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Energy, property, and the industrial revolution narrative

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ABSTRACT

The Industrial Revolution (IR) story is the core of a mainstream economic history narrative of energy/development relationships, celebrating Modern Economic Growth (MEG) as the increase in per capita energy consumption in the last two centuries. Such a narrative emphasizes mineral technology and private property as the key elements of growth processes. I will criticize the above narrative, from a socio-environmental history perspective, for its inability to account for two crucial aspects of energy history: 1. the role of social power as key determinant in how energy sources are used and to what ends; 2. the socio-ecological costs associated with the increase of energy consumption. I will then review Environmental History studies on energy/industrialization and highlight possible future developments in the field. The article makes a strong point for the need to look at energy transitions as social processes, and to include the unequal distribution of environmental, health, and social costs of mineral energy into global history narratives.

1. Introduction

Although its historiography dates back more than a century, there is still something hidden within (and more often by) the narrative of the Industrial Revolution (IR). One of the most powerful cross-field narratives concerning the 'rise of the western world' and its techno-economic supremacy, the story of the IR is the core of a broader progressive narrative about the relations between energy patterns and Modern Economic Growth (MEG), including a number of implications about society/nature and north/south relationships. This narrative identifies modernity with an unprecedented increase in energy consumption, considered an undisputable accomplishment of European culture on behalf of humanity. Originating at the very 'energy mystique' that Watt's steam engine produced among contemporary observers (Greenberg, 1990), this idea informed a series of studies in Economic History published during the post-war and pre-energy crisis period, that have educated generations of students, shaping common perceptions of economic development in the industrial era.

In what follows, I will offer a critique of this mainstream MEG narrative, and some insights on how Environmental History has dealt with energy and the IR. My analysis is informed by the long-standing concern of Environmental History with the political meaning/use of historical narratives (Cronon, 1992; Hughes, 1995; Merchant, 2004; Redclift, 1995; Dovers, 2000). Though pointing to some faulties of the mainstream story of the IR, my critique is mostly concerned with what is missing from that narrative — that is, with the way in which it systematically silences environmental and social costs and the global inequalities incorporated into current energy regimes.

1.1. Stealing Fire from the Gods: Energy and Property in Modern Economic Growth Narratives

The invention of the IR as a subject of historical investigation is generally attributed to Arnold Toynbee, who, writing at the end of the 19th century, based on two building blocks: classical political economy (the division of labor, in particular) and steam technology (Toynbee, 1960 [1884]). The two have been brought together in a variety of different narratives ever since: among them, those produced in the 1960s have been particularly relevant to the formation of common perceptions about 'modern growth' as a western pattern of development, based on techno-institutional superiority and the mastering of inanimate power (Deane, 1965). A landmark in the field, recently republished, D. Landes 2003 (1969) *The Unbound Prometheus* for example, launched a definition of the IR as the final victory of humanity (represented by the male hero who stole fire from the gods) from the constraints of 'natural' conditions, thanks to new technologies and social values (Landes, 2003 (1969)).

Such progressive mainstream story of industrialization rests upon a series of more or less implicit assumptions about society/nature and north/south relationships. In one of the most widely read histories of technology, for example, economic historian Joel Mokyr states that 'techniques (…) are analogues of species' so that 'changes in them have an evolutionary character'; the author even categorizes the idea of how to produce a commodity as the genotype and the actual technique utilized by the firm in producing it as the phenotype (Mokyr, 1990, 275 ff). The resort to biology comes after about 300 pages in which the book seeks to

Abbreviations: MEG, Modern Economic Growth; IR, Industrial Revolution; EH, Environmental History.

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explain 'the difference between rich nations and poor nations', establishing that the ability of rich nations 'to control and manipulate nature and people for productive ends is superior' (ib. 3). No consideration is given to the relationships between individuals and social groups, geographic areas and 'nations', nor between any of them and the pieces of nature that they are manipulating (or are failing to manipulate) for superior ends. Progress, says the author, is the equivalent of a free lunch gained by exceptionally smart people. The possibility that free lunches might be stolen from someone else's table is not considered in the book.

Mostly, economic history studies on energy draw on Fred Cottrell's and Carlo Cipolla's seminal works (Cottrell, 2009 [1955]; Cipolla, 1962), which examined the whole human history with a few tracts of calculation, depicting shifts in energy-use patterns. Cipolla's view of the IR as 'the process by which a society acquired control over vast sources of inanimate energy', in particular, was enormously influential on more than a generation of scholars (Cipolla, 1973; Mathias, 2003). Conversely, the idea that change in energy systems is influenced by power relationships in society — as stated by Marc Bloch (1967) — has been mostly ignored in mainstream narratives of energy and industrialization.

Overall, among the many aspects of the IR, energy has been probably the *least* debated among historians. A general consensus has been reached that the essence of the IR consists in the fact that, as Pat Hudson wrote, 'no previous society had been able to escape the *barriers* which pre-industrial technology and culture placed on production' (Hudson, 1992, 2–3, emphasis added). Wide consensus exists among economic historians that, like the French Revolution, so the Industrial was a process of *liberation*: it was followed by dramatic change and suffering, but it was nonetheless necessary and positive, since it allowed the freeing of human potential from constraints both 'natural' (the solar energy flow) and 'un-natural' (the moral economy), finally allowing unlimited growth. By emphasizing this liberation of humanity by the means of a new energy system, the narrative of the IR necessarily comes to consider Capitalism as its hero (=Prometheus).

