

Geology & Marxism: The Anthropocene debate and Andreas Malm's "Fossil Capital" - a review

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***Fossil Capital - the rise of steam power and the roots of global warming*, by Andreas Malm. Verso 2016 at 488 pp £19.99 reviewed by Alan Thornett.**

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This book is a well researched, and well-written account, from a Marxist perspective, of the industrial revolution in Britain, the origins of fossil fuel as the principal source of energy in the industrial age and the bitter struggles and social impact involved

It is a great read for those interested in the origins of fossil capital, and the implications of this for the ecological and climate crisis we face today.

It is not uncontroversial. Andreas Malm also enters into one of the key debates on the ecological left today, the Anthropocene. This is the matter of whether (or not) the current definition of the geological epoch through which the planet is passing, the 'Holocene', should be changed to the 'Anthropocene' (or the age of humans) as a result of the impact of modern humans on its ecosystems. Also the extent to which steam power and fossil capital, as the roots of global warming, has contributed to that impact.

I take a different view on the Anthropocene to Malm, as I will explain later in this review.

Both, however, for what it tells us about the origins of fossil capitalism, and its contribution to the debate on the Anthropocene, his book deserves to be widely read amongst those who are committed to the struggle both for an end to capitalism and for a new society built on social justice and ecological sustainability.

The industrial revolution

The earlier sections (and biggest part of the book) present a highly detailed, and fascinating, account of how waterpower drove the early years of the industrial revolution, in Britain, and the economic and social consequences that arose from them.

It describes, how, by the middle of the 18th century, the dominant source of energy in the cotton mills of Lancashire, Derbyshire, and of Greenock in Scotland, was water. Abundant supplies of water with, an adequate drop, were provided by the topography and climate of the Northwest of England and the West of Scotland.

Rivers such as the Derwent, the Irwell, and the Tame, powered machines such as Hargreaves's spinning jenny, Arkwright's water frame, and Crompton's spinning mule. Water mills churned out textiles in ever-greater quantities and the factory system of production was born. Since most water mills had to be built in remote locations where the waterpower was available, the mill owners had to build housing and community structures in order to accommodate the workforce—Malm rightly calls them 'colonies'.

Waterpower was highly profitable with high levels of capital investment producing rates of profit of up to 50%. By the early part of the 19th century, however, waterpower was in trouble. It was struggling to compete with steam, despite its continued viability, and the high cost of coal.

Waterpower had many drawbacks, however, as far as the mill owners were concerned—apart from the remote locations. The rivers could freeze up or flood, and they were vulnerable to drought and water shortage. With steam the mills could be built anywhere, including inside the cities with the workforce on the doorstep, and there was plenty of coal available. There were disputes between the mill owners over the best supplies of water, particularly when it became scarce.

The book describes how great efforts were made, in engineering terms, to improve the efficiency, and availability of waterpower. Systems of reservoirs, sluices and channels were constructed to ensure that each owner could have the water they needed. Disputes, however, continued between the mill owners as one accused the other of using more water than they were entitled, or of deliberately sabotaging the production of a rival in a water grab.

With steam the mills could be built anywhere including in the cities and mill owners could be in complete control of their own power source. They would not have to supply accommodation for their labour force. Instead the slums of the big cities would provide all the labour they needed.

The revolt against steam

By the early part of the 19th century steam had become the fuel of choice of the mill owners, eclipsing water within a few years. It led to even higher rates of profitability and exploitation than water. It also led to considerably worse social conditions, and to much higher levels of industrial conflict.

The book paints a vivid picture of how the repeal of the Combination Act in 1824, and then the first major financial crash (or structural crisis as Malm describes it) of the capitalist era, led to an explosion of uprisings, strikes, and unionisation struggles in Glasgow, Manchester, and the cotton towns of Lancashire.

The book records that: "Outbreaks of popular insurrection became more frequent as the crisis took hold: first the Lancashire rising of 1826, then the Swing Riots of 1830, the South Wales rebellion of 1832-4, The Reform crisis of 1831-2, all succeeded in 1838 by the supreme challenge of Chartism, culminating in the general strike of 1842 – the most critical near-revolutionary moment in the 19th century, if not the entire modern history of Britain." (Page 62)

The book recounts in remarkable detail how, faced with tumbling profits, the mill owners in

Stalybridge and Ashton cut wages of their workforce by up to 25%: as a result thousands of workers assembled under the banner of Chartism to immobilise the steam engines by 'pulling the plugs'. It records how most mills in Manchester and Salford were closed down and how in Manchester rioters successfully entered a police station and threw furniture out of the window.

It goes on: "in Bury, insurgents drew the plugs in all the factories; according to one of the many correspondents serving the government with daily updates from the field, a mob on the outskirts of the town was also in the process of 'breaking machinery and had nearly pulled down one mill'. From Burnley word came that 'almost every mill and workshop in the town where steam is employed was in a few hours effectively stopped.'"

