

Neoliberalism and the Calculable World: The Rise of Carbon Trading

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Neoliberalism can be a vague, even incoherent concept when it becomes entangled in the false dichotomies between market and state that are habitually thrown up by its adherents. It is often said, for example, that neoliberalism promotes free markets and reins in the state; yet, as Karl Polanyi (2001 [1944]) pointed out long ago, *laissez faire* itself is an interventionist state project (*'laissez faire* was planned; planning was not'). It is said, too, that neoliberalism looks to economic growth rather than the state to solve many social problems; yet the quantifiable entity called 'the economy' was created in the 20th century largely by reorganizing and redistributing knowledge and embedding new practices of description and calculation in governmental practice, and can at no point be sharply marked off from official coercion, state corruption and 'non-economic' institutions (Mitchell, 2002). Similarly, the neoliberal attempt to simulate efficient market outcomes by deploying cost-benefit analysis in policymaking depends on calculation and regulation undertaken by the state (Lohmann, 2009).

Nowhere is the state/market dichotomy more misleading than in the analysis of one of the last, most ambitious manifestations of neoliberalism – the carbon markets that began to emerge in the 1990s as the main international policy response to climate change. While carbon markets are typically defended using neoliberal rhetoric ('What is the best way to tackle climate change? If we have a global carbon price, the market sorts it out' [Scott, 2008]; 'Carbon trading is seen as a market-based alternative to either direct taxation or a "command and control" approach' [Milner, 2007]), the commodity in which the biggest carbon markets trade owes its very existence to government fiat and regulation. In tracing the causes of the havoc carbon markets are in the process of creating and abetting, it is useful to look beyond the misleading market/state, choice/coercion, efficiency/inefficiency dualisms commonly used to justify them. This chapter focuses instead on the power dynamics implicated in abstraction, commensuration and commodification as the features of the neoliberal approach to climate change that will most repay study. In so doing, it hopes to provide an introduction to one of neoliberalism's potentially greatest class projects: the attempt to privatise the climate itself.

WHAT IS CARBON TRADING?

First proposed in the 1960s, pollution trading was developed by US economists and derivatives traders in the 1970s and 1980s and underwent a series of failed policy experiments in that country before becoming the centrepiece of the US Acid Rain Programme in the 1990s at a time of deregulatory fervour. In 1997, the Bill Clinton

regime successfully pressed for the Kyoto Protocol to become a set of carbon trading instruments (Al Gore, who carried the US ultimatum to Kyoto, later became a carbon market actor himself). In the 2000s Europe picked up the initiative to become the host of what is today the world's largest carbon market, the EU Emissions Trading Scheme (EU ETS) – although under Barack Obama the US may soon take over that position. Carbon markets now trade over US\$100 billion yearly, and are projected to rival the financial derivatives market, currently the world's largest, within a decade. Pioneered by figures such as Richard Sandor of the Chicago Board of Trade and Ken Newcombe, who relinquished leadership of the World Bank's carbon funds to become a carbon trader at firms such as Goldman Sachs, carbon markets have recently become a magnet for hedge funds, banks, energy traders and other speculators.

Carbon trading treats the safeguarding of climatic stability, or the earth's capacity to regulate its climate, as a measurable commodity. After being granted or auctioned off to private firms or other polluters, the commodity can then be allocated 'cost-effectively' via market mechanisms. Obviously, the commoditized capacity in question was never produced for sale. Rather than being consumed, it is continually reused. Although difficult to define or even locate, the capacity forms part of the background 'infrastructure' for human survival. Framing it as a commodity, moreover, involves complex contradictions and blowbacks (Lohmann, 2009). Current efforts to assemble carbon markets are likely, when carried beyond a certain point, to engender systemic crises. The earth's climate-regulating capacity is thus a quintessential Polanyian 'fictitious commodity'. Accordingly, illuminating comparisons and contrasts can be drawn with Polanyi's original 'fictitious commodities' of land, labour and money, as well as with other candidates for 'fictitious commodity' status that have been proposed since, including knowledge, health, genes and uncertainty.

