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American Long-Distance Locomobility and the Spaces of Actor-Network Theory

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Abstract: Much of the discourse surrounding national intercity passenger rail service in the United States revolves around why it has lagged so far behind European and Asian counterparts. However, a more interesting question might be why it has survived despite competition from faster, more nimble transport modes, discriminatory public policy, and the ascension of neoliberal discourse hostile to public endeavor. This paper uses the concept of durability in actor-network theory to offer some insights into how the system has achieved a remarkable but problematic stability, and how that durability relates to an imagined role for national intercity passenger rail in a future of increasingly constrained material resources. This paper also demonstrates the application of actor-network theory (ANT) in a way that can serve as a useful introduction to and template for the use of that methodology.

Keywords: actor-network theory; Amtrak; locomobility; passenger railroads; durability

1. Introduction

The United States is unique in the developed world for its limited role in national intercity passenger rail. American travelers in Europe or Asia ride robust (and, often, high-speed) rail systems and wonder why they do not have systems like that at home. However, this difference may be better conceptualized by turning the negative question of “why not” to a positive inquiry about why national intercity passenger rail still exists at all in the United States despite competition from faster, more nimble transport modes, discriminatory public policy, and the ascension of neoliberal discourse hostile to public endeavor.

This paper uses actor-network theory (ANT) to analyze the history and semiotics of Amtrak and argues that in the context of America’s unique socio-technical meanings, Amtrak can actually be considered a success. A specific focus is given to the concept of network durability, which makes it possible for a socio-technical network to resist change—both positive and negative. Amtrak is one of these actor-networks, persisting with only incremental change despite the concerted efforts of a variety of actors to defund, rationalize, privatize, corridorize, reform, and transform America’s last remaining national passenger railroad.

ANT is chosen as a methodology because it provides a means to consider the historical and semiotic issues often ignored by the positivist methodologies that dominate contemporary transportation analysis. Railroads in the US are large socio-technical systems that have evolved through a rich, colorful and well-documented history. Much of the extant scholarship on railroads focuses on specific (and often fetishized) aspects of railroads like equipment, infrastructure, economics, or organization, often making it difficult to see the semiotic relationships between those different entities in the socio-technical networks and locking the internal social networks as static

structures. ANT offers a way to aggressively address both the social and technical aspects of passenger rail with a perspective distinct from conventional social research that separates the social and technical worlds into fixed statistical reductions. ANT also offers a deeper theoretical framework than historical large technical systems studies [1] while being somewhat more accessible and concrete than highly abstracted transitions studies [2–4] or assemblage theory [5–7].

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In contrast, ANT's perspective on socio-technical systems as dynamic networks of heterogeneous elements offers the potential for a richer understanding of passenger rail systems and the ways those systems might be affected by equally complex exogenous forces like energy-resource scarcity. Accordingly, this paper uses a conception of passenger rail travel as *locomobility*, analogous to similar systemic conceptions of auto and air travel as *automobility* and *aeromobility*, respectively [8–11].

2. Discussion

2.1. Literature Review

2.1.1. Actor-Network Theory

Actor-network theory (ANT) has been used in a wide variety of contexts and, accordingly, is subject to different interpretations as to exactly what it is. Therefore, an introduction is needed on how ANT will be used in this analysis.

ANT emerged in the mid-1980s in the work of John Law, Michel Callon and Bruno Latour as a conceptual frame for exploring socio-technical processes [12]. Law states that:

Actor network theory is a disparate family of material-semiotic tools, sensibilities, and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located. It assumes that nothing has reality or form outside the enactment of those relations. Its studies explore and characterize the webs and the practices that carry them ([13], p. 141).

Atkinson observes that, rather than being an overarching theory for explaining actions, ANT provides:

...an underpinning philosophical position and a methodology for inquiring into the real-world processes by which associations of humans and non-humans coalesce into persistent networks or fail to do so ([14], p. 115).

Understanding what ANT is and how it can be used has been obscured by the seemingly deliberate intention of ANT's creators to obfuscate their creation. Latour notoriously states that, "...there are four things that do not work with actor-network theory; the word actor, the word network, the word theory and the hyphen," and Latour's oft-cited 2005 book *Reassembling the Social* is dominated by lengthy descriptions of what ANT is not ([15], p. 15). In response, this paper aspires to provide a tangible example of ANT analysis in a specific case study that explicitly identifies unique analytical components of ANT.

The reason for the definitional ambiguity of ANT may lie in a fundamental ontology that eschews the idea of a single positive reality. ANT is not one thing because the reality it explores is not one thing. Law asserts that ANT is, "an empirical version of post-structuralism" ([13], p. 145). All actions in the material-semiotic world are relational effects. Those relations are provisional,

precarious and fragmentary forms of ordering that are located in no larger overall order. Therefore, Law declares ANT to be:

...a ruthless application of *semiotics*. It tells that entities take their form and acquire their attributes as a result of their relations with other entities. In this scheme of things entities have no inherent qualities...([16], p. 3).

Despite the absence of a single definition, Latour provides three “tests” for determining whether an analysis is ANT ([17], p. 10):

- Non-humans are *actors* that are actively involved in networks and “not simply the hapless bearers of symbolic projection (by human actors).”
- The direction of explanation constructs the social as a dynamic entity rather than starting with a stable social structure and using it to explain a particular state of affairs.
- The analysis reconstructs the social rather than attempting to deconstruct or disperse predefined aggregations.