The fossil fuel economy

The date from which Britain became a fully fossil fuel economy—or put the other way around when it broke from renewable energy in favour of steam—Malm argues, was around 1830. The years between 1830 and 1854, he says, saw the rapid expansion of mass production from cotton and textiles to general engineering—driven by steam and fuelled by coal. By 1870 three times as much coal was used in general engineering, and in iron and steel production, than was used for domestic consumption.

By 1850 Britain emitted nearly twice as much CO₂ as the USA, Germany and Belgium combined. This opened up a new stage in the development of capitalism with a great expansion of productivity and growth—capitalism as we know it today.

The fossil fuel economy, Malm notes, liberated British capitalism from the constraints imposed upon it by all previous energy sources: water, biomass (wood), animal (horses and oxen) and human beings and opened up the road for built-in growth. He points out that by 1900 a Europe without fossil fuels would have needed 2.7 times its land surface to sustain waterpower or biomass and 20 times its land surface by 2,000.

For future generations, however, it ushered in a process that would threaten the viability of the planet itself in terms of its habitability for many of the species that currently inhabit it—via global warming and climate change.

A succession of major fossil fuel technologies quickly followed steam: electricity, the internal combustion engine—the age of the motor car and the age of air travel.

Malm explains how global warming takes place. He points out that for many thousands of years (since the last ice age) CO₂ in the atmosphere, which causes the greenhouse effect and therefore global warming, was constant at around 285 parts per million (ppm). After the establishment of the fossil economy, first in Britain and then beyond, it rose rapidly. By 2013 it had reached 400 ppm and is now rising by 2 ppm every year.

He explains that: " Given that CO₂ acts as a thermostat in regulating the temperature on earth, and given that the temperature sets the climatic conditions in which all life on earth exists, the magnitude of the rise—from 285 ppm as late as the mid-19th century to the current 400 plus—upgrades Homo sapiens into a geological agent." (Page 27)

He is certainly right about that, or at least that it is one of several factors that pitch homo sapiens in the role of such an agency.

The Anthropocene debate

Malm then enters more controversial territory, as mentioned above, by launching into an important current debate amongst environmentalists—the idea of the Anthropocene. This is the proposition—first proposed by Paul Crutzen, a climate scientist and a Nobel Prize winner, in 2000 and now supported by a growing body of scientific opinion—that the impact of the human species (*Homo sapiens*), or modern humans, on the biosphere of the planet is now so great that it defines the current geological epoch.

Advocates of the Anthropocene, which includes myself, argue that the current geological epoch—the Holocene (or interglacial period)—should be superseded by, or redefined as, the Anthropocene, or the ‘age of humans’. This would involve a change to the official geological time scale—the chart that divides the Earth’s 4.5bn year history into eons, eras, periods, epochs and ages, with each division of diminishing length and geological significance.

A more substantial explanation of the case for the Anthropocene proposition can be found in my review of *The Anthropocene and the Global Environmental Crisis* edited by Clive Hamilton, Cristophe Bonneuil, and Francois Gemenne published by the Routledge Environmental Humanities Series in 2015. [1]

The Anthropocene was first proposed by Paul Crutzen, a climate scientist and a Nobel Prize winner, in 2000. Since then scientific opinion has increasingly supported his thesis.

Malm opposes the Anthropocene, branding it ‘species thinking’. He argues that it is wrong to attribute global warming to the human species (*Homo sapiens*) as such but to a small group of capitalists within the human species. We should ‘not mistake capitalist for human beings’ he argues.

Steam engines, he argues, “were not adopted by some natural-born deputies of the human species. By the nature of the social order of things, they could only be installed by the owners of the means of production. [Emphasis original]... Is there any reason to consider it any more truly representative of ‘the human enterprise’ than the Luddites or the plug drawers or the preachers of steam demonology?” (Page 267)

He goes on: “Capitalists in a small corner of the Western world invested in steam, laying the foundations of the fossil economy; at no moment did the species vote for it either with feet or ballots, or march in mechanical unison, or exercise any sort of shared authority under its own destiny and that of the earth system. It did not figure as an actor on the historical stage.”

The Anthropocene, he says: “might be a useful concept and narrative for polar bears and amphibians and birds who want to know what species is wreaking such terrible havoc on their habitats, but, alas, they lack the capacity to scrutinize and stand up to the human actions; for those who may do so—other human beings—species thinking on climate change conduces to paralysis”. (Page 272)

It is certainly true (as Malm suggests at one point) that global warming is far too narrow a basis on which to declare the change from the Holocene to the Anthropocene. In fact it is only one part of a much wider rationale for such a change. The most compelling single factor for the Anthropocene idea, in my view, is the biodiversity crisis.

