Chronotopes of Petromodernity: Oil and Mobile Privatization in the 1950s

Kyle Conway
University of Ottawa, kconwa2@uottawa.ca

Abstract: Theories of modernity in fields such as sociology and media studies frequently deal with people's relationships to space and time, but they have overlooked the role that oil and its derivatives play in shaping those relationships. This article addresses that oversight by considering how the transition from coal to oil in Europe and North America in the years leading up to and following the Second World War shaped the phenomenon of mobile privatization, as proposed by media theorist Raymond Williams. Oil's transportability and energy density influenced the choices people made as they moved from cities to suburbs, while electricity, derived largely from coal, influenced their evolving notions of privacy. These shifts in turn affected how Europeans and North Americans negotiated their identities with respect to the categories of family, community, and nation.

Keywords: chronotope; petromodernity; oil; coal; Raymond Williams; Dakota Access Pipeline

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The technologies that oil makes possible—the cars we drive or the houses we heat—have a profound impact on how we organize our lives spatially within neighbourhoods, cities, regions, and even countries. Consequently, they also help structure the encounters we have with—and the ways we relate to—those with whom we share the spaces we inhabit. Yet the sheer ubiquity of oil (a term I use metonymically to describe petroleum and its many derivatives) makes it unremarkable and, in a sense, invisible. It's not that we *can't* see oil, of course, but that we *don't*: if our cars run and our houses are warm, we can direct our attention elsewhere (Conway 2018). We also don't see how oil structures the ways we relate to others and come more broadly to understand concepts like family, community, or nation. We don't see the material effects that oil, a substance that we trade and consume, has on the abstractions we use to make sense of our social experience.

My purpose in this article is to make some of oil's structuring effects visible. These effects contribute to what the Petrocultures Research Group describes as the "epistemological and practical problem of the impasse of fossil fuels" (2016, 15), or the simultaneous need and inability to transition to a new form of energy. To work through this impasse, we must recognize how oil has shaped our sense of ourselves and our communities. To do this, I examine one of the dominant chronotopes of petromodernity. The term *chronotope* comes

from literary theorist Mikhail Bakhtin (1981, 84), who uses it to signify "the intrinsic connectedness of temporal and spatial relationships [...]." *Petromodernity* comes from a range of authors, who use it to signify "modern life based in the cheap energy systems made possible by oil" (LeMenager 2014, 67) or the condition in which we "moderns" live, characterized by "perpetual growth, ceaseless mobility, and the expanded personal capacities associated with the past century's new flood of energy into our lives" (Wilson, Szeman & Carlson 2017, 3).

The idea of petromodernity is relatively new, having been developed by researchers in the field of energy humanities only in the past decade or so (see Szeman 2019b). I develop it further by exploring one of the ways it has structured people's experiences of time and space. I focus on Europe and North America (but especially the United States) the late 1940s and early 1950s, a key period in two respects: first, during that time, oil surpassed coal as the most consumed energy source, and second, human-induced climate change reached a turning point, as measured by a "great acceleration" in rates of resource use and corresponding socioeconomic trends (Steffen *et al.* 2015). I adopt a historiographical approach, treating the lack of attention paid to oil as a "silence," in Michel-Rolph Trouillot's (1995) terms, that is produced when facts are retrieved from archives and transformed into a narrative. To make such silences speak, according to Trouillot, the researcher's task is not necessarily to uncover new facts but to ask how we might rearrange those already at hand to reveal stories left untold.

To that end, I examine a key passage of Raymond Williams's (2003) classic media studies book, *Television: Technology and Cultural Form*, originally published in 1974. One of Williams's concerns is how the institutions of broadcasting shaped people's experience of space and, to a more limited degree, time. He examines the period leading up to and following the Second World War, during which an increase in personal car use accompanied a population shift away from cities toward their suburbs. He argues that engineers and policymakers developed new technologies and institutions such as broadcasting to address a central tension between mobility (within and between cities) and privatization (through the development of the family home). This tension is my focus. Thus, after an overview of my key terms and theoretical and methodological assumptions, I examine the way social institutions evolved as the consumption of oil surpassed that of coal in Europe and North America. I examine the effect of that transition first on mobility, then on privatization, before considering the implications of this analysis for politics of the impasse evoked above. Although this specific dialectical relationship between energy and social institutions has gone unexamined, the influence it exerts on people's notions of space and time is fundamental to our understanding of how politics operates in the era of petromodernity.