These tests reinforce Latour’s contrasting of ANT as a “sociology of associations” in opposition to the more conventional “sociology of the social”. While the latter is often based on the study of predefined and static social groupings, Latour follows Law in defining ANT as based in a relational materiality from semiotics where entities have meaning in relation to other entities.

Another distinguishing characteristic of ANT is a specific vocabulary that frames the analysis of relationships and distinguishes ANT analysis from similar analytical approaches. That vocabulary is introduced and addressed throughout this paper.

Law emphasizes that, although ANT is defined and described in abstract terms, ANT is grounded in empirical case studies ([13], p. 141). Classical and contemporary objects of ANT analysis include: scallops [18], electric cars [19], microbes [20], transit systems [21], lighting systems [22], military aircraft projects [23], cervical cancer screening programs [24], health care information systems [14], and housing developments [25].

Much of the analysis in this paper is patterned after the Law and Callon’s analysis of the ill-fated TSR.2 military aircraft project, which had its initial conception in the late 1950s and was canceled in 1965 [23]. While the narrative portions of Law and Callon’s analysis are structured much like conventional journalistic accounts of the political and technical chaos surrounding the fated project, the clear, integrated tracing of the narrative plot points to associations between dynamic, multi-scalar networks of humans and non-human actors using a specific vocabulary of relational terms distinguishes ANT analysis from simple storytelling.

2.1.2. Amtrak

Railroad companies in the US have existed in an almost perpetual state of economic chaos and crisis, even during their heyday [26]. This state of crisis was in varying parts material and discursive, which is in keeping with the integral role of railroads in crisis-prone capitalism ([27], pp. 75–97). The mid-20th-century crisis in passenger service would be resolved with the formation of Amtrak in 1971, and the crisis in freight service would be resolved with a subsequent series of deregulatory policy changes culminating in the Staggers Act of 1980 [28]. However, the result of that resolution has been a stalemate—referred to in this paper under the novel coinage *Amtrak Equilibrium*—where federal subsidy of Amtrak is just large enough to keep the service politically viable, but not so large as to attract significant opposition outside of a handful of fervent (albeit vocal and well-funded) ideologues ([29], p. 78).

There was a strong inverse correlation over the 20th century between rail travel *versus* air and auto travel that clearly implicates mode shift as the proximate cause of the decline of US passenger railroading to its current skeletal state ([30], p. 12). However, when analysts have sought ultimate causes, the results over the years have often involved deterministic generalization.

The 1958 Interstate Commerce Commission “Hosmer Report” cited the technological obsolescence of the passenger train, presuming that it would eventually take its place along with the “stagecoach, the sidewheeler and the steam locomotive” ([30], p. 69). The Hosmer Report also offered a demand-side market-based explanation in consumer preference, echoed later by numerous authors like Hilton ([29], p. 8). Morgan reframed this in broader social terms as a “psychological obsolescence”, where “the passenger train is being buried, unconsciously and without collusion for the most part, by those who man, regulate, manage ride, advocate and compete with it” ([31], p. 16).

Other holistic reductions of the failure of passenger rail to thrive after the mid 20th century include America’s economic geography [32], an innate American frontier mentality and distrust of government ([33], p. 42), and Amtrak’s fundamental structural flaws ([34], pp. 9–10).

A number of specific groups have been blamed for the failings of passenger railroading, including intransigent labor unions ([30], pp. 14–17; [35], pp. 218, 226; [36], p. 29), and federal legislators in their subsidy of competing air and auto infrastructure ([35], p. 228; [36], pp. 16–20). In 1968, Lyon blamed railroad management for the mid-20th-century decline of passenger railroads ([37], pp. 233–55), while Philips cites political opposition by competing industries as a reason for the absence of a 21st-century rebirth ([33], p. 43).

While some element of truth can be ascribed to all of these explanations, in isolation, they are incomplete social reductions. In contrast, Latour devotes a significant amount of effort to distinguishing the conventional “sociology of the social” in contrast with the more fine-grained “tracing of associations” characteristic of ANT ([17], pp. 4–5). ANT seeks to unpack grand generalizations about centralization that become less meaningful when specific points of crisis and responses to those crises are examined and unpacked.

Railroading in the US can be seen as a centralized and centralizing actor-network built by a distributed network of private economic institutions and translated public policies (such as land grants) working within topographically-defined constraints. Likewise, the post-WW-II project of decentralizing suburbanization was the acceleration of a process that had been ongoing for almost a century, facilitated by construction of a centrally-planned and publicly-funded interstate highway system ([38]; [39], p. 69). The contention of the competing automobility, aeromobility and locomobility local actor-networks for resources from the global network favored highway transportation, resulted in the destabilization of both passenger and freight rail networks and, finally the creation of Amtrak (for passenger service) in 1971 and Conrail (from a collection of bankrupt northeastern freight railroads) in 1976.

2.2. Global and Local Networks

Law and Callon introduce the concept of global and local networks:

...an actor attempts to mobilize and stabilize what we call a *global network* in order to obtain resources with which to build a project. In our language, then, a global network is a set of relations between an actor and its neighbors on the one hand, and between those neighbors on the other. It is a network that is built up, deliberately or otherwise, and that generates a space, a period of time, and a set of resources in which innovation may take place. Within this space—we call it a *negotiation space*—the process of building a project may be treated as the elaboration of a *local network*—that is, the development of an array of the heterogeneous set of bits and pieces that is necessary to the successful production of any working device ([23], p. 21).

