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Berkeley Undergraduate Journal

Title

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Permalink

<https://escholarship.org/uc/item/261884mq>

Journal

Berkeley Undergraduate Journal, 24(2)

ISSN

1099-5331

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Publication Date

2011

Peer reviewed|Undergraduate

The Use of English Coal in the Netherlands in the 17th and 18th Centuries

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August 22, 2011

What fuels history? Is it great leaders, wars, and political dealings, or can the course of human events be fundamentally shaped by something as simple as whether one thing or another is burned as a source of heat?

Hi. My name is Gregory Swain; I'm an undergraduate in the history department, and my mentor is Professor Jan de Vries. The title of this paper is "The Use of English Coal in the Netherlands in the Seventeenth and Eighteenth Centuries."

From our perspective looking back through time, in the seventeenth century the Netherlands seem to have been on the brink of an industrial revolution. The *Republiek der Zeven Verenigde Nederlanden* (also known as the Dutch Republic or the United Provinces) was one of the wealthiest and, in social, political, and economic terms, one of the most modern countries in Europe, with high urbanization, relatively high levels of social mobility, "rational" legal and political institutions, and a market-based economy [18, p. 217, 222–223]. The Dutch had a well-developed patent system [9, p. 404], a ground-breaking central bank [12; 9, p. 225], and had developed labor-saving, cost-reducing, and production-centralizing technologies such as wind-driven sawmills, paper mills, and other facilities [9, p. 270–271; 5, p. 93]. Yet despite Dutch society exhibiting trends and features traditionally linked with industrialization, the economic growth of the Golden Century stagnated, and by the end of the eighteenth century England, not the Netherlands, had become the first country to truly industrialize. Why was this so? The answer may be involved with the use, or lack thereof, of coal as a fuel in the seventeenth-century Netherlands.

My thesis research aims to look at the Anglo-Dutch coal trade and the use of different fuels in the Netherlands in the early modern period, particularly looking at the impact of English laws regarding the exportation of coal on the use of coal in the Netherlands. Although my research is still in progress, in this presentation I will argue that English coal was an important source of fuel in the Netherlands, beginning in the Dutch Golden Age of the 17th century and continuing into the 18th century and beyond, with large impacts on the industrial development of the Netherlands and on Anglo-Dutch relations. In

order to do this, I will expand on 3 main points, (1) that there is a historiographic debate over the amount of coal used in the Netherlands in the early modern period and its importance to the economy, (2) that coal was in fact important to the Dutch economy, particularly for urban, industrial uses, and that it became a more and more important fuel as time went on, and (3) that England was the main, though by no means only, source of coal for the Netherlands and that the English attempted to control that supply of coal.

In investigating early modern Dutch coal use and importation, I have thus far relied on secondary sources, i.e., the writings of various economic historians, this being due to a lack of both the time and the linguistic ability needed to investigate primary records from the period and the inaccessible and fragmented nature of such records. Many historians have investigated historical coal use in the Netherlands and the export of English coal, although to my knowledge and in my opinion, only Richard Unger and J. U. Nef have attempted to unite the two topics in a meaningful way. These various estimates and analyses of Dutch coal use are drawn from multiple sources of data, including private institutional records, Dutch tax data, and British customs records, as well as qualitative records such as laws, contemporary descriptions of the coal trade and petitions regarding the use of coal. The strengths and weaknesses of these various sources of data are directly tied into the historiographic debate over coal use in the Netherlands.

My investigation of the effects of English laws on the importation and use of coal in the early modern Netherlands takes as a starting point the basic assumptions of cliometrics, which is to say that it assumes that looking at history, especially economic history, quantitatively can give insights into historical situations and historical trends, although my research also makes use of qualitative descriptions. Although I have not yet begun this level of analysis, the implications of Dutch coal use and of English efforts to control the coal trade can be looked at through the frameworks of Fernand Braudel's center/periphery theory and Immanuel Wallerstein's world-systems theory, which, to simplify, would involve examining how the coal trade, and restrictions on it, affected the center of economic power and the roles of England, the Netherlands, and other nations and regions in relation to each other [17, 3].