Epistemologies of petromodernity

One of the challenges in defining petromodernity is that oil's role in modernity has gone largely unobserved. Consider, for instance, the influential book *The Consequences of Modernity*, where Anthony Giddens argues that "[t]he dynamism of modernity," in particular after the Second World War,

> *"derives from the* separation of time and space *and their recombination in forms which permit the precise time-space 'zoning' of social life; the* disembedding *of social systems (a phenomenon which connects closely with the factors involved in time-space separation); and the* reflexive ordering and reordering *of social relations in the light of continual inputs of knowledge affecting the actions of individuals and groups."* (Giddens 1990, 16–17, original emphasis)

These symptoms of modernity, he argues, are of a piece. We are disembedded in that we are geographically and temporally removed from where things happen: I depend on engineers I never see (perhaps they are in my own city; perhaps they are on the other side of the globe) to bring electricity into my house so I can cook dinner when I return home and see my family. So long as my range turns on, I do not have to think about them. Such a system is possible because of a new form of reflexivity whereby "social practices are constantly examined and reformed in the light of incoming information about those very practices" (Giddens 1990, 38): we change our habits as the technologies of disembedding develop.

Giddens, however, never mentions oil, despite the fact that without it and its derivatives (gasoline, asphalt, plastic and other synthetic materials, etc.), such disembedding would be impossible. Why this oversight? Antti Salminen and Tere Vadén (2015, 34) argue that oil is so energy-dense that it erases any markers of its presence:

> *"Simply put, the high EROEI [energy return on energy investment] of oil and the large amount of oil together intoxicated the human ape so that it started imagining that the effects of oil were due to the ape's own merits. It started to see a combination of virtue and natural determinism as the roots of its prowess."*

In this respect, they argue, its invisibility is a result, at least in part, of the logic of capital. Capitalism, fuelled literally and figuratively by oil, has a homogenizing effect on people. The logic of capital (not to mention modernity, by which they mean the social organization capital has brought about) is efficiency, the pursuit of which has led to the instrumentalization of people, who come to have value in the role they play in the capitalist machine. The idea that technology develops to serve people's needs, they argue, puts the cart before the horse: the logic of capital, as invested in technology, is to subordinate people to technology.

Hence there is a danger in not seeing oil, as Bob Johnson (2017, xx) writes:

> *"in order to live with fossil fuels, the [U.S.] middle class learned to bury the human and environmental costs of its dependencies out of sight both geographically and socially [...] and*

to repress the many traumas and dislocations associated with fossil fuels both psychically and symbolically within a national narrative of progress, emancipation, and empowerment that had little room for modernity's objections and casualties."

Although we can turn away from the traumas that have made our modern lives possible, we cannot escape the anxiety attendant to the capitalist logic of modernity that challenges the security those very traumas promised to secure. On the one hand, the reflexivity that is characteristic of modernity seems to suggest that whatever problems we encounter, we will be able to develop tools to solve them. James Carey and John Quirk (2009) describe this idea as deriving from the "rhetoric of the technological sublime," according to which the solution to the problems caused by technology is more and better technology. But, on the other hand, such ideas hide a deeper anxiety stemming from the way people come to question the epistemological foundations of what they think they know: rather than increase their confidence, this reflexivity undermines it because "we can never be sure that any given element of that knowledge will not be revised" (Giddens 1990, 39). More simply, as Amitov Ghosh (1992, 29) writes, "the history of oil is a matter of embarrassment verging on the unspeakable, the pornographic."

How, then, do we come to *see* oil and develop our understanding of petromodernity? Oil saturates our lives to the point where it appears coextensive with modernity itself, and we can observe it, much like the phenomena of modernity, only partially. The questions we ask shape the answers we find by focusing our attention on specific aspects of oil. Questions about history yield answers about history; questions about art yield answers about art; questions about activism yield answers about activism (Szeman 2019a). Put another way, the questions we ask simultaneously illuminate and obscure oil's role in our lives. We can adopt a macro-level view, as Edward Burtynsky does in his sweeping aerial photographs of a sprawling cityscape in Lagos, Nigeria, or a field of flood-damaged cars in Baytown, Texas (Burtynsky, Baichwal & De Pencier 2018, 76–77, 83). The challenge of this perspective is that it leaves details hidden in the creases and the shadows. We can also adopt a micro-level view, as Sougandhica Hoysal (2014) does when calculating the amount of petroleum used in the production of one copy of an academic book. The challenge of this granular perspective is that it obscures larger structures.

