

Defining an Alternative Future
Birth of the Light Rail Movement in North America

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Covering three subjects, this paper sets forth conditions that led to the beginning of the light rail movement in North America. The first subject is a history of ideas and conditions that led to the National Conference on Light Rail held in Philadelphia, Pennsylvania, in June 1975. The second and third subjects are summaries of the ideas and conditions that led to the adoption of light rail transit in Edmonton, Alberta, and San Diego, California, the first regions to adopt light rail in Canada and the United States, respectively. The information presented relies primarily on written documents and interviews with people who participated in events described herein. It is argued that light rail transit was a product of social movements of the late 1960s and 1970s when, for the first time in American history, large numbers of people looked to the future with a sense of foreboding but at the same time felt empowered to control the future. Many thought that they could reverse the fortunes of transit, thereby improving urban conditions, by embracing light rail transit. This was a northern European concept that strove to achieve the level of service of rapid transit at a fraction of the cost. Although the American transit industry was ambivalent to the idea activists championed it, which the National Conference on Light Rail disseminated to the planning and transportation engineering community throughout the United States and Canada. At the same time the same forces led to light rail adoption in Edmonton and San Diego.

INTRODUCTION

In the two decades preceding 1970, U.S. transit patronage fell by 58%, and the percentage of that ridership using streetcars declined from 23% in 1950 to just 3% in 1970 (1). During this period automobile use grew much more than transit use declined, so transit's relative decline was much more than even these figures suggest. In 1970 there appeared to be little future for the U.S. transit industry and its suppliers.

What actually transpired was quite different. Not only was there a renaissance in U.S. and Canadian transit investment, in some metropolitan areas there was even a small increase in transit's importance. The renaissance partly is the result of visionaries and reformers who, because of globalization, were able to look past the domestic transit industry and its suppliers to more promising offerings from the transit industry in northern Europe. One of the promising prospects from northern Europe was light rail transit, that evolved from traditional streetcar systems in many northern European cities during the 1950s and 1960s. Light rail jumped the Atlantic in the late 1960s and early 1970s.

This discussion will trace how European experience with light rail captured the

imagination of transit reformers in the United States, and it will look at how the idea actually took root in the first application of light rail in Canada (Edmonton, 1978) and the United States (San Diego, 1981).

In general, the light rail movement arose in North America during the 1960s and 1970s amidst growing disillusionment with technological progress. Prior to this time the public was fatalistic about its ability to alter the course of technological progress but optimistic that the results ultimately would turn out for the better. In the 1960s, pessimism began to replace optimism about the long-term consequences of market-led technological progress (2). At the same time, however, there was increasing optimism that individuals could act collectively to alter the course of technological (and also social) progress for the greater good. Fatalism about the inevitability of progress gave way to activism.

This paper argues that the coming of light rail to North America was an expression of this new North American spirit of political activism. The light rail movement attempted to steer technological progress away from what the established transit institutions in North America promised. In that respect it had a revolutionary aspect to it, earning the appellation of a “movement.” I also argue, however, that the early light rail movement had a strong pragmatic streak, resulting in a complex and not obvious relationship between the light rail movement and both the established transit industry and the anti-highway movement of the same period.

APPEARANCE OF THE LIGHT RAIL VISION IN NORTH AMERICA

Dean Quinby’s Contribution

The term “light rail transit” did not appear in North America until 1972, but the concept to which it referred had been talked about for at least a decade before then. In 1962, *Traffic Quarterly* published an article by H. Dean Quinby describing the concept (3). Quinby was an engineer employed by Parsons, Brinkerhoff, Quade and Douglas, and he was a part of the team assembled in California’s San Francisco Bay Area to design and build the nation’s first regional rapid transit system, the Bay Area Rapid Transit (BART). What Quinby talked about in “Major Urban Corridor Facilities: A New Concept” was not BART, however. It was a description of a new form of transit that was evolving in several West German, Swiss, Belgian, Netherlands, and Swedish cities from their efforts to upgrade their historic streetcar systems during the post World War II period as automobile use was surging upward.