Beyond future methods of analysis, my work rests on an assumption of the historical importance of coal, which is in turn mostly based on the ideas of E.A. Wrigley, who, in his recent book, *Energy and the English Industrial Revolution*, proposed that the massive increases in production of the Industrial Revolution were fundamentally made possible by the use of coal, as while almost all previous sources of energy (whether food for animal or human labor or wood to be burnt) had been based on solar energy and limited by photosynthetic inefficiencies, the energy available from coal was effectively unlimited [18, p. 13-17, 21].

The Dutch Republic during this time period was involved in a number of energy-intensive industries, such as beer brewing, sugar refining, and brick making, and thus had a high demand for fuel [4, p. 202-206; 5, p. 93, 165-166]. Although the Netherlands had almost no coal deposits, imported coal was available both from Britain, by far the coal-mining capital of the world in the early mod-

ern period, and from continental sources such as the prince-bishopric of Liège. The possibility of using English coal is particularly interesting, as coal mined in north-eastern England was transported by sea to London and elsewhere in England, and thus would conceivably have been almost just as easy to transport across the North Sea to the Netherlands instead. If England did in fact supply large amounts of coal to the Netherlands, it also stands to reason that English laws regarding coal export might have greatly affected the sources, availability, and price of coal in the Netherlands.



Fig. 1: Map of the relevant area (credit: the Author).

Of course, other factors could have been involved in the Dutch importation and use of coal. Perhaps the advantage of coal over peat (partially decayed plant matter dug from bogs, the traditional fuel of the largely tree-less Netherlands) was not as great as has been thought [7; 9, p. 102; 14, p. 225–226], perhaps the costs of converting infrastructure to use coal had significant impacts [8, p. 206; 2, p. 88–89; 18, p. 215–223], or perhaps demand for fuel was low due to economic factors beyond the availability of coal, however legally restricted or unrestricted [6, p. 710, 719–720]. Nevertheless, with England as the primary producer of coal in the early modern period and the United Provinces as a nearby large urban and industrial market, the hypothesis that artificial restrictions on the coal supply could have had large effects seems plausible.

To examine the effect of English laws on the Dutch coal supply, it first must be proven that significant amounts of coal were, in fact, used in the Dutch Republic. While I believe that this can be proven to have been the case, historians have disagreed on the subject. My project at this stage is as much a historiography of these different views on Dutch coal use and the Anglo-Dutch coal trade as a history of those subjects, and a summary of the different views is an important step in understanding the use of coal and its implications.

Nicolaas Posthumus, in his 1964 collection of Dutch historical price data, was unable to locate enough data to create an aggregate index of retail coal prices, as he did with most other consumer items. Furthermore, in his collection of financial records from various charitable and public institutions, there is only one rather patchy series of coal prices [11, p. 503], and he concluded that “There are a few scattered prices, which points to a comparative dearth of this commodity” [11, p. 556].

The view that coal was not used much in the Netherlands was supported more recently by Robert Allen, who in the book *The British Industrial Revolution in Global Perspective* presented data demonstrating that, depending on the measurement used, during the 17th and 18th centuries peat and/or wood in Amsterdam were cheaper than coal in London, or at least of a comparable price [2, p. 99–101], and in another article commented that while coal could have been sold in Amsterdam for the same price as in London, “that was too expensive to induce consumers to switch to a dirtier fuel” [2, p. 476].

	1500	1550	1600	1650	1700	1750	1800
London, coal	1.57	2.67	3.26	5.00	5.26	6.47	8.16
London, charcoal	1.86	4.36	6.25	14.83	14.90	16.36	18.04
Amsterdam, peat	1.81	2.64	4.48	4.47	4.88	6.39	11.61
Amsterdam, wood			2.92	4.05	4.24	5.44	8.91
Amsterdam, coal							7.52

Fig. 2: Average cost of energy (in grams of silver per million BTUs, for half-century beginning in given year). [1, p. 99]

	1500	1550	1600	1650	1700	1750	1800
London, coal	3.36	3.08	2.63	3.56	3.93	3.96	3.84
London, charcoal	4.14	5.91	5.08	10.21	11.15	10.08	
Amsterdam, peat	4.04	3.01	4.09	3.70	4.21	4.87	7.08
Amsterdam, wood			2.55	3.39	3.57	4.23	5.67
Amsterdam, coal							4.57