The chronotope and the archive

And yet, all of these questions help us develop a more complete account of petromodernity. As mentioned in the introduction, Bakhtin (1981) provides a useful term for focusing on spatiotemporal relations, that of *chronotope*, which he borrows from biology. In abstract terms, he asks how time and space mediate notions of cause and effect. For instance, do people perceive time as flowing linearly, with cause preceding effect, or as cyclical, with cause and effect recognizable in patterns observable through history? Likewise,

do they perceive space as continuous, understandable primarily in relational terms, or as discontinuous, divisible into measurable, countable units?

Such abstractions become more concrete when we examine specific cases. Consider the protests and counter-protests in 2016 at the site of the Dakota Access Pipeline in the U.S. state of North Dakota. David Archambault (2016), chair of the Standing Rock Sioux tribe and one spokesperson for pipeline opponents, treated time as circular, as history repeating itself. For him, the pipeline represented a new form of colonial resource extraction, but it was consistent with the history of broken treaties between his nation and federal and state governments. He also evoked a sense of space as continuous, characterized by a "relational logic of proximity according to which the people closest to a danger (and therefore most affected by it) [had] the authority to say what should be done" (Conway & Duguay 2019, 39). In contrast, Drew Wrigley, North Dakota's lieutenant governor and one spokesperson for pipeline supporters, treated time as linear and forward-moving, and for him, the only events relevant to the debate were recent (Dennis 2016). Native history, for him, was beside the point. At the same time, he treated space as divisible by borders: the pipeline would run outside of the Standing Rock reservation and was therefore not subject to Native jurisdiction (Conway & Duguay 2019). Because their arguments were grounded in contradictory chronotopes, they failed even to agree on the terms of their conflict. (I will return to this example in the conclusion, as it serves as a reminder that dominant notions of time and space can be contested.)

Identifying chronotopes in the context of petromodernity is challenging because of the gaps we encounter in the historical record. The historian Michel-Rolph Trouillot (1995) describes such gaps as "silences," of which he sees four types. Silences occur at

> *"the moment of fact creation (the making of* sources*); the moment of fact assembly (the making of* archives*); the moment of fact retrieval (the making of* narratives*); and the moment of retrospective significance (the making of* history *in the final instance)."* (Trouillot 1995, 26, original emphasis)

In the case of oil, silences occur at all four moments. With respect to sources, when people focus on the tasks they want to accomplish, rather than the tools such as oil and its derivatives they use to do so, they do not necessarily think to keep records of their tools. When they do focus on their tools, it is because they have specific tasks related to the tools in mind. They create archives, but in ways that reflect the idiosyncratic demands of these tasks—the archivists and record-keepers are responding to their own immediate concerns. When historians use these archives, they have the raw material to craft narratives that reflect the archivists' concerns, but not necessarily their own. They can tell some stories but not others, which affects the meaning they ultimately make of the events they describe.

To give a more concrete example, most people in the United States in the 1940s and 1950s who drove cars used them to get to the places where they had something

else to do. Their focus was their task, although there were exceptions: amateur car enthusiasts, for instance, focused on cars themselves, so they kept records of changing styles and technologies. In a different vein, employees of the Public Roads Administration, later renamed the Federal Highway Administration, were responsible for the creation and maintenance of the country's new highway system, so they kept records of the number of vehicles registered, the miles of highway maintained, and so on. Car enthusiasts created informal archives in their personal records of their hobby, while the Federal Highway Administration created archives recording the statistics it needed to serve the public. Such archives, however, lend themselves well to narratives of changing styles, in the case of car enthusiasts, or administrative histories, in the case of governmental agencies, but not necessarily to accounts of the way that oil and its derivatives affect people's conceptions of space and time. Consequently, much of the meaning of oil derives from a nostalgia for the culture that grew up around cars, evident in books with titles such as *The Big Book Of Car Culture: The Armchair Guide to Automotive Americana* (Hinckley 2005), or from administrative accounts of road creation and maintenance, evident in the highway statistics summaries published by the Federal Highway Administration.