Rebuilding took different forms in the various northern European cities, but Quinby discerned two attributes common to most of the rebuilding efforts that together constituted to him the emergence of a new transit concept. One was capacity enhancement with emphasis on larger cars, operation of cars in trains, and much greater door capacity with new fare systems to make use of that capacity. The result was that for the first time surface transit could engorge and disgorge large volumes of passengers at intermediate stops quickly. The other was speed enhancement, achieved through traffic engineering and light infrastructure investments, with short applications of heavy infrastructure investment in critical areas. What particularly impressed Quinby was the effort to achieve both attributes at low cost. Rapid transit lines, of course, already had both attributes, but they were prohibitively costly. As Quinby saw it, the goal of the streetcar rebuilding was to bring the qualities that long had been the sole province of rapid transit to surface-running transit, thus making the attributes much more widely available to the public.

These ideas appealed to some who wished to reverse the long decline of transit, summarized in [Figure 1](#). From 1930 on, transit managers replaced streetcars with buses to cut costs. Buses were not popular, however. By 1970, the public's use of them was plummeting. Had traditional streetcars been retained, they probably would not have done much better. Interestingly, though, rapid transit patronage was comparatively resilient to the auto onslaught. For those who wanted to preserve public transit use, rapid transit seemed like an obvious choice. Unfortunately, it was too costly to be adopted widely. What, however, if one could obtain many of the characteristics of rapid transit at a fraction of the cost? The goal of what became known as light rail transit after 1972 was to do just that: it was to be every city's rapid transit.

The appeal of such ideas spread through the 1960s even as streetcar lines and the last of the interurbans continued to be abandoned in cities such as St. Louis, Los Angeles, Chicago, Baltimore, Pittsburgh, Philadelphia, and Washington, D.C., and U.S. transit use continued to plummet. An English publication, *Modern Tramways*, kept North American readers up to date with the latest northern European developments, and increasing numbers of North Americans were traveling to northern Europe, including some who were interested in transit revival. The difference between what they were experiencing at home and what they saw in northern Europe was stunning and galvanizing.

Bill Adams' Contribution

In 1965, *Traffic Quarterly* published another article on the concept, but this was rooted in rationalization of American transit practices (4). As an employee of the Boston Redevelopment Authority and the Metropolitan Boston Transit Authority, the article's author, William Adams,

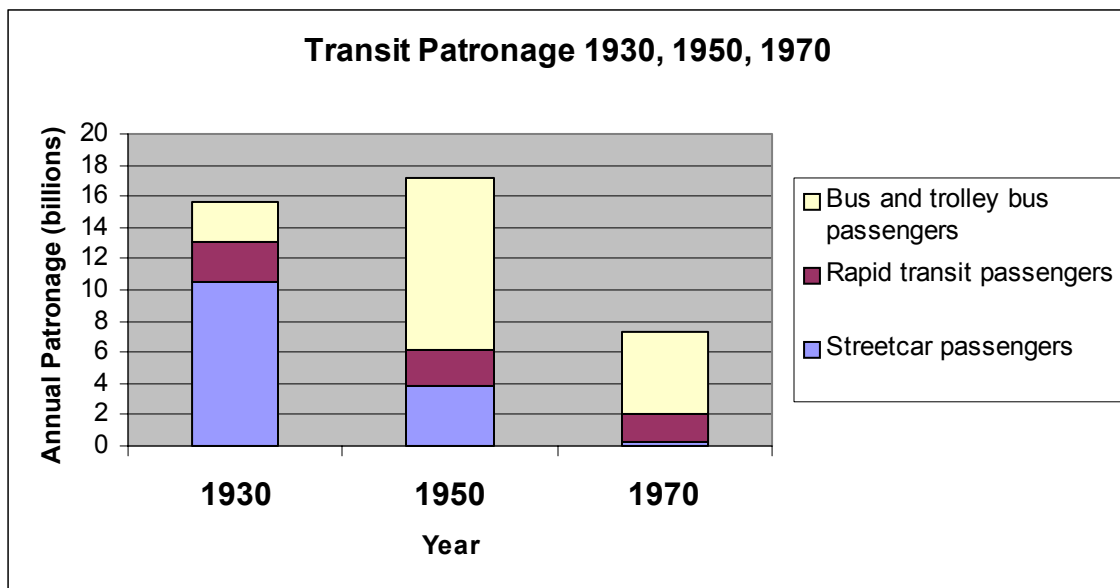


FIGURE 1 U.S. transit patronage by mode; 1930, 1950, and 1970.