The attempt to build a climate commodity proceeds in several steps (see BOX). First, the goal of maintaining the earth's capacity to regulate its climate is conceptualized in terms of numerical greenhouse gas emissions reduction targets. Governments determine – although currently more on explicitly political than on climatological grounds – how much of the world's physical, chemical and biological ability to regulate its own climate should be enclosed, 'propertized', privatised and made scarce. They then give it out (or, sometimes, sell it) to large polluters, before 'letting the market decide' on its final distribution (Lohmann, 2005; Lohmann, 2006).

Making climate benefits and disbenefits into quantifiable 'things' opens them up to the possibility of exchange. For example, once climate benefit is identified with emissions reductions, an emissions cut in one place becomes climatically 'equivalent' to, and thus exchangeable with, a cut of the same magnitude elsewhere. An emissions cut owing to one technology becomes climatically equivalent to an emissions cut that relies on another. An emissions cut that is part of a package that brings about one set of social effects becomes climatically equivalent to a cut associated with another set of social effects. Where emissions permit banking is allowed, an emissions cut at one time becomes climatically equivalent to a cut achieved at another. Once all these identities are established, it becomes possible for a market to select for the emissions reductions (and, *ipso facto*, the climate benefits) that can be achieved most cheaply.

BOX: Carbon market construction in brief

Step 1

The goal of overcoming fossil fuel dependence by entrenching a new historical pathway is changed into the goal of placing progressive numerical limits on emissions (*cap*) →

Step 2

A large pool of ‘equivalent’ emissions reductions is created through regulatory means by abstracting from place, technology, history and gas, making a liquid market and various ‘efficiencies’ possible (*cap and trade*) →

Step 3

Further tradeable emissions reductions ‘equivalents’ are invented through special compensatory projects, usually in regions not covered by any cap, for additional corporate cost savings, and added to the commodity pool for enhanced liquidity and further ‘efficiencies’ (*offsets*) →

Step 4

Project bundling, securitization, financial regulation, rating agencies, ‘programmatic CDM’ etc. add new layers of obscurity and complexity.

At first glance, these equivalences may seem uncontroversial. Market proponents tend to repeat, with the air of someone airing a tautology, that (for example) ‘a carbon dioxide molecule released in Samarkand has the same climatic effect as one released in Sandusky’. A moment’s reflection will show, however, that, in producing such equivalences, carbon traders are already drifting away from the climate problem. That problem consists mainly of the challenge of initiating a new historical pathway that leads away from dependence on fossil fuels, which are by far the major contributor to human-caused climate change. Once taken out of the ground and burned, coal, oil and gas add to the carbon burden cycling between the atmosphere and the oceans, soil, rock and vegetation. This transfer is, for human purposes, irreversible: once mined and burned, fossil carbon cannot be locked away safely underground again in the form of new deposits of coal, oil or gas, or in the form of carbonate rock, for millions of years. The transfer is also unsustainable: there is simply not enough ‘space’ in above-ground biological and geological systems to park safely the huge mass of carbon that is coming out of the ground without carbon dioxide building up catastrophically in the air and the seas. As biologist Tim Flannery (2005) puts it, ‘There is so much carbon buried in the world’s coal seams [alone] that, should it find its way back to the surface, it would make the planet hostile to life as we know it’. Most unmined coal, oil and gas, in other words, is going to have to stay in the ground. Accordingly, industrialized societies, currently ‘locked in’ (Unruh, 2000) to fossil fuels, need instead to ‘lock in’ non-fossil energy, transport, agricultural and consumption regimes within at most a few decades. Because this shift is structural, the first steps need to be undertaken immediately to minimize future dangers and costs.

It follows that short-term actions can be assessed for their climatic effectiveness only by determining the part they play in a longer-term shift away from reliance on fossil fuels. For example, the choice of technology used in making a short-

term billion-tonne emissions cut will make a large difference to long-term climatic outcomes. If the technology is one that reinforces overall societal addiction to fossil fuels, it will be more climatically damaging than one which contributes toward a pathway that keeps most remaining fossil fuels in the ground. Similarly, a billion-tonne reduction in one place may have social effects which have a different impact on long-term fossil fuel use (and thus on future reductions) than a supposedly 'identical' billion-tonne reduction in another place. Workable climate solutions, in short, are embedded in future history.

