The Coal Paradox

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The analytical foundations of the debate about coal mining in Africa tend to be buried or sacrificed for the advocacy of certain policy choices centred on unhelpful binaries: 'no coal' or 'more coal'. Attempts to bridge the polarised positions – often centred on the development of renewables - contradictory because they seem to accept that both positions are accurate. Dissatisfied with these three positions, this paper revisits the coal question by seeking to develop W.S. Jevons' path-breaking treatise, The Coal Question (1906), as an analytical critique of, and alternative to, the existing state of knowledge. Jevons' work is insightful but incomplete because it is weak in its grasp of property relations in the coal industry which, in the case of Africa, are highly monopolistic. A stronger framework must view as nested the analysis of the relationship between coal and technology, the implications of the historical development of energy for the current interest in renewables and, the relationship between ecological and economic questions.

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INTRODUCTION

According to the Africa Progress Panel (2015, 76), 'Coal is the dominant primary energy resource for the region, accounting for 45 per cent of total electricity supply'. Also, 'Sub-Saharan Africa has abundant reserves of coal and oil. At current production levels, coal reserves are sufficient to meet demand for around 141 years' (Africa Progress Panel, 2015, 78).

The distribution of coal reserves and how those reserves have been used are, however, uneven. Mozambique has the potential to emerge as a major producer, with estimated reserves of 25 billion tonnes, but South Africa's share is far more substantial than all the reserves of other African countries put together. Indeed, alone, South Africa contributes about 6 per cent of the total stock of coal in the world and ranks 6th among the world leading coal producers. It is coal that has propelled South Africa out of what Ayodeji Olukoju (2004, 56) calls 'epileptic power supply' not problem in Africa. With coal, the recurrent power fluctuation problem common in many parts of the continent (Motengwe and Alagidede, 2017), especially in Nigeria where children sing 'up NEPA' when power is restored because

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they 'Never expect power always (NEPA)' (Olukoju, 2004, 56), is less known in South Africa. Together with coal-based prosperity, the South African experience can look promising for other countries on the continent, even if the issue of emissions remains an albatross around the neck of South Africa (Motengwe and Alagidede, 2017).

Across Africa, coal-fired power plants are rapidly being developed. Malawi, Zambia, Zimbabwe, Nigeria, and Senegal are respectively developing 300 MW, 300-600mw, 600MW, 1,200MW, and 1050MW coal-fired power plants (Jacob, 2017). Tanzania too is planning to develop over two thousand major coal-fired power plants (Jacob, 2017). Most of these mining projects are financed by China, a major coal producer itself. As recently as June, 2016, the Chairperson of the Africa Union noted that coal will, if not should, form the backbone of Africa's energy renaissance (Jacob, 2017). There is, in short, a 'surging appetite for coal energy in sub-Saharan Africa' (Jacob, 2017, 343).

Africa's coal question magnifies the polarised debate on coal in the world. On the one hand, there are resource optimists and growth advocates such as Paul Collier of the Oxford Centre for the Study of African Economies and Donald Kaberuka, economist and former President of the African Development Bank (see, for a summary, Jacob, 2017), who contend that more coal should be extracted from the ground, subject only to greater marketization. From this perspective, the emphasis is on better management of coal, that is, its price in the market, reduction of the effects of emissions that arise from its combustion, environmental degradation due to the extraction, and investing returns such that economic growth that derives from its exploitation of could justify its use as a source of energy.

The emphasis on market forces and enclosure of the commons is anchored on the age-old idea of *the tragedy of the commons,* postulated by Garett Hardin (1968). According to the *tragedy of the commons* idea, when natural resources are held in common they are overused and abused and they lead to pollution and exhaustion. State intervention is not ideal because the state is an inefficient manager and the preference of people is marketization. This view is made more explicit in the 'open access exploitation thesis' but Hardin's ideas remain the silent underpinning framework for other theoretical perspectives too, including watered down versions that recommend public-private partnerships. This emphasis largely explains the turn to 'governance', that is, considering the trans-national corporation as a governance structure (Williamson 1981, 2002, 2009) as a solution to resource problems along with the rise of new institutional economics as the intellectual home of economic governance research (Boettke et al., 2012).