studied operations of Boston's remaining subway-surface streetcar lines and came to conclusions for reorganizing their operations that paralleled transformations in northern Europe. Adams claims that he was at the time unaware of northern European developments, but when he traveled to Germany shortly thereafter his convictions were reinforced. Not long thereafter Adams was hired by the newly established Urban Mass Transit Administration (UMTA) (interview with William Adams, June 11, 2002; interview with Jeff Mora, June 10, 2002).

Stewart Taylor's Contribution

In the late 1960s, a U.S. transit consultant who had been traveling to Europe since before World War II and who regularly read *Modern Tramways* came to the conclusion that many of the nation's urban ills—urban highway expansion, suburban sprawl, and transit decline—were interrelated issues. The consultant, Stewart Taylor, was from an influential Washington family and had grown up comfortable in the presence of power. He also was a gifted writer. He believed that northern European streetcar transformations held considerable promise for U.S. urban regions, and he resolved to popularize the concept with those in power. After contacting the editors of *Traffic Quarterly*, which he considered the most widely read and erudite journal in the transportation field, of their potential interest in a story on the topic, he traveled at his own expense to tour several of the systems undergoing transformation and meet with their managements. He then drafted an article intended to appeal to decision makers, and *Traffic Quarterly* published it in 1970 as “The Rapid Tramway: A Feasible Solution to the Urban Transportation Problem” (5).

Taylor characterized his article as “the shot heard around the world,” for the light rail movement (interview with Stewart Taylor, June 14, 2002), and for years thereafter he used the article and variants of it to lobby influential people and as support in appearances on radio and TV programs. News magazines also summarized Taylor's theme. The article outlined problems of congestion, inner city troubles, and suburban sprawl as consequences of federal policy promoting massive urban freeways, while it stated that rapid transit was an infeasible alternative because of its cost. Buses were an unacceptable form of transportation to those with choice. The rapid tramway, on the other hand, could be afforded in most U.S. urban regions and would be used by those with choice. Taylor's concept of light rail was as a higher capacity but lower cost and more environmentally friendly transport mode serving the downtowns of major cities.

Federal Transportation Legislation

By the early 1970s, such efforts began to affect public policy, which was in a period of rapid flux. The Highway Act of 1962 established the beginnings of the metropolitan planning organization (MPO) planning process, which was strengthened with the Highway Act of 1973. In the early 1970s, newly established regional planning bodies around the U.S. were undertaking studies of regional rapid transit systems alongside regional freeway systems. Municipal and regional transit authorities took control of most U.S. private transit systems during this period. The Urban Mass Transit Act of 1964 established the UMTA and provided funds for the public takeover of private bus systems, the purchase of new buses, and the construction of new garages. The Urban Mass Transportation Assistance Act of 1970 provided \$3.1 billion to mass transit systems over a 5-year period, some of it intended for the renewal of existing rapid transit systems, but much of it intended for new-start rapid transit systems. It was apparent from the

beginning, however, that claims for such funds would outstrip supply by several fold (6–8, interview with Ken Orski, June 14, 2002).