The creation of Amtrak can be analyzed as a *local network* which operates within a *global network* of *punctualized* actors, which included a host of federal and state governing and administrative bodies, rail labor unions, rail advocacy groups (like the National Association of Rail Passengers), individual riders, etc. Over the course of the *negotiation space*, the local network was transformed from a large but

loose confederation of privately-owned and -run operations to a smaller, unified network controlled by the government-owned corporation, Amtrak.

In keeping with the ascription of agency to non-human actors characteristic of ANT, aeromobility and automobility might also be considered actors in the global network. Those socio-technical systems are themselves complex actor-networks of relationships that are *punctualized* for analytical convenience. A number of individual human *actors* like Senator Claiborne Pell and President Richard Nixon also emerge as pivotal figures in the negotiations between actor-networks.

In analysis by Law and Callon, the British TSR.2 military aircraft project involved the *elaboration* of a local network with the ultimate goal of production of a military jet airplane [23]. However, the specifics of what that airplane would look like, what problems it would solve, and whether it should exist at all were the result of negotiations between neighboring actors in the global network that had different answers to those questions.

A similar situation existed for locomobility in the 1950s. Secular cost and ridership trends clearly presaged a *juxtaposition* of some kind, but different actors responded in contradictory ways. This reflects the *variable geometry/interpretive flexibility* where the passenger rail system meant different things to different actors.

Some company managers attempted to maintain high levels of service and others made intentional efforts to alienate customers and suppress ridership (such as stopping trains in the middle of runs or suppressing operating schedule information) as a pretext for discontinuance of money-losing services ([29], pp. 10–11, 65; [37], pp. 223–55; [40], p. 23).

Unions fought to keep jobs and advocates of service in different communities used political influence to prevent the Interstate Commerce Commission (ICC) from permitting private passenger train discontinuances. However, the non-advocate populace in those communities was abandoning those trains for autos and airplanes while other departments and branches of the government were engaged in heavy public subsidy for that same auto and aviation infrastructure ([36], pp. 14–35).

As part of the negotiation process, the flows of *intermediaries* between these actor-networks included money, political power, legal and regulatory action, infrastructure, and rail service itself. However, in these negotiations, the local actor-network of locomobility was unable to obtain sustaining resources from the global network and the crisis worsened.

In 1962, Rhode Island Democratic Senator Claiborne Pell gave a Senate speech (which he codified into the book *Megalopolis Unbound* in 1966) advocating federal investment in high-speed service in the Northeast Corridor, which, through his advocacy, ultimately resulted in the successful *Metroliner* service. Pell also proposed a solution for the problems of the system as a whole: “The answer is to divide the railroad system into a public authority that would carry passengers while the existing private companies would continue their more profitable function of hauling freight” ([41], p. 2). This intermediary in the negotiation process largely codified the structure chosen for Amtrak nine years later.

The account by Phillips of the formation of Amtrak gives Pell credit for saving passenger rail in the United States, and Pell himself provides support for this position [40,42]. However, Whittle and Spicer note that ANT has:

...sought to move beyond deterministic models that trace organizational phenomena back to powerful individuals, social structures, hegemonic discourses or technological effects. Rather, ANT prefers to seek out complex patterns of causality rooted in connections between actors ([43], p. 616).

From this perspective, the Claiborne Pell of this narrative becomes less of a heroic individual than a *spokesperson* for a *punctualized* local network of relationships with other government leaders, businesses and businessmen, staffers, constituents, family, friends, and others that even Pell may not have been conscious of. Pell’s effort can be praised or reviled, but, regardless, he would not have accomplished the same things outside of his particular actor-network of relationships. Questions

about the political future of national intercity locomobility in the US dictate a similar unpacking of the complex local networks of governance.

Pell's conversations with President Kennedy led to a White House task force that recommended a coordinated transport program in the Northeast Corridor. After Kennedy's assassination, Pell continued his advocacy with President Johnson, who saw the proposal as *intermediary* that could be used in an election-year strategy to bolster weak support in the Northeast—translating a transportation actor-network into the political actor-network of which Johnson was the *spokesperson*. With Pell standing behind him, newly-re-elected President Johnson signed the High-Speed Ground Transportation Act into law on 30 September 1965, which resulted in highly-successful *Metroliner* service between Washington and New York and the audacious but somewhat less-successful *TurboTrain* service between New York and Boston. The first revenue runs of the *Metroliner* took place on 16 January 1969. In this case, translation brought additional support for the local network from a global network that included a local network of selected voters in the Northeast.

However, the *Metroliner* as an *intermediary* did little to address the growing instability in the local rail system network. The managers (*spokespersons*) of the Pennsylvania Railroad (PRR) and the New York Central Railroad (NYCRR) were desperate for a merger. The Northeast Corridor demonstration project was partially funded by the PRR and the project was quickly approved by the PRR in hopes of gaining political capital for getting the merger approved.

The zeal for merger led to approval of additional intermediaries with the New Haven Railroad (to be included in the merger) and labor union demands (layoff restrictions and rehires) that would ultimately make the agglomeration too unstable to persist. This strategy by a local network to gain resources from the global network resulted in destabilization of the local network. Hobbled by the contractual arrangements, continued business decline, the ending of postal service mail carriage by rail, questionable management and accounting practices, and an apocalyptically harsh winter, the merged Penn Central went bankrupt on 21 June 1970.

