

The Coal Economists

by Gabriel Lombard

In the period between 1865 and 1931, economists were already questioning coal and the exploitation of “exhaustible” energies. Can their analyses shed light on the current environmental crisis?

Reviewed: Antoine Missemmer, *Les Économistes et la fin des énergies fossiles (1865-1931)*, Classiques Garnier, “Bibliothèque de l’économiste” series, 2017, 225 pp., €28.

England, 1865: a century and a half after the first steam engines came into use, the British empire was at the height of its political and commercial power. Right in the middle of the capitalist party, a discordant voice spoke up. In *The Coal Question, An Inquiry Concerning the Progress of the Nation, and the Probable Exhaustion of our Coal-Mines*, the young economist and logician William Stanley Jevons drew attention to the Victorian economy’s dependence on coal, the limits of the national reserves and the decline in influence that would inevitably follow any price increase. The book—quoted by John Stuart Mill in the House of Commons and noted by Chancellor Gladstone, who set up a royal commission on the matter—sparked an unprecedented debate on the country’s future energy needs.

In his new book *Les Économistes et la fin des énergies fossiles*, Antoine Missemmer (<https://journals.openedition.org/lectures/11540>), a researcher at the Centre International de Recherche sur l’Environnement et le Développement (CIRED) and author of a book on Nicholas Georgescu-Roegen, delivers the fruit of his ambitious PhD thesis that lends historical depth to the contemporary debate on fossil fuels. As he states in the introduction:

At the turn of the 20th century, it was not peak oil but peak coal that occupied everyone's minds. This mining period has shaped economists' representations and modes of reasoning on the issue of energy to the present day (p.11).

Missemer sets out to retrace the main discourses on coal, from Jevons' *The Coal Question* to the article by American economist Harold Hotelling entitled "The Economics of Exhaustible Resources", published in 1931 and still used as a reference today in the economics of non-renewable resources.

A Perilous Dependence

Concerned with "the history of facts" (p. 15) as he explains in the introduction, Antoine Missemer highlights the system of "interconnectedness and interdependence" that hinged the fate of Victorian England on coal (pp. 26, 51-60). Once its extraction had been made easier by steam engines, which served primarily to pump water out of the mines, coal was not only used to provide heat and light; it also became vital for the development of the metal industries and "all sectors likely to use engines". Its very exploitation was circular, requiring ever-increasing numbers of engines as well as rail and maritime networks that consumed huge amounts of coal. Between 1775 and 1865, British production rose from 8.9 to 102.3 million tons, following a trend that continued until the First World War.

In *The Coal Question*, Jevons built on the work of Irish geologist Edward Hull, who several years earlier had published a history of British mines. Jevons, however, reasoned like an economist: the material question of the amount of coal present in the ground was of less concern to him than "the problem of cost and profitability" (p. 39) posed by the increasingly difficult task of mining a lower-quality ore.

This was the primary meaning behind Jevons' warning over the "exhaustion" of coal mines, a term that reoccurs in the subtitle of *The Coal Question* and which, even today, can cause confusion when interpreted in literal and physical terms. The long-term profitability of mines was an emerging issue at the time, but Jevons skilfully transposed these sectoral expectations into the realm of industrial reality. In this sense, Missemer's description of an "emancipation of economic discourse" (p. 42) from geological discourse is accurate. The commercial, demographic and social issues linked to a probable price increase became a key part of Jevons' essay.

The author offers an additional interpretative hypothesis in order to highlight the contribution made by *The Coal Question*: Jevons also freed economics from the grip of engineers' optimistic discourse (p. 42 sq.). Given that the improvements made to steam engines were permanent, the expectation was that they would delay the exhaustion of coal supplies. However, he had turned the problem on its head and overlooked the phenomenon known today as the "Jevon's paradox" or "rebound effect". As Jevons explained, most of England's industrial, commercial and demographic development was precisely linked to these economies through coal use. The profit generated by more efficient processes attracted new capital and encouraged an increasing variety of uses of coal, which overcompensated gains made in efficiency; furthermore, innovations made to the steam engine spread throughout all the interdependent sectors driven by growing demand. Thanks to Jevons, therefore, for the first time "technological progress was seen as part of the problem of exhaustion, not as a solution" (p. 42).