The Role of Vukan Vuchic

In 1972 the UMTA commissioned Vukan Vuchic, Professor of Civil Engineering and Planning at the University of Pennsylvania, to write a report that summarized modern tramway development in Europe along with the status of subway-surface streetcar operation in the United States. Vuchic had been collaborating with Dr. Friedrich Lehner, the most influential of Germany's transit engineers and the developer of many of the ideas associated with light rail. Vuchic also was a confidant of Dean Quinby (interview with Vukan Vuchic, June 13, 2002). At the time, Boston and Philadelphia had old streetcar subways in their downtowns. Outside of the downtowns, streetcars in those cities ran in the streets or in the medians of streets. The BART project in the San Francisco Bay Area also was nearing completion, and in addition to regional rapid transit, it created a downtown subway in San Francisco which might be used by a new local rapid transit line or, alternatively, by the few remaining local streetcars. A heated political fight in the late 1960s in which both Quinby and Vuchic figured (Quinby clandestinely; Vuchic openly), resulted in a decision to put the streetcars in the subway. The streetcars still would operate on the surface in the inner suburbs. By this time, there was considerable interest in reconfiguring the U.S. subway-surface streetcar systems to resemble northern European practice, and there was increasing recognition that modern tramways might be appropriate for urban regions that long since had given up streetcar operation. The Vuchic report provided a state-of-the-art benchmark for future progress (interview with J. Mora; interview with V. Vuchic).

It also was in 1972 that the term light rail was coined to describe the concept of the streetcar transformations. By this time the Germans used the term *Stadtbahn* to describe the concept, and Vuchic was in favor of using the English translation, which is “city rail,” but UMTA decided upon light rail. Vuchic ultimately issued his report using the term light rail (interviews with V. Vuchic, J. Mora; interview with Robert Abrams, June 10, 2002).

UMTA and the Standard Light Rail Vehicle

During this time, UMTA decided to prepare a performance specification for what became known as the Standard Light Rail Vehicle (SLRV) to replace President's Conference Committee streetcars in San Francisco and Boston. According to Robert Abrams, who administered UMTA's capital grants program at the time, UMTA wanted to reduce the costs of light rail vehicles by creating an off-the-shelf model that all applicants for federal funds to build or refurbish light rail lines would be required to use. After the San Francisco Municipal Railway rejected high bids on its own specifications for a new light rail vehicle, UMTA retained Parsons-Brinkerhof to rewrite the specifications for the SLRV. The resulting performance specification was the size of a phone book, and in 1972 bid solicitations went out for the construction of 100 SLRVs for San Francisco and 150 SLRVs for Boston. There was only one bidder—not an established U.S. car company, but Boeing Vertol, which previously made helicopters for Viet Nam. The part of the Boeing Vertol order that went to Boston in 1976 was plagued with problems. The cars that went to San Francisco fared somewhat better but still required an inordinate maintenance effort to keep them running. To Abrams, the SLRV program turned into a fiasco, but it advanced awareness of light rail technology and its possible applicability to U.S.

transit systems (interview with R. Abrams).

Ken Orski and the National Conference on Light Rail

Between 1974 and 1976, a new UMTA Associate Administrator for Policy and Programs, Ken Orski, advanced the light rail movement considerably by changing its focus from re-equipping old streetcar systems to building entirely new systems. Orski, a lawyer trained at Harvard, joined General Dynamics in 1956, and during his 12 years there he examined peacetime markets that the company might pursue. Despite the declining fortunes of mass transit, Orski foresaw a sizeable market in rapid transit rolling stock that would be necessary to restore U.S. urban areas. Between 1968 and 1974 Orski worked for the Organization for Economic Cooperation and Development (OECD) in Brussels, where he focused on multilateral cooperation on transportation and urban development. That experience exposed Orski to the concept of light rail, which appealed to him. Shortly after assuming his UMTA role in early 1974, Orski circulated an internal memo calling for UMTA to require a planning process, ultimately known as alternatives analysis, for regions applying for federal funds to build new rail systems. One alternative that was to be given serious consideration was light rail transit, which was oriented to many of the same objectives as rapid transit but at lower cost. Orski issued a second internal memo in early 1974 suggesting that UMTA sponsor a national light rail conference to get the word out to planning bodies throughout the United States about the possibilities of light rail, which henceforth had to be considered in alternatives analysis (interview with K. Orski).