The impending Penn Central bankruptcy, along with the election of Richard Nixon in 1968 and the continuing and growing level of instability in the local networks of the individual railroads was increasingly being translated through the global network, making it difficult for the federal government to continue to ignore. This translation increased the federal government's dominance of the *negotiation space*, although since the federal government is also a heterogeneous local network, this translation did not reduce the complexity of the ongoing translation process.

The most serious concern in 1970 was freight rail service, which was still quite vital to industrial concerns. However, while passenger rail could likely have been terminated completely or absorbed by states with little effect on the global network, bubbling under the surface of the powerful commercial and governmental actor-networks was a somewhat less obvious local network of rail fans.

Lyon notes that, in contrast to the established local networks of industry, shipping and labor advocates, the passenger actor-network was uncoordinated and largely spokesperson-less ([37], p. 233). This began to change in 1966 when attorney Anthony Haswell formed the advocacy group The National Association of Rail Passengers. However, Phillips asserts that an influx of letters to Capital Hill in the crucial years of 1969 and 1970 appeared to be a spontaneous expression of concern by significant numbers of voters that Congress could not ignore ([40], p. 28). Regardless of the amount of centralized organization, the local actor-network of rail passengers was translating the global network for their benefit.

The members of this local advocacy actor-network were not exclusively civilian. Aside from the aforementioned Senator Pell, Phillips names a number of rail fans in government with the power to shape policy [40]. Wilner even asserts that President Nixon was a closeted rail fan, noting that Nixon's father was a streetcar conductor and that Nixon's memoir includes recollections that as a child his aspiration was to be a railroad engineer—something common in that

era ([36], pp. 42–43; [44]; [45], pp. 53–54). This demonstrates how the networks of ANT are dynamic, interlocking mesh structures, in contrast to the more static *a priori* structures of conventional sociology.

A variety of proposals for federal subsidies to private railroads or ownership of passenger equipment began circulating in Congress in 1969 ([36], pp. 36–51). The compromise that emerged from the process of negotiation between liberal and conservative local networks was *Railpax*, which involved a conception of a nationalized passenger rail system as a for-profit corporation. This imagined new local network had little basis in any possible material network. While the for-profit intermediary was a vital part of negotiation, it has left a persistent legacy in discursive instability and rhetorical vulnerability to conservative attacks.

The legislation was proposed by Transportation Secretary John Volpe, introduced into the Senate by Senators Vance Hartke and Winston Prouty and introduced into the House by Representative Harley Staggers ([40], p. 30; [46], p. 153). The Senate passed the *Railpax* bill with little debate on 1 May 1970. The bankruptcy of the Penn Central on 21 June 1970 was an intermediary that spurred similar action in the House, and the reconciled *Railpax* bill (HR 17849) passed both houses by voice vote on 14 October 1970. Despite last-minute rumors of a pocket-veto, President Nixon signed the bill into law on 30 October 1970 with no official ceremony.

Furious negotiation and translation then ensued as the new actor-network became fully *elaborated*. Of the 259 intercity trains still running at the time, 110 were cut. Twenty of the 26 eligible railroads chose to join Amtrak. After a number of storied trains took their final, well-publicized runs, Amtrak—a new local network of intercity passenger rail—began operation at 12:01 am on 1 May 1971.

2.3. Network Durability

Law ascribes the durability of actor-networks to three aspects: material, strategic, and discursive ([13], pp. 148–49). While these three aspects are views of actor-networks and, therefore, interdependent, use of these perspectives provides a framework for building some measure of understanding of complex network dynamics.

Law notes that the focus of ANT is on *hows* in opposition to the focus of traditional sociology on *whys* (the Aristotelean efficient causes rather than end causes). This leaves questions about whether this ideographic methodology can reveal any useful nomothetic knowledge about regularities. Law asserts that ANT responded by “exploring the logics of network architecture and looking for configurations that might lead to relative stability” ([13], p. 148).

In asking *why* intercity passenger rail has survived in the US, the ANT perspective transforms this into a question of *how* Amtrak has survived, and by using the durability framework of ANT, some larger insights into the logic of that survival and into the future may result.

2.3.1. Material Durability

Law notes the obvious in stating that, “some materials last longer than others”. However, this statement highlights an absence in explanations for the state of passenger rail that rely solely on technological, economic or social influences ([13], p. 148). Since ANT acknowledges the interdependence of the human and non-human, ANT suggests that the vast material and formal durability of the physical railroad may offer an explanation for its persistence.

Level rights-of-way, steel track, stone ballast and monumental structures are all materially-durable non-human actors that facilitate the exertion of massive energies in the transportation of goods and people. They require massive infusions of capital and energy to construct, and are stable, defining fixtures of both urban and rural landscapes. Rail lines are active participants in the life of the community in ways that can be viewed as positive (commodity supply, mobility) or negative (noise, pollution, traffic congestion).

Even when abandoned, portions of this infrastructure will often physically persist for generations unless equally massive energies are exerted to obliterate their form. Adaptive reuse of stations as malls (e.g., St. Louis, Denver) or rail-banking of right-of-way as recreational trails

preserves the mythology of the railroad in fetishized sacred spaces. The material persistence of the sacred space promotes the social reproduction of this mythology in the same way that the physical majesty of the religious cathedral promotes social reproduction of submission to the nominal mortal representatives of the eternal. The translation of the material mythology of the railroad through the performative “kinetic art” of Amtrak ([29], pp. 75–78) is a driver of ridership and revenue.