Appeasement and rationalisation

Missemer studies the reception and development of these energy debates, primarily within the American conservationist movement. The iconic representative of the movement, Gifford Pinchot, chief of the United States Forest Service under President Roosevelt (1901-1909), believed in long-term management of resources without, however, making sacrifices on behalf of future generations. As Missemer explains, a major change of atmosphere later followed when the discovery of new coal reserves around the world and the growing exploitation of American oil pushed fears over the end of fossil fuels into the background. Declinist and pre-ecologist attitudes in England and the United States respectively, which had characterized mining discourse before the First World War, gave way to a far more relaxed economic rationality with regard to the future.

Missemer details the way in which rent theory, which had emerged out of new reflections on agriculture, was adapted to the new subject of non-renewable resources by authors such as Alfred Marshall, John Bates Clark and even Luigi Einaudi, the future president of Italy. He considers Hotelling's article to be the culmination of a long discussion of financial arbitrage between an immediate sale and a future sale at a higher price. The American Lewis C. Gray was one of the first to take the interest rate into account when considering mine owners' reasoning. Hotelling incorporated this

rule (which, in mathematical terms, is known as “Hotelling’s law”) but took it further. First of all, by clearly articulating its subject—exhaustible resources—and, above all, by offering a modelling of the different exploitation scenarios: monopoly, duopoly, competition, variable levels of state intervention, etc. His conclusion was that competition maximized what he called “social value”, in other words production at the lowest cost. In doing so, he set himself apart from the conservationist movement that advocated state control over mines as a way of slowing the exploitation of precious resources. In contrast, Hotelling believed that monopoly merely drove up prices at the consumer’s expense.

A Problematic Set-Up

There is a certain continuity between Jevons, who concluded his study with a reference to the “momentous choice” that England faced between “brief greatness and longer continued mediocrity”¹, and Hotelling, who established a mathematical concept for arbitrage from the perspective of the individual mine owner. While both believed in the temporal optimisation of a resource, it is the differences in context and conceptualisation between the two that are most striking, rather than their vaguely similar reasoning. From this point of view, the account put forward by Missemer at times seems too homogeneous, and confined by questionable limits.

This is particularly true when the author asserts the foundational nature of *The Coal Question* in the “automatisation” (pp. 12, 43, 47, etc.) of economic discourse on coal. Economics historians acknowledge Jevons as one of the fathers of mathematical economics. But should he also be hailed as having “signed the fossil fuel economy’s birth certificate” (p. 12)? As several researchers have highlighted, the link between his mathematical work and his book on coal is tenuous.² If we take a look at specialists on resources and energy, we find that the statistician Hotelling never cited Jevons, and that within the much later specialised field of energy economics Jevons has little presence and is rarely studied. Even Leonard Brookes, who put the rebound effect into context in the 1980s, only made vague reference to him, since modern economists tend to be naturally disinclined to analyse such out-dated texts³. Modern energy textbooks

¹ Jevons 1866, p. 376 (bottom lines).

² Antonin Pottier underlines this in a recent thesis that makes a very useful and enlightening contribution, in French, on the same themes: see Pottier 2014, pp. 108 and 111-112.

³ Brookes 1990.

usually retain Jevons' (somewhat inflated) prediction concerning the exhaustion of coal mines and the rebound effect in its modern interpretation.

What Breaks?

Similarly, Missemer strives to highlight the "trajectory" in which Hotelling supposedly constituted the "final realisation" (pp. 49, 129). The intellectual adventure "journeying towards Hotelling" at times seems too good to be true. In this account, where are the discontinuities and paradigm shifts? These are inevitable over the course of more than 70 years of intellectual history, and are a priori equally as relevant as the continuities.