A commodity approach, by contrast, abstracts from where, how, when and by whom the cuts are made, disembedding climate solutions from history and technology and re-embedding them in neoclassical economic theory, trade treaties, property law, risk management and so forth. For example, carbon trading gives emissions-reduction technologies that are likely to result in unquantifiable but important 'spillovers' (Frischmann & Lemley, 2006) leading to radically-lessened long-term dependence on fossil fuels equal weight with technologies lacking such effects, as long as both achieve the same numerical emissions reduction over the short term in a particular locality. While carbon trading encourages ingenuity in inventing measurable 'equivalences' between emissions of different types in different places, it does not select for innovations that can initiate or sustain a historical trajectory away from fossil fuels (the effectiveness of which is less easy to measure). Indeed, once the carbon commodity has been defined, merely to weigh different long-range social and technological trajectories or evaluate and 'backcast' from distant goals is to threaten the efficiency imperative.

A commodity approach also functions to detach the global warming problem from climatological uncertainties and indeterminacies. This is because the sum of fungible greenhouse gas pollution rights that governments create and distribute for purposes of trade are implied to approach, in principle if not in practice, an economically optimal, 'climatically safe' level of overall greenhouse gas pollution. As work by the Harvard economist Martin Weitzman and others suggests, this move engenders a degraded conception of the climate problem: the commensuration process inherent in multi-equation, computerized Integrated Assessment Models that aggregate economic growth with simple climate dynamics heightens systemic hazards by 'presenting a cost-benefit estimate for what is inherently a fat-tailed situation with potentially unlimited downside exposure as if it is accurate and objective' (Weitzman 2008).

DISEMBEDDING AND RE-EMBEDDING: A SECOND STAGE

The disembedding/re-embedding process inherent in carbon trading then ramifies and proliferates through a succession of further acts of commensuration and abstraction. After the state creates a divisible, tradeable commodity whose 'efficient' allocation in the form of pollution rights can become a coherent, 'apolitical' programme for action ('cap and trade'), its status as asset, grant, or financial instrument is engineered to fit various accounting standards (MacKenzie, 2009). Grants of pollution rights are made to industrialized countries (under the Kyoto Protocol) or private firms or other polluters (under the EU ETS), according to their existing pollution levels. Due to industrial lobbying efforts and measurement difficulties, these grants are often more generous than the polluters need to cover their existing level of emissions.

Corporations receiving EU ETS grants are then allowed to pass on to their customers the nominal market cost of the asset they have received for free. (Auctioning may become more common in the future, but so far has not been widespread.) In this way, the bulk of the earth's carbon-cycling capacity is in effect made into property and distributed to the industrialized North, and in particular to the heaviest corporate polluters.

A second class of measurable, thing-like climate-benefit units called 'offsets' is then developed to be pooled together with 'reductions' for further 'efficiency' gains. These offsets are manufactured by special projects requiring special expertise, most located in the global South, that are claimed to result in less greenhouse gases accumulating in the atmosphere than would be the case in the absence of carbon finance, such as tree plantations (which are supposed to absorb carbon dioxide emissions) or fuel switches, wind farms and hydroelectric dams (which are argued to reduce or displace fossil energy). Schemes for generating still more saleable greenhouse gas pollution licenses – including projects involving agrofuels, biochar, nuclear energy, forest conservation and the capture, liquefaction and storage of carbon dioxide from coal-fired power plants – are also under consideration. Such 'project-based' credits, no matter what their origin, are designed to be fungible with the emissions allowances created and distributed by governments in the industrialized North. Indeed, in an act of commensuration-by-fiat, the Kyoto Protocol stipulated in Articles 3 and 12 that these offset credits *are* emissions reductions, thus legislating into existence a new, abstract, nonsituated, omnibus category of reductions/offsets. It thus helped open a niche for a new corps of specialists and consultants – analogous to the 'quants' who helped develop advanced financial derivatives – to seek profits working out the needed commensuration procedures. Such 'carbon quants' produce calculations claiming, for example, that reducing carbon emissions from a power plant in Britain is 'the same as' building a wind farm in India or Brazil because the wind farm displaces fossil fuel use.