Fig. 3: Average real price of energy (for half-century beginning in given year). [1, p. 101]

This issue of coal being an inferior fuel compared to peat or wood does have some truth to it, as although coal is a far more concentrated fuel [14, p. 225–226, 246], burning coal is a dirtier process, and laws were passed in the Netherlands in the 16th and 17th centuries attempting to ban, minimize, or regulate coal use, specifically mentioning the odors and soot [14, p. 332–335; 15, p. 329]. Coal also produces sulfurous gases that made it difficult to use in baking, brick-making, metal-work, and a number of other industries, at least until technological improvements were made [10, p. 215–223].

Another argument against the economically significant use of coal in the Netherlands comes from J. W. de Zeeuw, who points out (as other authors have done) [4, p. 68, 106, 202–206; 5, p. 93, 165–166] the vast scale of Dutch peat deposits, and the fact that peat continued to play a large role in the energy supply of the country up through the middle of the 19th century, which leads him to conclude that “Quantities are unknown, but coal consumption could not have been very important,” and that “between 1600 and 1700 the contribution of coal must have been negligible except perhaps for some special situations” [7, p. 15].

However, despite Posthumus’s lack of data, de Zeeuw’s emphasis on the widespread and enduring nature of peat, and Allen’s evidence of coal’s relatively high cost, there is evidence that significant amounts of coal were used in the Dutch Republic. In two articles published in 1981 and 1984, Richard Unger claimed that the use of coal in the Dutch Republic had been traditionally underestimated, and the use of peat overestimated [14, p. 221–222]. He points out that coal was used alongside peat in Holland long before the golden century, with coal coming in down the Maas River from Liège as early as the 13th century and being shipped in from the English port of Newcastle in the 14th [13, p. 6–7]. Unger particularly emphasizes that while peat was the traditional and preferred fuel for home heating (unlike in England, where coal had since the mid-16th century become widespread as a fuel for home heating) [18], in the Netherlands coal was used exclusively in urban areas (as evidenced by the general lack of records of its being sold outside of the urban areas of Rotterdam and Amsterdam), and mostly for industrial processes [14, p. 222]. Evidence for coal’s industrial uses comes from repeated petitions from various heat-intensive industries, particularly sugar refineries, asking for the relaxation of laws restricting the use of coal in favor of peat [6, p. 329]. Ad van der Woude has, using tax data, demonstrated that, at least in Holland (the most populous and urbanized province of the Dutch Republic), industrial uses accounted for around 80% of all heating energy used and domestic heating only around 20% [15, p. 456–457]. If coal accounted for even part of this, its importance to the economy can hardly be understated, although it is hard to determine from records exactly what percentage of fuel supplies was in the form of coal, as peat and coal were taxed identically, as inter-changeable alternatives, throughout the 17th and 18th centuries [15, p. 455]. Van der Woude points out that this large but geographically concentrated and purpose-specific use of coal would not have been sufficiently represented in the records relied upon by Posthumus, particularly in the records of the Amsterdam stock exchange and records of heating fuel for charitable institutions [15, p. 455–456].

According to Unger’s data, by the late 17th century, over 20,000 tons was the typical volume of coal sent to Amsterdam from Newcastle and Sunderland alone (Newcastle and Sunderland being the two main English coal ports), and in 1680, up to 15,000 tons of British coal were imported into Rotterdam. (Unger further logically notes that “the total of coal imports from all England to the entire Dutch Republic must have been higher” [14, p. 239–240]) Dutch records are sporadic from the 17th century and early 18th century, largely due to the tax

issue I just mentioned, but English customs records from the 18th century show steadily increasing amounts of coal being shipped to Holland, around 25,000 tons in the 1710s and 35,000 tons in the 1730s [10, p. 385–386; 14, p. 42].