Technological and institutional ingenuity are universally treated in economic history textbooks as the two interrelated keys to the 'rise of the West' in the modern era. According to MEG narratives, in fact, the foundational moment of a development process is the individual appropriation of land, and/or other natural resources (water, oil, etc.), their 'liberation' from a previous state of un-certainty of property rights, implying their over- or under-exploitation, and their 'improvement' by technical innovation; the reference is generally to the experience of the English enclosures between the 17th and 18th centuries, celebrated in a consolidated historiography as the necessary prelude to the IR. Probably the most influential example of this line of explanation in the last decades has been that elaborated by Nobel Prize winner (in Economics) Douglass North and Robert Thomas in their theorization of the 'rise of the western world' (North and Thomas, 1973). Building on economist Harold Demsetz's view of the relations between property and economic development (Demsetz, 1967; Alchian and Demsetz, 1973), the authors defined modern growth as the 'break of the Malthusian trap', and ascribed it to institutional changes 'which by incentive *direct* man's efforts towards technological change and sustained productivity growth' (North and Thomas, 1994, 4). The use of the present tense ('direct') shows how the intent of the authors was not to give a historical explanation for the English IR, but rather to build a universal model of economic development capable of explaining how the latter 'occurs' in abstract terms. This is consonant with the tendency of Economic History as a discipline to consider itself as a branch of Economics, so gaining a more 'scientific' stature. As a result, the two causal explanations of modern growth — the emergence of private property and the energy shift — have mutually reinforced each other, producing a unified and powerful narrative of techno-institutional supremacy as the main cause of economic growth in northern countries.

Probably the best example of this progressive vision of energy/society relationships through time is E.A. Wrigley's account of the IR (Wrigley, 1988), in which mineral energy and private property institutions are systematically linked to each other as the fundamentals of capitalism. Acknowledged as a leading study on the IR from an energy-and-material flows perspective, Wrigley's work was informed by fairly optimistic (and implicitly anti-ecological) visions of future energy/economy relationships. Most of all, in fact, the book represented the shift to the mineral regime as a totally positive and costless process which allowed the liberation of 'humanity' from the limits of renewable energy flows, initiating a virtually limitless economic growth. The book incessantly highlighted how the non mineral — which he called the 'organic' — economy was 'necessarily severely inhibited by its energy budget' (5), and how this was the main difference between the old and the new energy regime.

In his zeal to highlight the conquest of mineral energy, Wrigley did not consider fossil fuels as limited resources, subject to diminishing returns. He completely overlooked the question of the time span in which the economic process is considered. And yet — like many other economic narratives before and after — this study had profound implications in terms of speculations about the present and future relationships between economy and ecology, and between rich and poor countries. As the author himself stated in the Introduction, the book aimed to highlight the events 'that brought into being a world (…) that no longer follows the rhythms of the sun and the seasons; a world in which the fortunes of man depend largely upon how he himself regulates the economy and not upon the vagaries of weather and harvest; a world in which poverty has become an optional state rather than a reflection of the necessary limitations of human productive powers; a world increasingly free from major natural disasters, but in which human folly can mean utter and total destruction' (6). The book is thus posited within a discursive framework which: 1) considers nature as a pure obstacle to human life and technology as an absolute good; 2) sees poverty as invariably the product of human will (not of ecological or power relationships); 3) inexplicably erases disasters — either naturally or socially produced — from the sphere of experience of modern humanity (and so doing obliterates most socio-ecological concerns with one coup); and 4) attributes the eventuality of total destruction to human folly, that is an unpredictable but also unlikely factor, and not to structural characteristics of the modern world economy. This is a consequential logic for a book which devotes no attention to the social costs related to MEG in any form, and which represents the contemporary world economy as the fortunate result of a major energy shift occurred two centuries ago, whose heredity modern humanity cannot refuse, only acknowledge. In fact, the book's purpose is to help the reader in finding answers on the causes of the IR, all converging towards one particular explanation: mineral energy.

Not only did Wrigley's narrative overlook the problem of the future exhaustion of mineral sources, but, even more importantly, it lacked any account for social and environmental costs, either past, present or future. The clearest example is the way in which the author applied the same positive vision to the agricultural sector: he claimed that the industrialization of agriculture not only postponed the logic of diminishing returns, but invalidated it completely. Wrigley paid no attention to energy efficiency, either in agriculture or in the economic system in general — not to mention the many other costs of fossil-fuelled agriculture, from soil exhaustion and pesticide contamination to dependence on expensive industrial inputs and the need for subsidies on the part of governments.

Despite forming a substantial portion of the history of industrial societies, neither atmospheric pollution, local and global, nor living and working conditions in the coalfields and factories, nor ill-health and environmental degradation related to the extraction of mineral resources preoccupied the author, who completely omitted such aspects from his account of the English IR. As such, the book offers a notable example of the MEG paradigm: in such interpretation of energy/economy relationships, history is narrated as the ability of