From this governance perspective, the market can be strengthened to enhance the near perpetual drilling of coal. According to the Hartwick Rule, for instance, it is prudent for the resource-rich economy to invest the returns from natural resources in physical and human capital to lengthen the exhaustibility period but also to cater for the post resource phase (Hartwick, 1977). Milton Friedman's Permanent

Income Hypothesis is the other idea which has triggered much interest in Sovereign Wealth Fund (Alagidede and Akpoza, 2015; Amoako-Tuffour, 2016). Similarly, Harold Hotelling (1931) offered the analytical foundations for the view that the price mechanism is the best way to ensure that exhaustible resources are exploited at a socially optimal rate. For Hotelling (1931, 173), the dictum 'higher prices and lower rates of production' is a 'general condition' or universal law, which now acts as an invisible hand that guides mainstream economists today (Rosewarne, 2011).

To the extent, then, that ways can be found through the market for more coal to be mined 'sustainably' (read over a long period of time) through investment in technology, human, and other physical capital, the mainstream economics view holds that the more coal there is, the better. Buoyed by donor insistence on the 'Big Push' approach common in the work of the mainstream economist Jeffrey Sachs, the prevailing view takes neoliberal policy forms such as Tanzania's 'Big Results Now' developmentalist initiatives (Jacob, 2017).

On the other hand, some writers advocate that coal should be left in the ground. Part of a grand support for climate change policies, 'the African position on climate changes' was delivered by President Kikweter of Tanzania during the 19th and 20th sessions of the United Nations Framework Convention on Climate Change. As part of a broad array of programs, including the African Ministerial Conference on the Environment, there is much disdain for a red hot African economy on coal fire and support for a green Africa without coal (Jacob, 2017). Nnimmo Bassey (2012), a well-known environmental activist, argues that the fossil-fuel development model has failed to improve social conditions as they have been polluting, enclaved, or simply destructive of social structure. Others such as E.G. Frankel (2007), writing more generally about the need to move away from fossil, contends that the world is moving away from fossil so it is better to move away with the world otherwise the African countries will have no one buying their natural resources in the near future. Either way, the interest in the role of Africa in a post fossil era is increasing with publications such as such as *Energy Transition in Africa* (Simelane and Abdel-Rahman, 2011) and *Future Directions of Municipal Solid Waste Management in Africa* (Mohee and Simelane, 2015).

In most of these publications, a debate on the future role of coal in Africa's energy mix seems to be neglected. Advocates of the continuous use of coal for energy argue that the problem lies with the technologies used not coal as a resource. So, the focus is often to try to manage emissions using market mechanisms such as emissions trading scheme, cap and trade, and carbon sequestration (Stilwell, 2011). The appeal to engineering solutions centred on advanced technology, is also common as is addressing the coal question by simply getting away from it and not mining coal at all.

Attempts to bridge the polarised perspectives by simply embracing renewables look ambitious. They are, however, neither complete in their analysis of impacts nor satisfactory in their analytical foundations of the root causes of problems linked

to energy sources such as coal. In terms of expediency and practical implication, they are typically inattentive to possible spatial mismatch between where old jobs are lost in the energy transition and where new, 'green jobs', will be created (Pearce and Stilwell, 2008; Stilwell and Primrose, 2010; Acey and Culhane, 2013). Indeed, the crucial question of whether technologies used to exploit renewable energies will allow successful transition that has less environmental impact compared to coal exploitation or leaving them in the ground still remains (Goodman and Rosewarne, 2015). Analytically, as this third way is often patterned after the polarised positions of resource blessings/curse, it appears to accept that both positions may be accurate.

One way to address the shortcomings of the existing perspectives is to revisit and re-view an oft-forgotten major study: *The Coal Question.* Written by the English economist Stanley Williams Jevons, *The Coal Question* is a classic and a major text for research on the political economy of natural resources. Many studies suggest that its insights (e.g., the geographical finitude of coal and the paradox of economising on coal) are relevant to-day. E.G. Frankel (2007, 4), for one, notes:

> The stage is now set for the eclipse of the fossil fuel age in global development. It will start with the rapid replacement of traditional coal and petroleum use in power plants and industry by cleaner burning gas and other fuels, as well as nuclear, wind, hydro, and solar power processes. We expect that within 20 years (2027) only about 10% of utility and industrial fuel will be petroleum and coal. In fact, it is expected that its use in power generation may be phased out completely before the middle of this century.