Year (Dec. 25- Dec. 25)	Total of All Exports	Tonsto Holland	Percent to Holland
1710/11	66,176	27,296	41
1711/12	66,907	24,117	37
1712/13	79,225	24,013	30
X	X	X	X
1728/29	124,127	31,663	26
1729/30	87,060	34,613	40
1730/31	123,197	34,280	28
1731/32	128,917	37,925	29
1732/33	125,018	33,214	27
1733/34	133,244	35,243	27

Fig. 4: English coal exports (tons). [14, p. 242]

By the later 18th century, Dutch port records show that the Netherlands were consistently importing well over 120,000 tons of coal per year [14, p. 239–240]. The vast majority of this coal—over 90% in the later 18th century—was British [14, p. 239–240].

Year	From Overseas	From Germany	From Brabant	Percent from overseas
1784	106,740	6,806	4,067	90.8
1785	109,706	10,101	3,462	99
1786	99,492	9,070	2,715	89.4
1787	111,432	9,063	1,695	91.2
1788	105,757	5,652	2,640	92.7
1789	109,247	11,601	3,059	88.2
1790	115,735	9,891	3,368	89.7
1791	123,800	8,705	3,616	90.9
1792	125,449	7,985	4,787	90.8
1793	131,930	9,039	3,836	91.1

Fig. 5: Rotterdam coal imports (tons). Note that twenty to thirty thousand tons were also imported in Amsterdam. Also note that I have assumed all overseas imports to be of British origin. Based on [14, p. 240].

These British customs records of course do not include the significant amounts of coal that officials complained of being shipped out of the country without the required export taxes paid (more on that in just a moment) through bribery, under-reporting of cargo sizes, and other means [10, p. 236–237].

The English and Dutch states of the 17th and 18th centuries were quite conscious of their nations' status as commercial and industrial rivals (and indeed fought multiple wars, whose effects on the coal trade I hope to investigate in the

future). They were also aware of the importance of heating fuel to standards of living, to various industries, and to national wealth and power, and so English law of the time explicitly aimed to reserve coal supplies for domestic use [10, p. 260, 211–218]. Over the course of the 17th century, tariffs on exporting coal were steadily raised, to the extent that by mid-century the duties were more than the cost of coal. Furthermore, after the passage of the Navigation Acts in 1660, rates were made much higher for export in foreign ships rather than English ones, and foreign shippers were eventually effectively shut out of the trade [14, p. 243; 10, p. 218–223]. Dutch customers for a time evaded these restrictions by turning to Scotland for their coal, but the smaller, less-well-organized, and more archaic Scottish mines never provided a huge supply of coal to the Netherlands, providing less than both continental sources and especially England, and following the 1707 Act of Union and the unification of the English and Scottish customs, the same laws applied there as well [14, p. 244–246]. English coal remained an important source of energy for the Netherlands, English attempts to stop this notwithstanding. When, in 1816, after the formation of the Kingdom of the Netherlands and various political upheavals, the importation of British coal was blocked by Dutch tariffs, the price of coal in the Netherlands sky-rocketed [16, p. 208].

More research is needed to examine trends in the supply of English coal to the Netherlands and the impact of English regulations on total amounts of coal imported. I believe it is clear that, despite claims to the contrary, English coal was and remained an important source of energy in the Netherlands throughout the early modern period. Still, it's interesting to consider whether restrictions and tariffs on the supply of English coal to the Netherlands might have had more subtle limiting and cost-imposing effects on the Dutch economy, and how that might have effected such larger happenings as the ending of the Dutch Golden Age and of Dutch economic primacy, the rise of England, and the English origins of the Industrial Revolution. Going forward, I hope to more closely examine the totals of British coal shipped to the Netherlands to see if they can be said to have been meaningfully impacted by the successive tariff increases, and analyze what this might imply about the Dutch use of and demand for coal as opposed to alternate fuels, and the degree of English control over the overall Dutch fuel supply.

I would like to thank the SURF donors for providing the funding that allowed me to dedicate the past few months to this research, and my mentor Professor de Vries for helping me shape my questions and recommending valuable sources of data, without which I would have never gotten my inquiries off of the ground. I would also like to thank the staff of the university Interlibrary Services Office for locating and obtaining some truly obscure articles for me, Timoteo Rodriguez for helping me shape my findings into this paper, my fellow SURF researchers for providing feedback on my research, and, last but not least, my family and friends for supporting my efforts and living with the miniature economic history library that seemed to assemble itself wherever I was.

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