However, Law is careful to point out that material durability begets tendencies rather than deterministic pathways ([13], p. 148). ANT focuses on relationships rather than actors. Although the physical durability of a massive non-human actor like a cathedral railroad station will promote the durability of relationships with the surrounding community, physical durability does not guarantee immortality. The abandonment and extensive destruction of physically durable housing stock within a single generation in the South Bronx, Highland Park, MI or central St. Louis, MO is testimony to the way in which relationships between humans and non-humans are performative, quickly mutable, and not inherent in the materials themselves. Understanding the durability of a performative institution like Amtrak requires understanding strategies and discourses.

2.3.2. Strategic Durability

Networks are elaborated through actions that are often deliberate strategies to create durable sets of relationships (the Aristotelean end causes). These strategies often involve the translation of strategies developed in other actor-networks. In addition, these strategies can also be said to include non-human actors from the biophysical environment that follow, “teleologically ordered patterns of relations indifferent to human intentions” ([13], p. 148).

The *Railpax* bill that formed Amtrak was the product of direct, deliberate action by actors like Secretary Volpe and Representative Staggers. These actors were operating in the context of relational network forces, such as constituent advocacy, failing railroad economics, the highway lobby, etc. Different actors and groups of actors had differing intentions for their actions (*variable geometry*). While many in the private railroad actor-network had supported *Railpax* as a strategy for preserving their own durability through the dissolution of the material passenger rail network, and many elected officials saw *Railpax* as an actor-network that could be translated for political benefit, *interpretive flexibility* allowed proponents inside and outside of government to advocate for the *Railpax* compromise as the beginning of a long-term strategy for creating a durable new actor-network of national intercity rail ([47], pp. 93–97).

Weaver notes the presence in federal governance of multiple veto points. This meta-strategic legacy of the founding fathers was intended to make governing cumbersome and inhibit tyranny ([48], p. 20). The result has been a system of governance where radical change is difficult and where programmatic actor-networks can endure long after the original rationale for their creation has ceased.

Strategies are not always successful. Chen notes that high-speed rail (HSR) proposals have appeared in Congress in perennial waves that coincide with economic downturns and Keynesian calls for economic stimulus and job creation [49]. Accordingly, these long-term projects have attempted to translate short-term needs, and, once the crises have abated, the initiatives have subsequently receded to fight another day.

The conservative political actor-network elaborated in the 1970s has had remarkable success in translating the discourses of politics in the US toward neoliberalism. However, despite the fervently-articulated and highly-detailed ideological arguments promulgated by conservative think-tanks—notably the Cato Institute (founded 1977) and the Reason Foundation (founded 1978)—the actor-network embodied by Amtrak thus far been too durable to translate out of existence ([47], p. 101). The budgetary arguments against Amtrak are discourses that attempt to translate multiscalar economic angst to the benefit of the broader neoliberal agenda. However, the benefits of the proposed systemic juxtaposition (devolution and dissolution) do not translate into legitimate material benefits outside of the ideologically-motivated minority network. Hence, there

is no translation of the strategies of the supporters and local beneficiaries who would suffer in such a juxtaposition.

Strategic durability extracts an opportunity cost in constraining the ability to adapt to changing conditions. A competitive equilibrium developed between ossified Gilded-Age-era regulatory actor-network and the longstanding administrative and financial actor-network of the private railroads, constraining vision and the capacity for strategic thought and action. As government and industry focused strategies for durability on highways and air travel, the network durability of the rail/regulation interlock precipitated the post-WW-II railroad crisis ([47], p. 12). The new strategies for creating durability that were represented by Amtrak and Conrail could only be pursued once the crisis had compromised the durability of the actor-network to the point where the actors could be juxtaposed and the needs of the actor-networks could be translated into new sets of relationships.

By contrast, in Europe and Asia, the destabilizing crisis was WW-II itself, which resulted in the catastrophic disruption of material, economic, political, and geopolitical networks. In the multi-generational process of building both new infrastructure and new identities, inadequacies in the rail components of their passenger transport actor-networks necessitated the development of new strategies to restore durability. In addition to expansion of automobility and aeromobility echoing that in the US (albeit at somewhat lower volumes), many European countries began construction of high-speed rail systems, which adapted established locomobility to the circulatory demands of late capitalism and reinforced the strategic and material durability of their legacy rail networks.

2.3.3. Discursive Durability

Law borrows the idea of mini-discourses from Foucault and defines them as modes of ordering (e.g., entrepreneurial, bureaucratic, charismatic, *etc.* ([13], p. 149; [50], p. 53). Discourses, “define conditions of possibility, making some ways of ordering webs of relations easier and others difficult or impossible”. Since realities beyond a single mode of ordering must be dealt with, stable actor-networks usually must operate multi-discursively, or in multiple modes of ordering.

Leatherby and Reynolds analyze passenger rail as, “a set of practices based on mutually shared understandings”, and note the role of discourses in that, “these shared understandings are based in language” ([51], p. 53).