Since the carbon dioxide resulting from fossil fuel combustion is only one of many greenhouse gases, it is possible to create still more equivalences, making possible yet further supposed 'efficiencies' in attaining any particular cap. In the 1990s, the Intergovernmental Panel on Climate Change (IPCC) devised a new abstraction called 'global warming potential' that commensurates an entire basket of climate-forcing gases according to how they compare to carbon dioxide in their climate impact. That ultimately enabled corporations to arrange to make spectacular savings in meeting emissions targets under the EU Emissions Trading Scheme. Instead of cutting its own carbon dioxide emissions, for example, the German-based generating firm RWE could plan on investing in United Nations-certified 'offset' projects destroying small amounts of nitrous oxide (a greenhouse gas stipulated to be 298 times more powerful than carbon dioxide over a 100-year time horizon) at factories in Egypt and South Korea and even smaller amounts of HFC-23 (a climate-forcing gas with a 'global warming potential' set at 14,800 times that of carbon dioxide over a 100-year horizon) at chemical plants in China (Lancaster, 2007; Forster, Ramaswamy et al., 2007). It could also explore the possibility of buying carbon credits from projects that would capture and burn methane (yet another greenhouse gas stipulated to be more harmful than carbon dioxide, especially over the short term) from landfills and coal mines in China and Russia. Commensurating all these gases was hard work, since they vary in their effects along many different axes

and time scales. In one reflection of the unclarities and disputes involved, in 2007 the IPCC increased the 100-year factor for HFC-23 by over 23 per cent, enabling at a keystone the production of millions of tonnes more carbon credits.

Using offsets to achieve increased liquidity and ‘efficiency’ distances carbon markets from the global warming problem not only because it ignores the importance of achieving a transition away from fossil fuels, but also because it tends to suppress, in a class- and culturally-biased way, concrete practices likely to play a significant part in those solutions. Carbon offset accounting necessarily frames the political question of what would have happened without carbon projects as matter of expert prediction in a deterministic system, while at the same time framing (usually wealthy) project proponents non-deterministically, as free decision-makers whose initiatives are capable of changing ‘business as usual’. Activists in Minas Gerais, Brazil called attention to this contradiction early on when they contested an attempt by a local charcoal and pig iron company, Plantar, to get carbon credits for the environmentally-destructive eucalyptus plantations it had established on seized land: ‘The argument that producing pig iron from charcoal is less bad than producing it from coal is a sinister strategy ... What we really need are investments in clean energies that at the same time contribute to the cultural, social and economic well-being of local populations’ (FASE, 2003). After insisting that ‘the claim that without carbon credits Plantar ... would have switched to coal as an energy source is absurd,’ the activists went on to characterize the accounting procedure as a ‘threat’: ‘It is comparable to loggers demanding money, otherwise they will cut down trees’ (Suptitz et al., 2004).

Typically, offset income supports conventional developments that harm local low-carbon livelihoods and sources of agricultural knowledge while at the same time doing little if anything for local transitions to a non-fossil society. In the mountainous river valleys of Uttaranchal, India, for example, scores of dam projects in line to be part-financed through selling carbon credits to Northern industry are damaging local low-carbon irrigation systems. In China, 763 hydroelectric dams have applied or are planning to apply to the United Nations to be allowed to sell more than 300 million tonnes of carbon dioxide pollution rights to Northern industry through the Kyoto Protocol’s Clean Development Mechanism, yet they do not replace fossil-fuelled generation, but merely supplement it, and were arguably going to be built anyway. (McDonald et al., 2009). In November 2008, the US Government Accountability Office warned that such carbon projects can allow industries in the North ‘to increase their emissions without a corresponding reduction in a developing country’ (GAO, 2008).