In this regard, M. King Hubert (1974) is much better known and is more widely credited with the idea of peak fossil era. Notably, Jevons' work predated Hubert's. Yet, a review of Jevons' work is needed because there is much confusion about its central contribution to the body of thought on fossil fuels and the exploitation of related resources. An early attempt to review the contribution of Jevons was made by J.M. Keynes (1936), but it was light or slight on coal and even this slight mention of the coal question contained a fundamental error. Keynes claimed that Jevons' *The Coal Question* (1906) was merely about the exhaustibility of resources and second that Jevons had not taken into account technology. None of these was correct, however: Jevons' argument was more sophisticated than a simple focus on the exhaustibility of resources and his entire book was a challenge to technological fixes of the coal question, leading to what is now widely called the 'Jevons Paradox'. Yet, surprisingly, Jevons' thoughts are sometimes misrepresented even in relation to the paradox. For instance, Richard York (2006) argues that Jevons never took into account capitalist pressures but, as I will show, he did consider these forces too. Political economists have simply buried Jevons, accusing him of unleashing mainstream economics upon the world – without acknowledging Jevons' pioneering contribution to a limit to growth thesis and an advocacy of using the state as an institution for redistribution and ecological change, as he did in his 1906 classic: *The Coal Question.*

Our knowledge of *The Coal Question* (1906) remains partial, sometimes even mistaken. Generally, '[t]he emergence of competing narratives about energy …calls for deeper inquiry into the political economy of energy transitions to establish a better understanding of the competing interests at play and the actors involved' (Jacob, 2017, 353).

It is this gap that this paper seeks to address. In doing so, the paper argues that the analytical foundations of the debate about coal mining in Africa tend to be buried or sacrificed for the advocacy of certain policy choices centred on unhelpful binaries: 'no coal' or 'more coal'. Attempts to bridge the polarised positions – often centred on the development of renewables - are contradictory because they seem to accept that both positions are accurate. Dissatisfied with these three positions, this paper revisits the coal question by seeking to develop W.S. Jevons' path-breaking treatise, *The Coal Question* (1906), an analytical critique of, and alternative to, the existing state of knowledge. Jevons' work is insightful but incomplete because it is weak in its grasp of property relations in the coal industry which, in the case of Africa, are highly monopolistic. A stronger framework must view as nested the analysis of the relationship between coal and technology, the implications of the historical development of energy for the current interest in renewables and, the relationship between ecological and economic questions. From this perspective, Africa can usefully seek self-reliance in the use of its coal resources. The continent can also change existing property relations, avoid the technological approach of ever-increasing extraction, and jettison the ideology of growth. De-growth, however, does not imply 'post-development'.

POST DEVELOPMENT

Much of the current push against coal mining is driven by 'post-development' concerns. Post-development represents both an intellectual tradition and a movement that reject the idea of 'development', which it tends to equate to 'growth'. Indeed, in the preface to the widely influential *The Development Dictionary,* which details the problems of development and outdoors 'post-development' as a panacea, Wolfgang Sachs notes that a central problem of development is 'development-as-growth' (see, Sachs, 2010, vi, xi). The *Dictionary* notes that the two key features of post-development are first, seeking the end of fossil fuels and developing an alternative world based on biodiversity and, second, reducing to a minimum economics and economic analysis (Sachs, 2010, xiii).

The analytical foundations of this anti-thesis and the resulting policy choices are, however, contestable. Currently, the coal question tends to be complicated by a property rights system that makes it possible for the rich to hide behind the poor, weaker races, classes, and gender to claim that coal mining helps the poor. In practice, weaker races, classes, and gender in peri-urban settlements and rural areas are

overworked in the coal industry and yet are poorly paid. These coal workers also live the inhumanity of being the bearers of coal waste when their settlements are targeted as dumping grounds for the coal TNCs (Talukdar, 2017).