Still, in light of the "traumas" evoked by Johnson (2014), whose effects reach far beyond car hobbyists or traffic statistics, it is worth asking what forces have contributed to the scholarly silence around oil. One possible answer lies in the shift that took place in notions of *work* from an act performed by physical bodies, whether human or animal, to something disembodied, performed by machines powered by steam (in the late nineteenth and early twentieth centuries) or oil (from the mid-twentieth century to the present day) (Johnson 2014, 44–45). This shift affected those in the middle class more than the working class, especially in the United States, as the coal-miners and, later, oil-workers put their "raw, maimed, and stunted subaltern bodies" on the line to make the "modern" conveniences of the middle class possible (Johnson 2014, 62). Salminen and Vadén (2015, 3) describe this specific form of disembedding as "con-distancing," or "the particular way of keeping something close so that it at the same time stays alien, at a distance. [...] Con-distancing is one of the roots of the peculiar alienation experienced during the age of oil [...]." Its effect has grown as the "amount of work fed into the system" has increased (Salminen & Vadén 2015, 25): as carbon-fuelled machine-work has pervaded people's lives (especially *middle class* lives), it has also become less remarkable, leading to a paradoxical situation where people lose their awareness of the very technologies upon which they depend the most.

There are exceptions to this trend, of course, such as the books and articles cited in this article's introduction, not to mention the present article itself. But they are made possible through deliberate efforts to overcome the silences of the archive through strategies of "reposition[ing] the evidence to generate a new narrative" (Trouillot 1995, 27). That will be my strategy as I reread Williams's description of mobile privatization in the sections that

follow. I do not dispute his account but instead take it as my starting point. What my analysis uncovers is the role played by oil in shaping the environment with which people interact.

Mobility: the shift from coal to oil

Williams (2003, 19) introduces the idea of mobile privatization in these terms: it was a "complex of developments" characterized by

> *two apparently paradoxical yet deeply connected tendencies of modern urban industrial living: on the one hand mobility, on the other hand the more apparently self-sufficient family home. The earlier period of public technology, best exemplified by the railways and city lighting, was being replaced by a kind of technology for which no satisfactory name has yet been found: that which served an at-once mobile and home-centred way of living: a form of* mobile privatisation. (original emphasis)

Williams approaches the history of technology by emphasizing the active role engineers and policymakers took in response to specific problems, as they both influenced and were influenced by broader cultural values. Mobile privatization arose, he argues, as part of people's response to needs created by specific shifts in industrial organization. During the nineteenth and early twentieth centuries (the "earlier period of public technology" to which he alludes), industrialization prompted people to move to urban centres, with consequences for extended families, as workers moved away from the people who had made up their support network. Such movement took place with little central planning: people moved where industrialists built factories, a choice shaped by access to resources and transportation networks.

What Williams fails to remark upon is the shift in energy consumption that took place in the years immediately following the Second World War. Prior to that time, coal was the most important source of energy in Europe and North America. It had helped people solve a number of important problems, in particular those related to the limits of physical labour (Johnson 2017). Coal's dominance is clear in Figure 1, which shows the rates of oil and coal consumption in the United States beginning in 1850. (My statistics focus on the United States because it is one of the countries Williams examines and because although the "world-historical transition to fossil fuels was a global rather than simply American phenomenon, [...] the United States stands out as *the* extreme case in that story" [Johnson 2017, 5, original emphasis].)

After the Second World War, countries in Europe and North America faced a different set of problems. Returning soldiers needed homes and jobs. Developers began to build suburbs outside of city centres, and oil, especially as refined into gasoline and diesel, helped solve the problem of transportation. It had a clear advantage over coal in that it was a denser source of energy (U.S. Energy Information Administration 2013). Crude oil provides about 42 megajoules of energy per kilogram (MJ/kg), while diesel provides about 45 MJ/kg and gasoline 46 MJ/kg. In contrast, coal provides only 24–31 MJ/kg, depending on whether it is bituminous or

