2015) calls the 'knowledge-action gap'.

The first point to make is that we need a trans-modern sensitivity in our political work. The chronology/chorography promoted above provides a positionality that will inevitably add some modesty to our politics. In anthropogenic climate change there are uncertainties in terms of future physical changes but these are dwarfed by the myriad possibilities for societal change resulting from the demise of modernity. The consequences are profound. Wallerstein (1992, 51) has argued that in attempting to comprehend a 'post-modern' future, we are in a similar position to a fourteenth century peasant trying to forecast the modern world. But we are where we are, and this is where the political action is: Braudel's (1972) *événementielle* from thesis/antithesis I. Manifold short-term politics has been given direction as in progress/evolution discourses of modern radical movements: generally the 'forward march of labour' and/or other oppressed categories, and theoretically the Marxist transition to a communist mode of production, to which we can now add Klein's (2014) 'unfinished business of liberation' for progressive climate change activism. But we have argued that these evolutionary/revolutionary and progressive arguments do not satisfy our trans-modern way of thinking. Further, there is a long tradition of modern bottom-up political movements degenerating into an alternative top-down elite politics. This is the opposite of the bottom-up processes envisaged in thesis/antithesis XI.

There have been two recent presentations of 'theses', one on urbanization (Brenner 2014b) and one on social science responses to climate change (Vinthagen 2015), that relate to our theses/antitheses argument. We have not built our position on these two sets of theses; we share their spirit for basic changes in how we approach these topics politically and there are instances of partial fits or overlaps with the reasoning we are developing. For instance, Brenner (2014b, 198-9) derives three horizons from his theses, the second of which addresses the Anthropocene in relation to urban history, albeit limited to 'industrial capital', followed by a glimpse at a 'broader politics' that extends 'right to the city' to contestation of a global commons. Vinthagen's (2015) thesis 8 relegates technical concern for climate change to below the 'essential question' that is changing the current economic system by challenging its upholders, previously addressed in his thesis 7 as a more proactive climate justice movement. But neither confronts the nature of the new politics that is forming and will necessarily be fundamentally different from modern politics. We use the Swyngedouw's (2009) urban 'antinomies' in producing a politics of environmental change as a possible foretaste of a new politics.

Swyngedouw's (2009) provides an overt, if unannounced, trans-modern approach to political change. He identifies a 'properly political' as a disruptive and transformative moment, a radical *événementielle*, that has been lost in contemporary managerial approaches to current politics dismissed as 'postpolitical'. He warns of bottom-up politics regressing into populist appeals to elites for help. Given that the production of nature and production of cities are co-evolutionary, irredeemably entwined, the new politics of environment should therefore accept conflict as inevitable in an interplay between the particular and the universal. In this process, particular urban demands transcend negotiations between interested parties and begin 'to function as the metaphoric condensation of the global restructuring of the entire social space' (Swyngedouw 2009, 616, quoting Žižek (1999)). It is hard to imagine a politics more different from the tradition of UN conferences of states negotiating a route to carbon reductions. Political expressions of the inevitable conflicts in an expanding global urban dynamic – the antinomies of world city networks – might be one antidote to postpolitics on the horizon.

However, there is by no means a simple match between Swyngedouw's (2009) position and the politics we are searching for. One of Swyngedouw's key preoccupations is to assert the primacy of politics over sociological understandings. We take a basic materialist view on this matter and therefore, the fact that our political discussion comes after our theses/antitheses indicates an important difference in approach. Our focus on relations between cities and states reflects a concern for relations between economics as commerce and politics as domination. In this regard postpolitical is a late modern political practice that is taming modern politics as class conflict, both domestically and internationally. Purporting to 'manage' global climate change becomes a classic example based upon 'we are all

in this together'. But Swingedouw also recognizes a potential for disruptive and transformative practices resurfacing through traces of past politics in interstices of postpolitical consensus. This is consistent with Klein's (2014) view of climate change as political opportunity bringing together stalled radical movements. The problem here is an inevitable projection forward of a modern politics that does not articulate the nature of change that trans-modern implies. Thus Wallerstein's (2004) political bifurcation pitting 'the spirit of Davos' against the 'spirit of Porto Alegro' is conventional modern class politics writ large; there is nothing much new about it. In fact the introduction of 'we are all in this together' courtesy of anthropogenic climate change suggests a future politics more like class politics' modern nemesis, national-type politics writ large, potentially encompassing all of its demagogy. And this could mean city mayors building a regressive politics against an urban politics of struggle. But we don't know. What we can say is that reducing carbon emissions is certainly a necessary condition for tackling anthropogenic climate change - satisfying urban demand in as climate-friendly way as possible - but it is also far, far, far from being a sufficient condition – carbon is not to blame for climate change, we modern consumers are.

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