In her excellent book *The Sixth Extinction* Elizabeth Kolbert argues (along with an increasing body of opinion) that we are facing the biggest mass extinction of species (the “sixth mass extinction”) since the demise of the dinosaurs 65m years ago. She also argues strongly for a recognition of the Anthropocene and predicts an early decision on its recognition. [2]

She points out that 40% of all mammal species are currently under a short to medium term threat of extinction against a background rate of one every 700 years. Amphibians are disappearing at staggering 45,000 times the background rate. She argues that an extinction rate of this scale ultimately puts at risk all species on the planet, including, eventually, our own.

Marxism and class society

Malm argues that responsibility for the false conception of the Anthropocene, as he sees it, lies with the natural science community. The Anthropocene narrative, he argues, is: “an illogical and ultimately self-defeating foray of the natural science community—responsible for the original discovery—into the domain of human affairs.” (Page 270)

His alternative to the Anthropocene is the ‘capitalocene’, or an epoch defined by capitalism. This designation, he argues, is based on: “the geology not of mankind, but of capital accumulation.” He does not however expect to see a consensus gather behind his idea. (Page 391)

His conclusion appears to be that the Anthropocene, or any notion of assessing the environmental impact of modern humans on the planet as a species, runs counter to a class based (or Marxist) analysis of capitalist society.

But why? The Anthropocene does not imply that modern human are all equally responsible for their impact on the planet. That would be ridiculous. The human species is class divided. The rich and the powerful, and corporate interests, clearly bear the main responsibility for such impact. They are the driving force of it.

This does not, however, mean that we can ignore the overall impact of our species on the biosphere, on other species, and on the viability of the planet itself to sustain life. We ignore this at our own peril.

As I argue in my review of *The Anthropocene and the Global Environmental Crisis* modern humans are the most, successful, resourceful, and effective species the planet has produced—by a very long way—and they had a disproportionate impact on other species and their habitats from the outset.

As humans migrated out from their African homelands to other parts of the globe they eliminated most of the big land animals and flightless birds, who were defenseless against their hunting skills, on the spot—often going far beyond their immediate needs. A fifth of all species were eliminated in this way. This was the case in Australia, New Zealand Madagascar, Indonesia, the Americas and Europe.

The ecological crisis did not start with the industrial revolution—although it clearly took it to a new level.

Another factor the book fails to address adequately is the challenge that industrialisation represented (and represents) to the ecology of the planet whatever mode of production emerged in the course of it.

Capitalism is the most rapacious system of society—with its drive for growth and profit—that modern humans have produced, with the possible exception of Stalinism. But the challenge represented by the invention of the steam engine (fuelled by coal) and the internal combustion engine (fuelled by oil) and the massive expansion of production and population made possible by these inventions, and others that followed, to the ecology of the planet, whatever mode of production

took control of it, was huge.

Ecosocialism

Surprisingly the Malm also does not mention ecosocialism (or at least I have been unable to find it)—which is crucial in my view in terms of a framework, from a Marxist standpoint, for a sustainable socialist society.

It defines the kind of society that we want to build when we are in a position to build a socialist society. It is a declaration that we are looking towards a model of socialism that has not yet existed and that few are even advocating.

The absence of capitalism does not necessarily resolve the problem as Malm recognises (on page 277). The Soviet Union and its satellites were arguably even more ecologically destructive than their capitalist counterparts.

Ecosocialism is a signal that we don't want to see a socialist revolution take place under conditions where there is nothing left, where the working class inherit a scorched earth with most other species gone, where we would be struggling even to produce food because the basic biodiversity and fertile land (and water) necessary for food production no longer exist. It is a recognition that we have to put the ecological crisis at the heart of our struggle for social change.

It is a declaration of all that we recognise that socialist revolution (and the end of capitalism) will not automatically resolve the ecological crisis. That the struggle to defend the ecosystems of the planet will have to continue even after a socialist revolution has been completed, and that it will not be easy.

It is a vision of a society that is built on the idea working in harmony with nature, of being a part of nature, and not existing at the expense of nature.

The book is essential reading, including the debates it raises, for those interested in the ecological crisis, first in terms of the rise of fossil capital and also in terms of the current debates in the movement. It adds to the body of knowledge as to the origins of the fossil capitalism and to the body of knowledge we will need to bring it to an end.

Alan Thornett, February 2016

P.S.

* <http://socialistresistance.org/fossil-capital/8181>

Footnotes

[1] This can be found at here: ESSF (article 37004), [Review for ecosocialists: The Age of Anthropocene ?](#).

[2] My review of her book can be found here: ESSF (article 36128), [Book Review: Elizabeth Kolbert and the next mass extinction – On the crisis of global biodiversity](#).