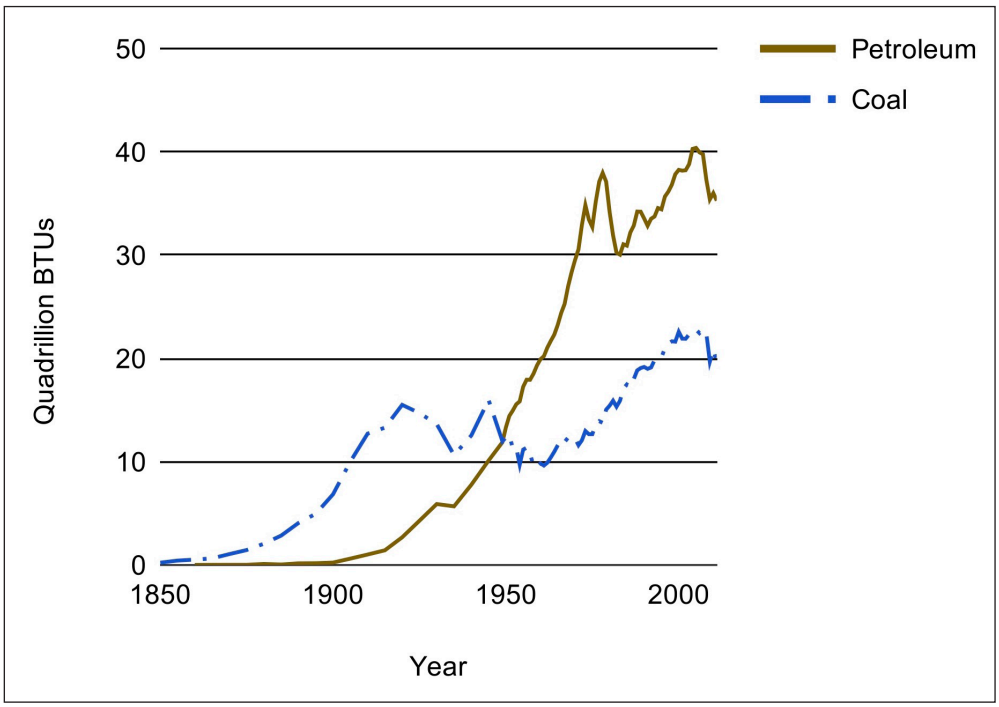

Figure 1. Petroleum and coal consumption in the United States, 1850–2011 (source: U.S. Energy Information Administration 2012).

anthracite (Rodrigue 2017). This density made gasoline more transportable because it was lighter and took up less space. (In this respect, it is also worth noting that natural gas, with an energy density of about 47 MJ/kg, also became more popular during this time, overtaking coal in usage rates in the late 1950s [Rodrigue 2017; U.S. Energy Information Administration 2012].)

Thus if coal had encouraged a move from the country into cities, oil prompted a shift from cities to their suburbs. This shift is reflected in the increased use of cars. They were necessary for getting to suburbs, which were less densely populated than city centres and generally lacked public transit options. One indirect measure of this use was the rate at which cars and other motor vehicles were registered in the United States. As Figure 2 shows, rates of registration dropped slightly during the Second World War and then picked up again after its end.

The increasing rate of automobile use is clear, too, in the ratio of registered vehicles to population, which nearly doubled between 1930 and 1960, as Table 1 shows. (As a point of comparison, the ratio was about 0.76 vehicles per person in 1990 [U.S. Federal Highway Administration 1995, Table MV200; U.S. Department of Commerce 2010, 2].)

Thus, if we borrow Williams's historiographical framework, we see that prior to the Second World War, coal helped industrialists increase the scale of production by fuelling large factories.