Nigeria’s oil-extraction zone offers another good example of carbon markets’ tendency to encourage private corporations and technical experts to expend ingenuity on inventing novel, geographically far-flung market ‘equivalents’ for emissions reductions rather than finding ways to implement a structural shift away from fossil fuels. For 50 years, energy companies operating in the Niger Delta have burned off the great bulk of the methane they find in underground oil reservoirs. Although methane is a valuable fuel, it is cheaper for corporations such as Shell and Chevron simply to flare it on site than to use it in power plants or reinject it underground. As a result, local people are subjected to continuous noise, light and heat, acid rain, retarded crop yields, corroded roofs, and respiratory and skin diseases (Osuji &

Avwiri, 2005). Although flaring is prohibited by law in Nigeria (in 2005 the Nigerian Federal High Court confirmed that gas flaring was illegal and a gross violation of human rights), oil companies have so far contented themselves with paying penalties for non-compliance. In this context, one focus of local and international environmental activism is simply to insist on the rule of law. The Clean Development Mechanism, however, takes breaches of the law in Nigeria as the 'baseline' for carbon accounting. The Italian oil corporation Eni-Agip, for example, plans to buy some 1.5 million tonnes per year of cheap carbon dioxide equivalent pollution rights from a project at an oil-gas installation at Kwale that was registered with the UN in November 2006 (UNEP, 2009). Eni-Agip and its validator, the Norwegian consultant DNV, claim that the project will be reducing emissions by putting gas which would otherwise be flared to productive use (although it is difficult to verify whether the gas in question will come from oil wells or dedicated gas extraction operations also present in the region, whose production is not flared). The core of the calculation is that

'whilst the Nigerian Federal High Court recently judged that gas flaring is illegal, it is difficult to envisage a situation where wholesale changes in practice in venting or flaring, or cessation of oil production in order to eliminate flaring will be forthcoming in the near term' (DNV, 2004).

Accordingly, the project creates a new incentive for the Nigerian authorities to replace legal sanctions with prices and the rule of law with markets for environmental services. It would be difficult to imagine a purer expression of neoliberal doctrines. Isaac Osuoka, the joint coordinator of the Gulf of Guinea Citizens Network, believes that 'carbon trading reflects one of the worst forms of neoliberal fanaticism and attempts at re-legitimizing corporate rule experienced in the past decades' (Osuoka, 2009).

Current proposals to allow industrialized countries and their corporations to compensate for continued fossil fuel use by pressing millions of hectares of land in the global South into service as biotic carbon stores or dumps further highlight carbon offsets' tendency toward regressive redistribution. In one proposed scheme, REDD ('Reducing Emissions from Deforestation and Degradation'), billions of dollars would be invested in acquiring and preserving carbon in the world's native forests, which would then be traded for permission to continue greenhouse gas pollution elsewhere. Land grabs have already begun in central Africa, Indonesia and Papua New Guinea in order to feed the expected need for forested land of the US's proposed carbon trading system under the Waxman-Markey Act. State forestry departments, conservation organizations, local authorities, indigenous communities or logging or plantation companies would serve as onsite security staff for this global carbon warehouse. REDD advocates include ex-World Bank chief economist Nicholas Stern, who sees it, tonne for tonne, as one of the cheapest ways of keeping carbon dioxide molecules out of the atmosphere; Wall Street firms such as Merrill Lynch (now owned by Bank of America), which see high potential in trading such new 'carbon assets'; the Food and Agriculture Organization, which welcomes it as an opportunity to expand its political role; and, often in the forefront, carbon consultants, forest scientists, technicians and master planners with careers in forest conservation, who are working on the ground in countries such as Indonesia to secure local authorities' consent to the schemes. The large sums of money potentially on offer have split indigenous peoples' movements,

some of whom see REDD as an opportunity for advancement, others of whom see it as an enclosure movement; and environmentalists, who divide between large, Washington-based proponents such as Conservation International and The Nature Conservancy and less well-funded opponents who see REDD as disempowering forest peoples in favour of acquisitive corporations and state agencies (Griffiths, 2008). Although its role and political nature are often misunderstood by traders and activists alike, commensuration is again central to this struggle: for trading to be possible, emissions arising from the combustion of fossil carbon must be made quantitatively comparable with tree carbon. This becomes an endless task due to the different roles played by fossil and biotic carbon in the climate system, as well as uncertainties and unpredictabilities in forest carbon absorption, which are being exacerbated by global warming itself (Philips et al., 2009; Linderoth et al., 2009).