ANT focuses on understandings as meanings, and consistent with the aforementioned *variable geometry*, the multiple meanings of Amtrak are shaped by differing discourses. For the environmentalist, Amtrak is sustainable mobility. For the neoclassical economist, Amtrak is a failed corporation and a waste of public funds. For the new rider, Amtrak is a novelty. For the politician, Amtrak is a means to mobilize political capital (both for proponents and opponents). For the rail worker, Amtrak is a job and source of identity. For the nostalgic rail fan, Amtrak is a kinetic connection to the past and orderly frame for a disorderly world. For the founding advocates of Amtrak, it was a way to reverse passenger rail decline through public investment ([47], p. 97). For the progressive rail advocate, Amtrak is an intermediate evolutionary stage on the way to the truly robust rail network that America deserves. For the elderly patron, Amtrak is a source of convenient mobility (in contrast to inconvenient aeromobility and inaccessible automobility). For the poor, Amtrak is a more comfortable alternative to the bus. For some rural communities, Amtrak is a vital form of connection to the outside world.

All of these associations of discourses with groups are generalizations and individual perspectives are shaped by multiple (and often contradictory) discourses. Yet from the viewpoint of ANT, it is this richness of meanings that might offer some clues to the durability of locomobility in the US via Amtrak.

If Amtrak were only highly localized political pork, it would be as systemically vulnerable as the handful of purely “political trains” in Wyoming and West Virginia that were discontinued when their congressional patrons (Mike Mansfield and Robert Byrd, respectively) retired or no longer had a direct role in Amtrak affairs ([36], pp. 47–48; [46], pp. 262–63; [47], p. 106). As a diverse

set of variable networked meanings, Amtrak retains a diverse set of networked constituencies that are strong enough to survive, but not visible enough outside the actor-networks of advocates or opponents to either thrive or attract fatal predators.

The discursive and the strategic are interdependent. For many advocates, Amtrak was a way of freeing locomobility from the destructive strategies of the private railroads, and, for many, it still represents the last hope for preserving the institution of passenger rail in the United States—which, once gone, would likely be difficult to revive ([47], p. 104; [48], p. 95; [52], p. 43). The capital investment in the physical network of track, structures and rolling stock promotes an (arguably fallacious) sunk-cost discourse for continuity ([29], p. 78).

While preserving the featherbedding of the traditional 150-mile workday limit that had been in effect since the slow steam locomotive era, during the negotiations that created Amtrak, labor also retained a traditional railroad severance package requiring six years of continued salary ([47], p. 98; [53]). The stated intention was to ease the impact on workers of a dissolution of passenger rail service, but this also served as a strategic poison-pill to prevent dissolution of Amtrak that, while of only minor economic significance in the context of the massive federal budget, is a discursive counterpoint to economic attacks based on the myth of profitability ([46], p. 269; [54]).

2.4. Demonstrations of Durability

2.4.1. Amtrak's Early Years

The assertion is that Amtrak was “designed to fail” as a graceful (or, at least, blame-free) termination of national intercity passenger rail transport has circumstantial support ([47], pp. 93–10; [55], p. 29). The *Railpax* bill that originally created Amtrak only required the corporation to run its designated system until July 1973 ([48], p. 95). Economist (and Amtrak critic) George Hilton articulated a teleological expectation typical of his era that Amtrak would die along with its legacy passengers as succeeding generations became habituated to air travel ([29], pp. 75–78). Hilton predicted a long devolution that would leave only the Northeast Corridor.

Nonetheless, Congress continued to fund Amtrak's operations and limited capital improvements throughout the 1970s as a *de facto* nationalized passenger train service. This survival is an example of the ANT concept of network *durability*.

Baron notes that the national aspect of Amtrak is significant to its survival ([56], p. 885). The interconnected national physical network permits distribution of benefits across political districts, broadening the political base of support. Even though the interests of different passengers and employees in different parts of the system are heterogeneous, the actor-network binds them in relationships of common cause to continue a service that focuses revenue from the larger global tax revenue actor-network into the smaller local actor-network that benefits from the national rail system.

Hilton makes a similar argument that the benefit to the local network is large enough to motivate political action, but, at such a small national per-capita cost, there is little incentive for anyone to fight against it except for a small number of fervent (albeit vocal and well-funded) ideologues and competitors ([29], p. 78). With a 2011 subsidy of \$1.6 billion out of a \$3.6 trillion federal budget, the per-capita subsidy for Amtrak was around \$6 compared to a total per-capita share of federal expenditures of \$11,500 per capita ([57], p. 41; [58]).

In ANT terms, the *enrollment* of the federal Government by the railroads caused a *juxtaposition* of roles within the local network of the federal Government, synchronizing the interests of both the railroads and the law-making actor-network (both legislative and executive) in opposition to the regulatory actor-network through the economic *obligatory point of passage* of the railroad actor-network. With the regulatory regime of the government (primarily through the ICC) now effectively working against the railroad ownership interests of the government, the *negotiation space* of Congress was activated to innovate a new regulatory regime.

However, awareness of the complexity of actor-network relations should temper a view of this synchronization as directly and uniquely causative of the deregulatory process. In contrast to the subsequent conservative demonization of President Carter with the rhetorical epithet *liberal* (e.g., [59], among many others), a closer historical examination of that period reveals Carter as a *spokesperson* for an unstable collection of local and global political networks that were undergoing *juxtaposition* under ascendant neoliberalism [60,61]. For example, Wilner presents Carter as a supporter of Amtrak in a way that has been consistent with conservative representation of Carter as an epitome of American liberalism ([36], p. 50). But far from being a passive and reluctant signer of legislation, Carter embraced deregulation and neoliberal discourses that would come to be personified by his more telegenic successor [62–64].