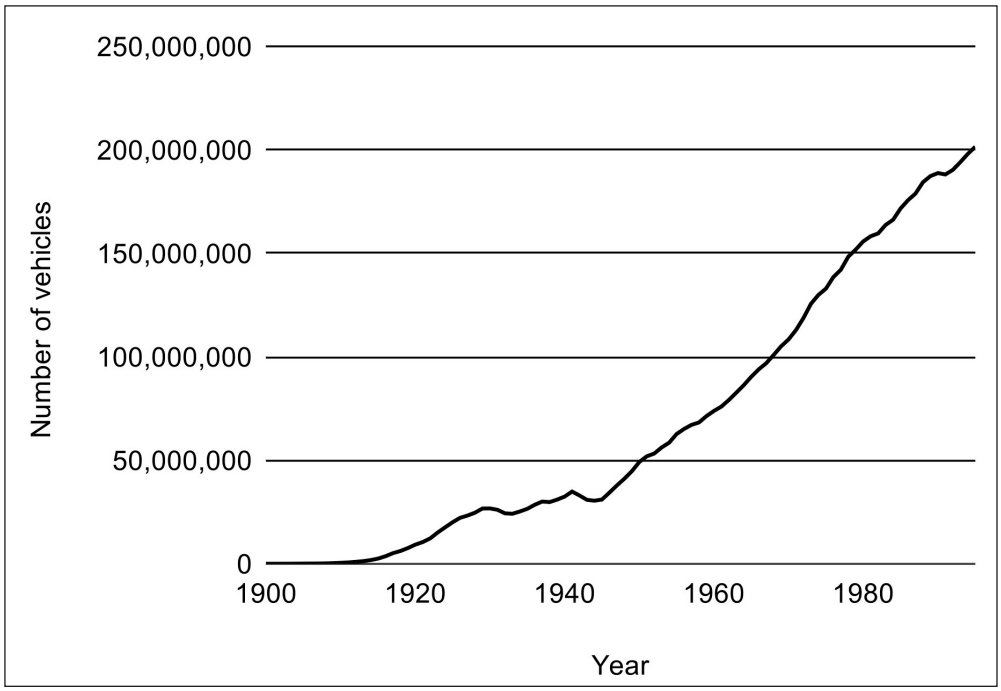

Figure 2. Motor vehicle registrations in the United States, 1900–1995 (source: U.S. Federal Highway Administration 1995).

Table 1. Number of registered vehicles per person in the United States, 1930–1960.

Year	Number of vehicles*	U.S. population**	Number of vehicles per person
1930	26,749,853	123,202,624	0.22
1940	32,453,233	132,164,569	0.25
1950	49,161,691	151,325,798	0.32
1960	73,857,768	179,323,175	0.41

* Source: U.S. Federal Highway Administration (1995, Table MV200)
** Source: U.S. Department of Commerce (2010, 2)

People looking for work moved into the cities where these factories were located. After the Second World War, as soldiers returned, governments and developers were looking for ways to house them. Gasoline and other refined forms of oil provided part of a solution by making travel into the suburbs, with their new housing stock, possible. The mobility identified by Williams would not have taken place without oil.

Privatization: electricity and consumer goods

Perhaps less obvious, but no less important, are the ways oil made privatization possible, too. Here we are dealing with a form of social organization that maintained characteristics of nineteenth century industrialization while also relying on oil and its derivatives. It featured, on the one hand, a largely coal-based electric system that provided electricity for consumer goods whose production, on the other hand, relied on petroleum derivatives.

The goods that interest Williams are of course radio and television. Williams (2003, 19) describes the 1920s as a "period of decisive development in sound broadcasting [...]." During the early part of the decade, engineers wanted to solve the problem of producing receivers for the home, and by the end of the decade, "the radio industry had become a major sector of industrial production, within a rapid general expansion of the new kinds of machines which were eventually to be called 'consumer durables'" (19). The decade was characterized by "intense social struggle" (20), not only over broadcasting, but also over the organization of public and private life. With respect to broadcasting, governments had to find ways to regulate the competing interests among individual citizens, who during radio's early years could build their own receivers and transmitters, and public and private companies seeking to use the airwaves. Most countries, especially in Europe, gave priority to government-funded corporations with public service mandates. The United States, in contrast, gave priority to commercial broadcasters, in particular the Radio Corporation of America, a government-sponsored monopoly formed in 1919 and run by Westinghouse, American Telephone & Telegraph (AT&T), and, most notably, General Electric.

With respect to the organization of public and private life, Williams refers to the social effects brought about by nineteenth century urbanization and, later, the growth of suburbs after the Second World War. One was that wages improved, as did work rhythms, and as a result, there was a newfound "emphasis on improvement of the small family home" (Williams 2003, 20). At the same time, there was a need for new forms of communication to maintain earlier relationships over new distances. Some needs were social, while others were material: "The new homes might appear private and 'self-sufficient' but could be maintained only by regular funding and supply from external sources" (20). This reliance on the world external to the home was frequently disruptive, as people were subject to forces beyond their control. In that respect, electrification, which was one way by which these forces entered the