FINANCE AND SECURITIZATION

A final step in the carbon markets' abstraction from the climate problem comes with securitization. Financial market actors have always been prominent in the carbon trade and today dominate the buyers' side of the credit market. Among the financial institutions that have set up desks to speculate in carbon permits are Deutsche Bank, Morgan Stanley, Barclays Capital, Rabobank, BNP Paribas Fortis, Sumitomo, Kommunalkredit, and Cantor Fitzgerald. JP Morgan Chase has snapped up the carbon offset firm Climate Care, while Credit Suisse has acquired a stake in the troubled carbon consultancy and accumulator EcoSecurities and Goldman Sachs has announced plans to buy Constellation Energy's carbon trading business. By 2008 there were about 80 carbon investment funds set up to finance offset projects or buy carbon credits, most oriented more toward speculation than toward helping companies comply with regulated carbon caps. Trading companies are also active, including Vitol, a major energy-market speculator, and while ENRON, an early enthusiast for the Kyoto Protocol carbon market, is no longer in business, some of the firm's ex-staff have moved into the carbon sector. Before the financial crash, even certain industrial companies, such as Arcelor Mittal (the world's largest steelmaker), opened departments specifically to seek profits in the carbon trade, just as companies such as General Electric opened finance divisions in the 1990s (Cleantech, 2008). As with financial derivatives, a host of specialized new institutions have also been set up that deal in the commodity, with names like Sindicatum Carbon Capital, NatSource Asset Management, New Carbon Finance, Carbon Capital Markets, Trading Emissions plc, South Pole Carbon Asset Management, Noble Carbon, and so forth.

One of the tasks of such firms is to bundle together various types of small offset projects for buyers. With increased investment, securitization is likely to follow. Already in November 2008, Credit Suisse announced a securitized carbon deal that would bundle together carbon credits from 25 offset projects at various stages of UN approval, sourced from three countries and five project developers. The bank then split these assets into three tranches, allegedly representing different risk levels, before marketing them to investors. In this way, products which already had only the most tenuous relation to the climate problem they were designed to tackle, and had been further disconnected from underlying values through a cascade of contested commensuration processes, were transformed through yet further disaggregation and reassembly. Evaluation of such securities, whether by credit rating agencies or regulators, is certain to be even more challenging, and even less amenable

to modeling, than was the evaluation of the mortgage-backed securities that played such an important part in the onset of the financial crisis. If carbon permit products are ‘toxic’ to climate change mitigation policy, they may prove to be no less so to financial stability, given the projected trillion-dollar scale of the market. The dangers of what Friends of the Earth analyst Michelle Chan calls ‘subprime carbon’ are obvious (Chan, 2009).

Insofar as it is aimed merely at improving carbon market practice rather than at fossil fuel use, and relies on a theory-practice dualism, regulation tends to become yet another moment in the neoliberal disembedding/re-embedding process, adding further layers of attempted calculation to an unstable structure and further concealing the problematic nature of the underlying abstractions. A case in point is the continuing attempt of the Clean Development Mechanism’s Executive Board and government regulators in various countries to tackle the riddle of ‘additionality’ in offset markets (that is, how to prove that a project goes beyond business as usual), to which, as carbon trader Mark Trexler noted years ago, there is no correct answer (Trexler, 2006). Constantly manufacturing and reaffirming the notion that offset projects’ shortcomings are due either to imperfect methodology or incorrect implementation, ten years of regulatory effort have only further skewed the political economy of the offset markets further in favour of corporations locked into fossil fuel use, since it is only they who have the resources necessary for navigating the regulatory mazes that the additionality debate has made ever more intricate. Ironically, of course, this is an effect which, logically speaking, should itself enter into calculations of carbon saved and lost – one more example of the ‘moving horizon’ characteristic of the market-environmentalist project of ‘internalizing externalities’. The recent establishment of a private carbon rating agency, as well as proposals for ‘programmatic’ and ‘sectoral’ carbon credits, which would help sidestep impossible ‘additionality’ requirements, reflect a continuing commitment to ‘better calculation’ in the face of irresolvable tensions between the needs for high-volume, predictable carbon credit output and for market credibility.