Such matters do not disappear simply because coal is left buried in the ground. Indeed, the renewables industry is becoming highly exploitative along property lines. Labour is both excluded and exploited, unvalued and undervalued on the many green farms in Africa. Common water is being slowly enclosed to produce renewables. Communities are being evicted and within them, inferiorised races and genders are the worst affected (Elhardary and Obeng-Odoom, 2012; Obeng-Odoom, 2013; 2016; Akiwumi, 2017; Chiweshe, 2017; Kuusaana, 2017). In the name of renewables, in developing clean, green, and sustainable energy, Africa is slowly returning to days of slavery where slaves were used as sustainable energy (Showers, 2014).

Without decolonising post development, the separatist treatment of development and nature in the post-development movement, itself led by Europeans and Western activists (Obeng-Odoom, 2017), will cause more harm than good, as often their demands are at variance with what African movements are seeking (see, for example, Adam Branch and Zachariah Mampilly's *Africa Uprising: Popular Protest and Political Change,* 2015). So, Simelane and Abdel-Rahman (2011) strongly argue for alternatives that meet a three-point-criteria. First, the alternative must be widely accepted by local people. Second, the alternative must help to build local capacity and, third, help to replenish the continent's natural resources.

The post-development emphasis on the 'local' scale is too mono-scalar and overlooks the importance of multi-scalar analysis and action. It is not clear, for example, what the state should be doing in a post-development world. Questions about social protection of the aged, the weak, and maimed –better handled at multiple scales - get insufficient attention in post-development mono-scalar world. Third, and still on scale, the emphasis on small scale makes post-development vulnerable to criticisms that bigness is the problem, not the nature of social institutions. In turn, post-development can easily provide the justification for considering cities, for example, as problems and 'too much' migration – whatever that means – as a crisis. Indeed, the tendency to praise the smallness of life in Africa overlooks the great cities of Africa such as Great Zimbabwe (see Grant, 2015 for more examples) and Pharaonic Africa (Diop, 1977). It is the anti-thesis of the approach in critical African political economy in which Africa is placed at the centre rather than the margins of the world (Cooper, 2014).

Post-development ignores post-colonial analyses, including its rich radical political economy. Indeed post-development arose outside of the rich body of knowledge developed in postcolonial literature and does not often engage with it. Questions such as race – central to the entire idea of development – are very poorly considered and the South tends to be objectified, indeed essentialised. Firmer analytical foundations and more comprehensive policy choices are, therefore, needed.

COAL: ECONOMY, SOCIETY, AND ENVIRONMENT

The Coal Question develops an approach to natural resource economic analysis centred on the intersectional relationships among economic principles, ethical judgement for society and environment, and history rather than 'the fickleness of statistical numbers' (Jevons, 1906, 6). The book is divided into 17 chapters, encased in commentaries that preface the book and a crisp conclusion. Chapter 1 sets out the coal question as (a) the durability of coal and whether an economy can keep expanding forever, and (b) the fallacious thinking about alternatives in the form of renewables.

Chapter 2 is a review of the state of research on the topic at the time Jevons wrote the book. Chapter 3 is on the geological question of coal. It is a critical account of geological studies and features of coal. Chapter 4 is on the cost of coal mining, while chapter 5 looks at the price of coal and how it is determined. The attempt is not to give a theory of coal price, but to offer the historical analysis of trends. Chapter 6 is the history of inventions and how they relied on coal. Chapter 7 is a comprehensive challenge to the idea that advances in technology can address social problems, including the exhaustibility of coal. It is in this chapter that Jevons introduces the idea that the technologies intended to save coal paradoxically expedite its exhaustibility.

Nevertheless, the solution is not turning to renewables. Indeed, Chapter 8 of the book launches an attack on alternatives such as electricity, sun, water, and wind. Chapter 9 is the law of uniform geometrical increase or the natural law of social growth. Here, Jevons wants to explain the exponential growth in our use of coal first, by using the logic in Malthus: we are a reflection of our past, that is, a son breeds in a similar way to that of the father (of course, subject to the social conditions pertaining at the time). The point, however, is that there are social forces that sustain this continuing pattern:

> The cost of continuing to use coal in the same way as we did in the past is the high price we now pay for new discoveries (see p. 198).

Chapter 10 is about flourishing population growth, and emigration, driven by coal-induced world development. An attempt to show that people are mainly living a better life but all that will likely vanish if we do not put a brake on how we use coal. In fact, the happiness will give way to miserly. It is a strange thesis because of the use of population numbers and marriages to gauge happiness.