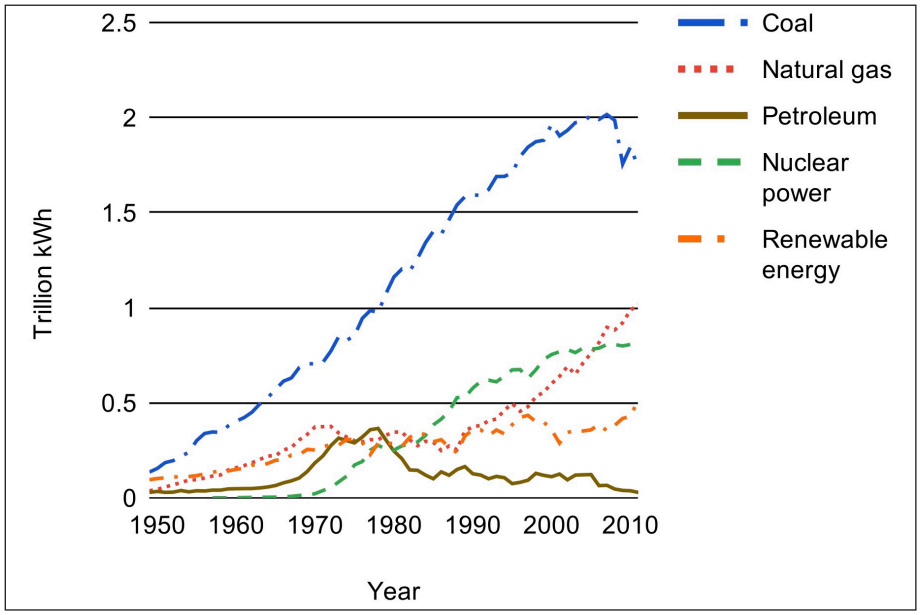

Figure 3. Total annual electricity production in the United States by source, 1949–2011 (source: U.S. Energy Information Administration 2012).

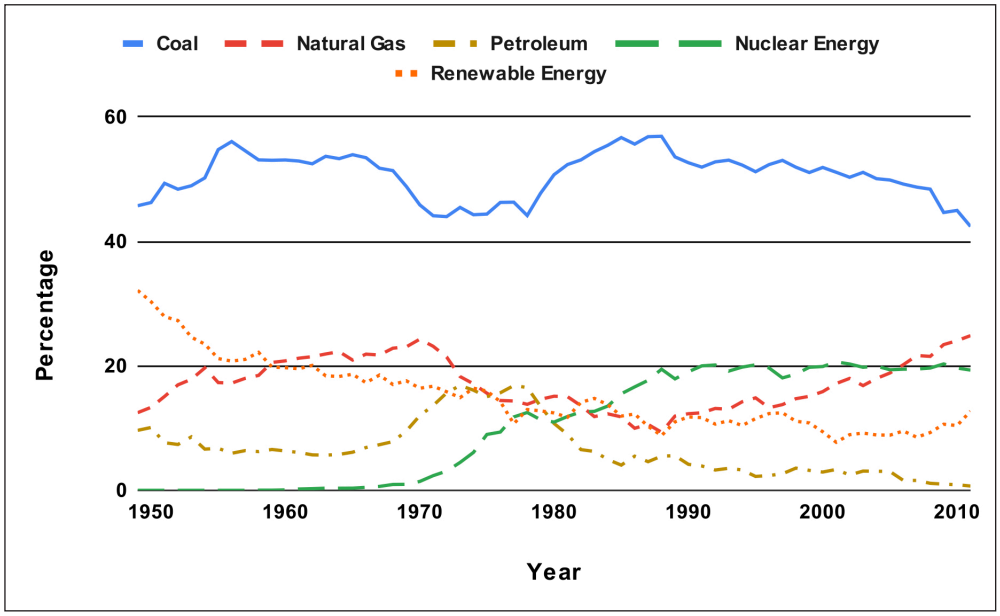

Figure 4. Percentage of annual electricity production in the United States by source, 1949–2011 (source: U.S. Energy Information Administration 2012).

home, was both a cause of disruption and a solution, to the degree that it enabled people to gain access to the supplies they needed.

Rates of electrification in the United States, to return to my earlier example, were about 50 percent by the late 1920s and 90 percent by the years immediately following the Second World War (U.S. Federal Communications Commission 2000). Coal was the primary source of electricity in the post-war years, and although in absolute terms its use has increased, in relative terms, its share of production has remained relatively steady (see figures 3 and 4).