2.4.2. Surviving Rationalization

Carter was an active participant in the 1978 rationalization of the Amtrak route network [56,65]. Carter mentioned Amtrak in only one of his State of the Union messages—the speech that followed his defeat by Ronald Reagan—but the brief mention clearly reflects a distaste for a subsidized national rail service that might seem more appropriate coming from the mouth of Carter’s conservative successor:

Our goal through federal assistance should be to maintain and enhance adequate rail service, where it is not otherwise available to needy communities. But federal subsidies must be closely scrutinized to be sure they are a stimulus to, and not a replacement for, private investment and initiative. Federal assistance cannot mean permanent subsidies for unprofitable operations [66].

Wilner notes that the local network of rail passengers and advocates remained politically active (and durable) despite the financial and operational deficiencies of Amtrak in the 1970s ([36], p. 50). This reinforced the durability of the larger locomobility actor-network of which they were a part. After the negotiation process, the 1978 rationalization resulted in a system that included only a 14% reduction in route miles—which placed Amtrak at approximately the same size as on its first day of service. In addition, the new legislation finally accepted the obvious, eliminating language defining eventual profitability as an objective.

With the advent of the Reagan administration and the translation of the federal Government by an actor-network unified by neoliberal ideology and discourse, rationalization of locomobility was marketed as the elimination of wasteful subsidy—which would effectively eliminate national intercity locomobility in the United States ([52], p. 43). Reagan’s budget director David Stockman repeatedly urged zeroing out funding for both Amtrak and Conrail, and he was especially dramatic in his media appearances in support of that proposal throughout his four-year tenure ([36], pp. 3–4; [67], p. 390).

Labor unions were a special target of the Reagan administration, which effectively translated public resentment and envy into policy that weakened the power of labor in the US. The acquiescence of railroad labor unions had been pivotal to the formation of Amtrak and the negotiated work rules and severance policies reflected that influence ([36], pp. 79–80). Railroad labor arguably remains one of the primary beneficiaries of the existing system, translating the needs of its local employee actor-network to acquire resources from the global federal actor-network ([56], p. 887). The comparatively generous work rules negotiated at the advent of Amtrak arguably gave the unions room for negotiation in a more hostile 1981–1986 environment as the work rules were rationalized down to a 40-hour work week from the previous traditional 150-mile/day limits that dated from the era of slow steam locomotives ([46], p. 269).

The Clinton administration might be regarded as the first administration since Nixon that was even nominally supportive of Amtrak, although that support may have been more discursive than material. In the signing statement on the Amtrak Reform and Accountability Act (which

his Department of Transportation originally proposed in 1995), Clinton referred to Amtrak as “a significant component of our national transportation services in densely populated corridors, such as the northeast; on medium- and short-haul routes; and on transcontinental routes linking cities across the Nation” [68].

However, the Amtrak Reform law was the product of a hostile Congress and built on the mythology of passenger rail profitability. The reform council mandated by that Act ultimately recommended a decomposition of Amtrak into a collection of independent companies—the economically weakest of which would, presumably, be easier to rationalize out of existence [54,69]. The HSR initiatives Clinton promoted in his successful 1992 presidential campaign died in Congress [70,71]. The FRA designated a number of HSR corridors during the 1990s (most of which preceded Clinton’s inauguration), but the partially-high-speed *Acela* service on the Northeast Corridor was the extent of the Clinton Administration’s actual progress on HSR in the United States [72].

2.4.3. Resistance to Improvement

On 17 February 2009, newly-inaugurated President Obama signed into law the American Recovery and Reinvestment Act (ARRA or PL 111-5), which included \$8 billion for a national network of high speed rail corridors. Fifty-eight days later, Obama unveiled a more detailed strategic plan with ten proposed 100- to 600-mile corridors in various parts of the country [73,74]. Little in this vision was actually new—most of the corridors had been in various states of proposal, research, or planning for as long as half a century [75–77]. What was comparatively novel was the exertion of Presidential leadership and the actual appropriation of a non-trivial amount of money to make this vision a reality.

However, outside of upgrades to a handful of corridors to higher conventional speeds, this effort ultimately proved to be no more successful than initiatives in the Johnson or Clinton administrations. Arguably, the same network forces that have made Amtrak durable enough to survive multiple attempts at destabilization have also made it highly resistant to change of any kind.

The back-door funding of the Passenger Rail Investment and Improvement Act (PRIIA or PL 110-432) via the ARRA reflected the weak political position of intercity rail. The initial compromise formation of Amtrak was a translation incorporating variable geometry that permitted both supporters and opponents of national intercity rail to see *Railpax* as furthering their oppositional goals. By contrast, the Vision for High Speed Rail was a marketing ploy that offered little value to rail opponents and was arguably deceptive in what it offered its beneficiaries.

Sold with imagery of sleek bullet trains (and, perhaps, legitimate hopes that would be the ultimate end), most of the corridor proposals were conventional upgrades of existing service (e.g., STL/CHI) or development of new conventional corridors (e.g., Ohio 3C). The one legitimate true HSR possibility was Florida, which had a seriously flawed initial level of utility (expressed as fare-box recovery) that could easily be attacked discursively and defunded materially by a hostile governor newly elected in the reactionary wave election of 2010.

Automobility, aeromobility and locomobility were in competition for resources from the global network, but automobility and aeromobility were larger and more stable. As an aggressive, expensive, geographically-expansive initiative by the rail network, the PRIIA called attention to itself in a way that the comparatively inexpensive annual Amtrak subsidy does not. Hence, the existing actor-networks were able to mobilize network resources in opposition to the PRIIA that had not previously been available in efforts to defund the stable Amtrak actor-network.