The role of coal in the transformation of the economic structure in Britain is acknowledged by Jevons. In Chapter 11, he looks at the changing nature of industry and how coal has fuelled a rapid advent of industrialisation. Chapter 12 is an analysis of the alarming rate at which coal is consumed. Chapter 13 considers whether imports of coal from abroad will solve the coal question in Britain. No, because (1) importing makes Britain lose money as it is more expensive (2) importing makes Britain dependent (3) Importing harms the competitiveness of other sectors of the British economy. Finally, the advantage of linkages is low if Britain

imports. Chapters 14 analyses the coal reserves of other countries, while chapter 15 examines the trade in iron. So, these chapters are comparative in nature. In chapter 16, Jevons argues that if Britain continues to expand, its expansion will undercut its global standing. Why? Selling stuff over leads those countries to develop, which in turn attracts Brits to emigrate. Together with local population, those countries can develop the industries to compete with Britain. It is also a methodological chapter because it says that you cannot discuss Britain in a vacuum. You need to consider it in relation to other settlements. The chapter is nationalist though and even glorifies colonialism. Chapter 17 puts the case of the only reform that Jevons argues will work: the reduction or elimination of the national debt. Doing so will have the effect of (1) increasing production capacity (2) saving posterity from future difficulties, and (3) reduction of excessive economic growth with harmful implications for society, economy, and environment.

THE RELEVANCE OF JEVONS

Three key ideas in Jevons' *The Coal Question* require particular emphasis because they are relevant for the contemporary political economic analysis of coal in Africa. The first is the so-called 'Jevons Paradox': the idea that more technology aimed at economising coal can save coal from exhaustion is in fact the reverse. More technology increases the likelihood that more coal will be used and as coal is not renewable, technology can in fact, expedite the exhaustion of coal. This is because technology leads to the production of more with less, in the end, more coal will be used to produce more and more. Indeed, as (a) the price of coal falls, products made of coal become cheap, more and more coal-powered products are demanded and produced and hence more coal is needed. And, (b) profit making capitalists seek to extract maximum coal for use and sale to enrich themselves.

It is important, then, to dwell a bit more on this idea. In this chapter, Jevons himself summarises the debate as: 'It is very commonly urged, that the failing supply of coal will be met by new modes of using it efficiently and economically. The amount of useful work got out of coal may be made to increase manifold, while the amount of coal consumed is stationary or diminishing'. (p. 137). Jevons concedes that at the household level, these claims might apply but, as the household use of coal is insubstantial (p. 138), it is coal that is used for manufactures and others that require the most attention. For that, Jevons notes: *'It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth'* (p. 140, italics in original)

Jevons gives examples about the introduction of technology and how it is supposed to lead to dispensing of the work of labour, but in the end actually increases the amount of labour employed:

> The economy of labour effected by the introduction of new machinery throws

> labourers out of employment for the moment. But such is the increased demand for the cheapened products, that eventually the sphere of employment is greatly widened. Often the very labourers whose labour is saved find their more efficient labour more demanded than before' (p. 140). The example Jevons uses is that of seamstresses. According to him, 'seamstresses…have perhaps in no case been injured, but have often gained wages before unthought of by the use of the sewing-machine, for which we are so much indebted to American inventors' (p. 140).

He continues, 'Now the same principles apply, with even greater force and distinctness, to the use of such a general agent as coal. It is the very economy of its use which leads to its extensive consumption' (p. 140):

> The number of tons of coal used in any branch of industry is the product of the number of separate works and the average number of tons consumed in each. Now, if the quantity of coal used in a blast-furnace, for instance, be diminished in comparison with the yield, the profits of the trade will increase, new capital will be attracted, the price of pig-iron will fall, but the demand for it increase; and eventually the greater number of furnaces will more than make up for the diminished consumption of each. And if such is not always the result within a single branch, it must be remembered that the progress of any branch of manufacture excites a new activity in most other branches, and leads indirectly, if not directly, to increased inroads upon our seams of coal (pp. 141-142).