The continued importance of coal in electricity production results, among other things, from the industrial logic shaping power plants, as well as the relative underdevelopment of competing forms of electricity production in the United States. Other countries rely more on nuclear energy, such as France, or renewable energy, such as Germany, but in all cases, an industrial logic remains, as power plants, like factories, exist in central, fixed positions. In other words, in contrast to gas- or diesel-powered cars, it is not necessary that their energy source be as transportable as oil. Nevertheless, oil played (and still plays) in important role in the production of consumer goods. To consider those of interest to Williams, 50 percent of U.S. households had radio receivers by 1920, and 90 percent by 1940. U.S. households adopted television at an even faster rate: between 1946 and 1950, penetration rates for black and white television went from just over 0 percent to 45 percent. For colour television, they went from 0 to 50 percent between 1950 and 1970, reaching about 90 percent by 1980 (U.S. Federal Communications Commission 2000). The manufacture of radio and television receivers would have been considerably more complicated without plastics, which derive from petroleum. Plastics insulated the wires that connected a radio receiver's components, for instance, and they contributed to the sets' casings, tuning knobs, and so on. They were also incorporated into the television sets that are Williams's concern. TV sets relied on printed circuit boards, which used a petroleum-based epoxy for insulating the material that served as the board onto which circuits were etched. Like radios, they also used plastic for insulation and for the shells that encased the electronics.

Thus, again borrowing Williams's historiographical framework, we see that the development of the family home took place within a hybrid energy regime that relied largely on coal for electricity, at least in the United States, but also on oil as an industrial raw material. The consumer goods that made individual households appear independent, even as they relied on distant sources of energy and information ("disembedding" or "con-distancing"), were possible only through the complex interactions between different energy sources and the forms of social organization they encouraged.

Conclusion: chronotopes of petromodernity

To understand the effects of these transformations on people's experience of space and time, it is necessary to move beyond Williams's account. The trend he

describes continued and accelerated one that was itself already a century and a half in the making, namely the creation and expansion of a public sphere—a place, both physical and metaphorical, independent of the state, where citizens, through debate and critique, could exert influence over their governments—made possible by the expansion of trade and what we would now describe as the middle class (Habermas 1989). This public sphere has its origins in print, but broadcasting, especially during the years examined here, expanded it, too: radio and TV gave more people access to public events such as "state occasions, public sporting events, theatres, and so on" (Williams 2003, 18), while at the same time expanding the range of topics perceived as acceptable for public discussion (Scannell 1990).

This access contributed to the dominant chronotope of petromodernity. People had the sense that faraway events took place in the same temporal plane as the one they inhabited and that, in principle, they could get in their car and travel to those places to attend those events, if they wanted. It strengthened the feeling of inhabiting what Benedict Anderson (2006, 24), borrowing from Walter Benjamin, describes as "'homogeneous, empty time,' in which simultaneity is, as it were, transverse, cross-time, marked not by prefiguring and fulfilment, but by temporal coincidence, and measured by clock and calendar." This experience of "empty time" was not new (Anderson sees it as a symptom of the modern nation), but through the technological and social developments of mobile privatization, inextricably linked to oil and other forms of energy, it came to reach further into people's private lives.

Such "clock and calendar" time operates in what we might describe as "homogeneous, empty space," finite and divisible into discrete units measured in kilometres or miles. Although the family is Williams's primary unit of analysis, that of the nation is also important, as it structured the organization of broadcasting in the years considered here. In the case of the nation, Anderson argues, this space is inhabited by people with a shared sense of identity, with common experiences (often because of the media they share) and common points of reference.

Why does this matter? Could we have arrived at a description of this chronotope without describing oil? Of course—that, in effect, is what Williams does. But our understanding of this chronotope would be lacking. More to the point, the impasse evoked in the introduction results in part from a gap in our critical vocabulary that prevents us from seeing and describing the effects of oil. Conversely, by identifying this chronotope, we deepen our understanding of petromodernity and identify strategies for challenging it. What teleologies, we might ask, does a linear sense of time support? How do they increase the appeal of the technological sublime (Carey & Quirk 2009), which blinds us to the deeper anxieties of petromodernity? How might we challenge them?

Hence the value of competing chronotopes, such as Archambault's, that circulate alongside the more dominant. Archambault grounded his argument against the Dakota Access Pipeline in a sense of space as continuous

and time as cyclical. He showed that people can put these conceptions to persuasive use through the stories they tell: one strategy to challenge a teleological narrative is to tell a better story, where historical patterns suggest the future effects of people's actions in the present day.

These are stories we must begin to imagine now. They will be one political tool among others, although we must find ways to continue to encourage democratic engagement, along the lines offered by the expansion of the public sphere, while also recognizing the ecological challenges that have accompanied it. The need for such narratives is urgent if we are also to find ways to transition to new sources of energy.

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