CONCLUSION

Like the neoclassical shibboleths (the efficient markets hypothesis, rational expectations and the like) that have so picturesquely come to grief during the financial crisis, the carbon credit prices flashing on electronic screens in trading rooms on Wall Street or in the City of London reflect a complex political movement to reorganize and redistribute knowledge and power. Spelling out another notable chapter in the political history of commensuration (Espeland & Stevens, 1998), they form a part of one of neoliberalism’s last and greatest class projects: the attempt to appropriate the climate itself. Carbon trading thus takes its place alongside other movements of recent decades that have invented new possibilities of accumulation through the creation of fresh objects of calculation and the intensified commodification of some of the more hidden aspects of the infrastructure of human existence. Examples include attempts to expand credit by mathematizing and privatizing an unprecedented variety of uncertainties through derivatives markets (Lohmann, forthcoming), to privatize creativity through global intellectual property rights (Frischmann & Lemley, 2006), and to transform health, health care and even biological species into measurable, tradeable commodities.

All these efforts to appropriate involve abstraction and commensuration as part of wider processes involving deregulation, banking and land law, treaty negotiation, structural adjustment, police work, mapping, resource seizures, export subsidies and so on. This abstraction and commensuration can never be completed any more than politics or the evolution of a language can be completed. As Mitchell (2002) observes, internalizing all externalities would make exchange impossible. Ideals of calculability, continually being developed and undermined in the course of attempts to carpenter together new structures of property and trade, are part of conflicted processes that can generate both profits and crisis. The largely unchecked pursuit of liquidity in risk markets, furthered by the achievements of quants, led in the end to a financial stampede for the exits and a drying up of liquidity, and may eventually do the same in the carbon markets. An unrestrained quest to ‘internalize’ the benefits of innovation leads in the end to the sapping of innovative forces and resources (Frischmann & Lemley, 2006). Cost-benefit analysis’s attempt to isolate an uncontroversial basis for social choice in the calculation of individual preferences itself generates heightened controversy. Headlong attempts to implement ‘market solutions’ for global warming end up exacerbating the climate crisis as well as social dislocations of diverse kinds and wide geographical reach.

The troubled trajectory of such initiatives hints at the continuing relevance of earlier traditions of crisis analysis: Polanyi’s (2001 [1944]) observation that the complete commodification of land would result in the ‘demolition of society’; Marx’s descriptions of the ‘contradictions’ of capitalism; Keynes’s warning about finance’s ‘fetish of liquidity’ that ‘there is no such thing as liquidity of investment for the community as a whole’ (Keynes, 2008 [1936]). Yet, as this chapter’s sketch of carbon trading has suggested, analytical space must also be made for newer concepts such as Michel Callon’s ‘overflows’ (Callon, 1998), Timothy Mitchell’s (2002) treatment of the theory/practice divide as a mode of modern power, and science scholars’ emphasis on nonhuman agents, whether the recalcitrant rainforest trees now being pressed into service as carbon stores or the ‘black swans’ and ‘monsters’ of nonlinearity now routinely referred to by both financial analysts and climatologists. Study of the arcane particularities of manifestations of neoliberalism such as carbon trading can both inform and transform analyses of contemporary politics generally. As Lydgate famously observed in *Middlemarch*, there must be a ‘systole and diastole in all inquiry’ aimed at ‘continually expanding and shrinking between the whole human horizon and the horizon of an object-glass’.

The unfolding disaster of carbon trading prefigures the disintegration of the picture of a thoroughly calculable world to which neoliberalism clings more stubbornly than any state socialist project of the past. The important question is how this disintegration is to be effected politically. What sort of alliances can be fashioned among, for example, grassroots resisters of offset projects in the South, environmental justice movements battling fossil fuel extraction and pollution, and a Northern public frustrated at the largesse being lavished by their governments and the United Nations on the creation of yet another dysfunctional speculative market? The answers are not yet clear, but here as elsewhere the fall of neoliberalism will be something to be achieved through patient movement-building and a long series of political struggles, not something automatically given by the mechanics of yet another crisis.

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