This conception of the rail/auto debate as competition between asymmetrical networks may offer insights into why the failure of rail initiatives can give the appearance of a high-level conspiracy to rail advocates. While there are overt expressions of negotiational opposition like Southwest Airlines’ successful effort to quash the Texas TGV initiative in the early 1990s, the opposition or lack of political support for high-speed-rail and higher-speed-rail (HrSR) initiatives is less easy to

trace as direct, centrally-coordinate *quid pro quo* between politicians and the “road gang” via the circumstantial evidence of campaign support ([47], pp. 166–69; [78], pp. 94–99). A similar network of support for HSR can be traced via contributions of the construction industry to promote HSR ballot initiatives [79].

Following ANT’s eschewing of the heroic for the tracing of human and non-human actor relationships, the failure of HSR efforts can be seen as a failure of the HSR local network to translate the global network in the face of a more fine-grained collection of negotiations with the local networks of automobility and aeromobility. These networks pushed back in opposition in a way that could be interpreted as a conspiracy, but which might simply be seen as a manifestation of their durability.

Unlike the 1960s rail crisis that was, in fact, a crisis of the local rail actor-network that demanded defensive translation of the comparatively strong global network, the 2008 recession was a broader crisis of the global network that an opportunistic actor-network of HSR advocates attempted to translate for elaboration of their local network. The distributional discursive strategy of 2009 was seed money for an aspirational mode of organization rather than the desperate strategy of Amtrak’s 1970 formation where a network of riders and advocates was seeking to avoid oblivion. The Amtrak of 2009 was a stable, stalemated network that faced no immediate existential crisis.

As with discourses surrounding Amtrak, judgment of the PRIIA as a failure is made against a standard of success that envisions an imagined network similar to the French TGV or Japanese Shinkansen. This is a continuation of the discourse of failure that has surrounded Amtrak like a halo since its foundation. If success is more simply defined as progress, final evaluation of the PRIIA may be more positive. Distribution of resources was the result of a discursive strategy that, consciously or not, became the opening position in a negotiation between the global and local network. Funds were distributed around the country as a political strategy to build a broad-based actor-network. However, as the negotiation process ensued, new Republican governors rejected distributed funds, and the funds ended up back in the corridors where they could have a more immediate effect: St. Louis/Chicago Northeast Corridor, California. In Michigan, the ongoing transformations in the auto industry closed plants, significantly reducing the freight utility of the Norfolk Southern’s Michigan Line in their Dearborn Division, precipitating its sale to the State, and facilitating an HSR conversion with minimal interference from freight [80,81]. The process was indirect, but it did result in modest system improvement. Whether a different strategy could have resulted in a more immodest outcome is a meaningful, but ultimately unknowable, counterfactual inquiry.

3. Conclusions

This paper has demonstrated how ANT can be used to aggressively address both the social and technical aspects of passenger rail in a way that offers a perspective distinct from research that separates the social and technical worlds into distinct statistical reductions.

In this analysis, national intercity passenger rail transportation can be said to have persisted in the US because of the material, discursive and strategic strength of the actor-network associated with that mode. This stability has been both positive and negative, with the Amtrak Equilibrium both preventing dissolution and inhibiting expansion. While this stability has significant potential to persist in the future, such persistence could be disrupted by transitions in other actor-networks that cause a juxtaposition in the locomobility actor-network.

Amtrak’s advent in the 1970s coincided with a pair of geopolitically-induced oil price shocks, which Amtrak translated to its benefit in early marketing materials. In the present time, Amtrak, specifically, and rail advocates, in general, frequently attempt to translate growing environmental concerns with the nominal energy efficiency of rail transportation as a rationale for further expansion and public investment in passenger rail systems.

The transition from fossil fuels to whatever comes after will be novel, although Smil notes that past energy transitions have been protracted affairs [82], reflecting the deep embedding of energy sources in the social and spatial forms that co-evolved with those energy sources. This view is

consistent with the ANT perspective on socio-technical systems as the often durable products of complex relational networks. However, the finitude of fossil fuel sources along with the uncertainty of that level of finitude and the historic adaptability of energy actor-networks mean that durability should not be confused with permanence or inevitability.

In this context, it is certainly possible to imagine the durable actor-network of intercity passenger rail in the US having a greater role in a more-energy-constrained future. However, this perspective should also temper any expectations based on rail having inherent heroic qualities that will someday restore it to the mythologized dominance of mobility that it had in late-19th and early-20th centuries. For those seeking paths to the post-fossil-fuel future, this should also suggest a need for further critical unpacking of common assertions about the inherent sustainability of passenger rail and examination of other potential transition pathways.

A critique of ANT, and postmodernism in general, is that it is, “the true relativist’s world...a world without foundations...” ([83], p. 324). If everything is relative, does anything really matter, and does an ANT analysis make any contribution other than retelling stories?

In many ways, ANT analysis can be seen as narrative art based in empirical reality. Art allows us to step back from the rational and reductive and examine the multitude of variable meanings often hidden in actions and choices. This places us in a new perspective for examining our own motivations and our place in these dynamic actor-networks. It asks us to question what kind of future we labor for—and for whom.

Is Amtrak a wasteful example of distributive politics or a medium that preserves the past for a sustainable future? Meanings construct networks and networks construct values. Understanding those networks can give a clearer focus on what can and should be accomplished.

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