What Jevons is arguing is not abstract. Indeed, he cites the example of Scotland, rich in fossil fuel, especially coal: *'the reduction of the consumption of coal, per ton of iron, to less than one-third of its former amount was followed, in Scotland, by a tenfold total consumption, between the years 1830 and 1863, not to speak of the indirect effect of cheap iron in accelerating other coal-consuming branches of industry'* (p. 154, italics in original). In other words: 'no one must suppose that coal thus saved is spared – it is only saved from one use to be employed in others, and the profits gained soon lead to extended employment in many new forms' (p. 155). It is here that Jevons offers detailed analysis of why economy is not economising.

Second, the existing alternatives to coal are not good enough. Jevons' argument is that such alternative power relies on coal anyway. In any case, they were overtaken by coal which proved more portable, more user friendly, and more reliable.

Third, Jevons puts forward a bold proposal for progress: slow growth, a reduction of national debt, living without debt, good communities, and healthy ways of life. How to pay the debt? Jevons recommends: (a) put a tax on inheritance ('legacy and success duties', p. 449). Or use the existing succession duties (as it was in the case in Britain at the time of writing, p. 451). (b) Don't expend more than what your earn, that is, be self-sufficient. (c) Give the proceeds of the tax to a separate commission to pay off the debt. Revenues from inheritance tax must be put to debt reduction/elimination because otherwise they are wasted (p. 451-452). Finally, the conclusion puts the case for the following Limit to Growth thesis or, as Jevons puts it, Seek a 'stationary state' (see, for example, p. xxxi) 'To secure a safe smallness' (p. 456) or

risk the danger to 'Contract to her former littleness' (p. 459). Jevons closes with his famous wise counsel to Britain:

> The alternatives before us are simple. Our empire and race already comprise one-fifth of the world's population; and by our plantation of new States, by our guardianship of the seas, by our penetrating commerce, by the example of our just laws and firm constitution, and above all by the dissemination of our new arts, we stimulate the progress of mankind in a degree not to be measured. If we lavishly and boldly push forward in the creation of our riches, both material and intellectual, it is hard to over-estimate the pitch of beneficial influence to which we may attain in the present. *But the maintenance of such a position is physically impossible. We have to make the momentous choice between brief but true greatness and longer continued mediocrity.* (pp. 459-460, italics in original)

Nevertheless, Jevons' analysis is weakened by not taking into account social relations, especially property relations. Fundamental questions about coal contracts, the role of TNCs, and the private appropriation of socially created rent are not considered in Jevons' analysis. What exactly are the social relations that characterise the coal industry? In particular, what property relations have been set in motion by coal at the national, sub-national, and community levels? What land rights are being created/reshaped, or destroyed? Is coal as a commons becoming more public, private, or in fact more common? What do these political economic changes say about rent and what, if any, is the state doing to capture or have a fair share of rent for the public?

These questions are important if we are to analytically look at and actually take slow growth seriously because when coal is the private property of transnational corporations, slow growth is a pipe dream. Where coal is part of a commons and ownership is vested in community, however, the tendency is not to overproduce but rather to produce for self-sufficiency and a limited amount of exchange. Otherwise, leaving the system of property relations unchanged and showing, as Jevons did, that a slowdown is needed will not bring about needed changes.

FROM THE COAL QUESTION TO THE COAL COMMONS

A reformulated 'post-development' must be about creating new social relations. Analytically, doing so will mean breaking away from both a central problem of development (patronising the south) and a key setback of post-development (the objectification of the south). It is possible to remain critical of development by forging stronger analytical bridges among various intellectual traditions such as post colonialism, political economy of development, land economics, stratification economics, institutional and Georgist economics (Van Griethuysen, 2012; Obeng-Odoom, 2015), while seeking real world social and ecological change through factual, and analytically-informed activism. Specifically, a march towards the commons can

bring about these changes. One way to bring about the commons is to regard land and all fossil as commons to be used in the satisfaction of the common rather than for profit. Currently, only 101 companies, mostly of British descent and listed on the London Stock Exchange, dominate the coal industry throughout Africa. These companies control 3.6 billion tonnes of coal valued at $216 billion (Curtis, 2016).

Those who already possess coal can be asked to give it up; not through violence but by putting a tax on coal *extraction.* Such a tax recognises that the value of coal, of land is created by labour locally and the specific value of coal is established *relatively* through pricing established by labour-production globally, through public investment, and through speculation; not anything intrinsic to coal. In that sense, the value of coal must be commoned, for example, through the capture of rent or the application of tax (see Henry George's, *Perplexed philosopher,* ([1892] 1981) Chapter 5). This is not increasing the amount of tax in the system because it also means untaxing labour.