Orski approached Stewart Taylor, whom he already knew, to begin planning for the conference, which became known as the National Conference on Light Rail. Taylor brought in Vukan Vuchic, whom Taylor had known since Vuchic had invited Taylor to address one of Vuchic's classes on the modern tramway concept. Joseph Silien and Bill Morris, both associated with an effort to start a new light rail line in Rochester, New York, also joined the planning committee. Orski wanted the committee to carve out a prominent role in the conference for Senator James R. Mills, president pro tempore of the California State Senate who was actively promoting the development of light rail in San Diego (interviews with K. Orski, S. Taylor, V. Vuchic, J. Mora).

Orski also approached TRB to cosponsor the light rail conference. In 1972 the then Highway Research Board (HRB) held a retreat in New Hampshire to discuss the growing federal role in transit and whether the HRB committee system should reflect that role. Following the conference HRB changed its name and established a new public transportation section with four committees and assigned Wm. Campbell Graeb to staff the new transit committees. Graeb (pronounced "Groib") was originally from Bern, Switzerland, but he was trained as a civil engineer in the U.S., and he had worked in highway planning for the District of Columbia before joining HRB in 1968. Graeb retained an interest in trams from his youth in Bern; however, and he was very interested in the light concept when he first heard of it. When TRB responded enthusiastically to Orski's request, Graeb was the logical person to handle the logistics of the conference (interview with Campbell Graeb, June 11, 2002).

The other logical body to cosponsor the conference was the American Public Transit Association (APTA), but Graeb said there was serious internal division within APTA over whether the organization should be associated with light rail. There was very strong opposition from APTA members associated with rapid transit systems. Graeb did not know why the rail transit people were opposed, but he speculated that they did not want potential government money for rail rapid transit diverted to new light rail systems. [Neither Graeb nor Vuchic mentioned it, and I did not bring it up

in the interviews because I did not know it at the time, but by 1977 the president of APTA was Thomas O. Prior, General Manager of the San Diego Transit Corporation and a bitter foe of Senator Mills and of light rail in San Diego (Interview with Senator James R. Mills, July 17, 2003). Whether Prior was president of APTA in 1975 I do not know, but if not he likely would have been an important member of APTA.] Ultimately, APTA decided to allow its name to be used as a cosponsor, but only reluctantly, according to both Graeb and Vuchic (interviews with C. Graeb, V. Vuchic).

The National Conference on Light Rail took place in Philadelphia in June 1975, with approximately 300 people registered, about double the number that Graeb and other organizers anticipated (interview with C. Graeb). Attendance exceeded that of earlier TRB specialty conferences. Trolley enthusiasts, which Graeb did not target in publicity for the conference, accounted for a significant part of the attendance. They came from all over the country and slept in dorms at the University of Pennsylvania. Graeb said that the trolley buffs were disappointed; they were not interested in light rail but in restoring old streetcar service, and there was little in the conference that interested them. The program focused largely on European light rail development and its potential applicability to North American urban regions. Much of the U.S. content focused on UMTA's efforts to develop the SLRV, and the conference featured a tour of the Boeing Vertol plant near Philadelphia to view SLRVs under construction. While these topics did not interest trolley buffs, they did interest community activists as well as city planners, MPO planners, state highway officials, transit operators, and other transportation professionals from around the country, who also were in attendance. Many of these people became enthusiastic carriers of the light rail message, which was that high performance regional rail transit could be achieved at costs low enough to be practical in mid-sized U.S. and Canadian cities. The conference met Orski's expectations, and subsequent to it, he commissioned DeLeuw Cather to write a state-of-the art review of light rail in Europe and the U.S. (9; interviews with S. Taylor, C. Graeb, V. Vuchic, K. Orski).

ADOPTION

The first region to adopt light rail in North America was Edmonton, whose first line opened in 1978. Calgary and San Diego opened their first lines in 1981. Decision making leading to the first three light rail starts was not influenced much by the light rail conference of 1975, but it was influenced by many of the same forces that led to the first national light rail conference. On the other hand, decision making leading to the second wave of light rail openings, in Portland, San Jose and Sacramento, California, was heavily swayed by the first national light rail conference. I am in the process of researching light rail adoption and its consequences in these cities, with research most advanced for Edmonton and San Diego. At this point I will briefly summarize factors influencing light rail adoption in Edmonton and San Diego and their relationship to the North American light rail movement. I will conclude with preliminary observations about how factors leading to the light rail conference and light rail adoption in Edmonton, Calgary, and San Diego influenced subsequent light rail adoption.