The story put forward by Missemer seems to develop along two main trends rather than through any clean breaks. The first is the narrowing, from a Jevons-style "macroscopic" problematic towards a "microscopic" approach (pp. 15, 171). Indeed, this observation is hard to overlook. As Missemer notes, in Hotelling's essay "resources" are replaced by the term "assets" (p. 167). The strictly energy-centred part of the problem—that is, the way in which a resource impacts the economy as a whole, and even a society's fate—has almost entirely disappeared. The social and indeed moral concerns expressed in Jevons' text,⁴ as well as the conservationist debates, have given way to a shrewd calculation of profit maximisation. Missemer at times appears to condemn this development, as when he rightly criticises the "illusion of a macrosocial concern" in Hotelling (p. 173), or more generally the "reductionism" of mathematical economists (p. 90, 174). It is nevertheless regrettable that this transition is not analysed in greater detail.⁵

The second historical trend is that of a *growing increase in scientificity and objectivity*: economics was gradually becoming an "autonomous field" (p. 15). In Missemer's book, its history sometimes boils down to a series of "intellectual operations" (p. 149) or even "reconstructions" (p. 119) disconnected from "the history

⁴ The prospect of the inevitability of rising coal prices raises "moral and political" questions of "almost religious" importance, writes Jevons in his preface (1866, p. 14). For the social dimensions of Jevons' thought, see Sekerle and Sigot 2013.

⁵ On this question, the work of Margaret Schabas is particularly useful on the "denaturalisation" of economics, that is, the gradual detachment of economic thought from its material foundation. Schabas is also the author of a monograph on Jevons.

of facts” whose importance the author stated at the beginning. And yet this intellectualist approach is questionable, if only because it tends to shrug off the inevitably normative dimension of economic discourse. For example, how can it be asserted that Hotelling “freed economic discourse from ethical discourse” (p. 166) when a note on the very same page acknowledges that the model was a vehicle for the “utilitarian” prejudices of his approach?

What Are the Contemporary Issues at Stake?

In his conclusion, the author expresses surprise: “It is clear that [the fossil fuels described by Hotelling] in fact have little in common with their counterparts from the 1860s” (p. 174, see also pp. 177, 121). It is regrettable that this remark did not serve as a guideline for the book, enabling the author to show how discourses on coal evolve in line with the technological, social and ideological context in which they arise.

This idea also holds true for the contemporary era. The title given to the book suggests that we have not yet witnessed “the end of fossil fuels”, which our planet still provides in large quantities and at relatively low cost. The author recalls that Jevons’ dark prophecies have been proven wrong and argues that modern-day “Cassandras” “may also be misguided” with regard to the energy shortage (p. 179).

However, are the terms of this problem not different nowadays? Coal for us is not just an exhaustible energy supply. It has become a deadly source of fine-particle pollution causing geopolitical destabilisation and even “climate wars” over the long term. The question is not knowing how quickly to exploit it but, rather, whether we even want to do so, particularly at the risk of exacerbating global climate change. In other words, it is questionable that 21st-century economics should build on the mathematical refinement of a Hotelling-style management model when it would be better to invent tools that reconcile our legitimate desire for well-being with environmental requirements—for example by countering the rebound effect. From this point of view, Missemer’s book, despite providing a much-needed and detailed perspective on a little-known area of intellectual history, pays the price for an economism that leaves the reader somewhat disarmed.

Further reading

- Brookes, L., “The Greenhouse Effect: The Fallacies in the Energy Efficiency Solution”, *Energy Policy*, 18(2), 1990, pp. 199-201.
- Illich Ivan, “L’énergie, un objet social”, *Esprit*, 8, 2010, pp. 211-227.
- Jevons, W. Stanley, *The Coal Question. An Enquiry Concerning the Progress of the Nation, and the Probable Exhaustion of our Coal-Mines*, Macmillan, 1866.
- Madureira, Nuno Luis, “The Anxiety of Abundance: William Stanley Jevons and Coal Scarcity in the Nineteenth Century”, *Environment and History*, 18/3, 2012, pp. 395-421.
- Pottier Antonin, *L’économie dans l’impasse climatique : développement matériel, théorie immatérielle et utopie auto-stabilisatrice*, EHESS, 2014.
- Schabas, Margaret, *The Natural Origins of Economics*, University of Chicago Press, 2009.
- Schabas, Margaret, *A World Ruled By Number: William Stanley Jevons and the Rise Of Mathematical Economics*, Princeton University Press, 2014.
- Sekerle Richiardi Pelin and Sigot Nathalie, “William Stanley Jevons et la ‘réforme sociale’ : une théorie du bien-être sans postérité”, *Cahiers d’économie politique/ Papers in Political Economy*, 64, 2013, pp. 221-251.

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