Such a tax is just for three reasons. First, it gives to the public and to labour what it created and hence overcomes the problem of a few TNCs monopolising value which it did not create in full. Second, this tax relieves labour of exactions that are unjust and hence enables the full enjoyment of the fruits of labour. Third, it overcomes a major structural mechanism for creating and sustaining inequality: private property, the creation and private appropriation of rent. It is this same mechanism – private property in the commons – that drives pollution, speculation, and sprawl, so the Georgist attempt to transform property relations is well-considered.

The government under such a taxation regime would become much stronger and could use the rents from the resources to invest in public goods and public works. As we learn in the 'functions of government' in *Social Problems* by Henry George (1883/1966, chapter 17), rent as public resource can strengthen the capacity of the local and national authorities to invest. Empirically, international experiences analysed by Brueckner and colleagues (2014) of coming mining rents to massive afforestation programs and the nourishment of nature suggest that the proposals by Henry George are plausible and, embraced more fully to include a transformation in existing property relations, can bring about propitious socio-ecological change. Indeed, rents may support sustainability directly or may be passed on to urban authorities to investigate how best to invest in social services, public parks, gardens, and public libraries.

These public spaces can, in fact, become common spaces by switching from top-down management typified by joint rights to bottom-up management characterised by equal rights in land by recognising that people have equal rights rather than joint rights in the land. In this sense, governance becomes an act of commoning rather than a system of majorities. Everyone becomes part of managing the coal commons. The false antimonies between commons and the state collapse because the state is based on the idea of the commons: commons-based state or a state which, in the words of Henry George (1883/1966, 171), is a commons whose 'organization',

'methods' and 'functions' are 'restricted to those necessary to the common welfare, and in all its parts it should be kept as close to the people and as directly within their control as may be'. In this system of the commons, coal for energy will be scaled down and eventually taken out of the hands of transnational corporations and put in the hands of commoners or their trustees, with whom they have close relationships (cf. state systems based on joint rights in which political representatives are neither known meaningfully by citizens nor know citizens meaningfully, see George, 1883/1966, 174-15). Such measures will enable closer transparency and democracy, while better reflecting the inner desires of the commoners. Simultaneously, such commons management can strongly contribute to creating what Jevons called a 'stationary condition' of low growth: 'Our motion must be reduced to rest, and it is on this change my attention is directed. How long we may exist in a stationary condition? I, for one, should never attempt to conjecture' (p. xxxi).

What is crucial is that the state – at various levels organised as commons - plays a clear and decisive role in addressing the coal question. Reducing the national debt as Jevons argued is clearly important but it falls under the functions of government; it is one of many steps that the government can take. Jevons is correct to look at the actual extraction of coal as the problem; not the management of coal or attempt to influence the individual behaviour of people; not trying to do business as usual by appealing to sophisticated technology. But the problem is no better addressed by ignoring it or leaving coal buried. Rather, as examples around the world, including Alaska show (see Widerquist and Howard, 2012a, 2012b), by boldly confronting the interlacing issues of property regimes, analysing who currently owns what and where, who should possess new finds, and how is resulting rent accumulating and is likely to be shared will better help us to appreciate the intersections of economy, ecology, and society. Indeed, with the strong linkages between coal and growth (Motengwe and Alagidede, 2017), the proposals discussed are likely to change the nature of growth on the continent. Also, as 'On a per unit basis, coal generates roughly twice as much CO_2 as natural gas' (Africa Progress Panel, 2015, p.86), a reduction in coal extraction will also reduce existing amounts of carbon emissions.

Leaving behind the false antimonies of blessings or curses is crucial to see the grave inequalities that characterise the extractive industries globally (Peters, 2017). It is also necessary to jettison third-way solutions of alternatives based on only renewables because, in fact, the true coal question is about contesting the ideology of growth, as Jevons showed. A more defensible answer to the coal question is to focus political economic analysis on the harrowing unequal property relations that characterise extractivism, challenge neo-colonial environmentalism whose activities deflect attention away from unequal social relations and naturalise social problems, and pursue self-determination based on principles of commons and commoning.

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