Edmonton

Edmonton had a municipally owned transit system dating from about 1912, which was managed by a cadre of professionally schooled engineers throughout its history. The general manager from 1949 to 1973 was an electrical engineer, Donald L. MacDonald, whose first major task was to replace the antiquated streetcar system with trolley buses circa 1949–51. Because of the discovery of oil in nearby Leduc in 1947, the city's population grew from about 150,000 in 1950 to about 500,000 in 1970, and MacDonald strove to expand the transit system to match the growth of the city. John J. Bakker, a civil engineering professor at the University of Alberta who gained experience in the planning and operation of timed transfer bus systems in German-occupied Netherlands during World War II, aided MacDonald with this effort. During the 1960s MacDonald and Bakker developed a long-range strategy of serving the downtown with rapid transit that was integrated with a region-wide timed transfer bus system, and although they persuaded city council to approve the construction of a small rapid transit system in 1968, the realization that fares could not support its construction caused city council to withdraw its support in 1970. The city engineering department then asked the council to approve the construction of a freeway ring encircling the downtown from which radials would extend to the suburbs. The proposal led to a revolt by community groups, which researched freeway revolts in Toronto and the United States and documented urban destruction that would ensue from the Edmonton freeway proposal, known as the Metropolitan Edmonton Transportation Study, or METS plan. The group published its findings in a little red book called *The Immorality of the Motor Car* and successfully lobbied city council to scrap the freeway plan in 1971. The group, called the Practicum on Community Analysis, then turned its attention to light rail, having been persuaded of its efficacy by articles in *Modern Tramways*, Dean Quinby's and Stewart Taylor's articles in *Traffic Quarterly*, and visits to German, Dutch, Swedish, and Swiss light rail systems. In 1972 the group published *Light Rapid Transit, the (Immediate) Answer for Edmonton*, explaining the light rail concept in Europe and showing how it could be applied to Edmonton. MacDonald's and Bakker's earlier integrated rapid transit and regional bus plans were adapted for this purpose. Nothing further happened until the 1973 energy crisis bloated Alberta provincial coffers with royalties. Both MacDonald and his counterpart in Calgary, William Kuyt, were known and respected by the new premier of Alberta, Peter Lougheed, who created funds for both Edmonton and Calgary to support the construction of light rapid transit for those cities. This led Edmonton City Council to approve light rail construction, using German U-2 cars identical to those that were placed into operation in Frankfurt am Main in Germany in 1968. Calgary City Council followed a couple of years later, using the same type of car. Both cities had looked widely for cars and could find no interest on the part of U.S., Canadian, Dutch, or English manufacturers in supplying small orders. (Edmonton's was for 14 cars; Calgary's was for 25 cars.) That was until DuWag, the manufacturer of the U2 car, was found. Bakker recalls DuWag asking, "How many cars do you want? Two, three, six?" (interview with John Bakker, Aug. 14, 2002; interview with Jaswant Kooner, July 22, 2002; interview with William Kuyt, Aug. 13, 2002; interview with Peter Boothroyd, Aug. 16 2002; interview with John Schnablegger, Aug. 20, 2002).

San Diego

San Diego was the first U.S. region to adopt a new light rail line. Planning for rail transit in San Diego originated in the region's MPO, then called the Comprehensive Planning Organization (CPO). CPO's executive director, Dick Huff and his assistant, Ken Sulzer had been recruited in the mid-1960s from the National Capital Planning Commission in Washington, D.C., and CPO's first regional plan reflected their vision for the region. Similar to the adopted plan for the nation's capital, the San Diego plan featured 59 mi of radial regional rail transit lines focused on the central business district. The rapid transit system was to be supported by dense land use development as well as approximately 2000 feeder buses. At the time the San Diego Transit Corporation (SDTC) operated about 250 buses. Low density development would separate the radial transit fingers. Prepared pursuant to national transit legislation of the early 1970s that allocated several billion dollars for the construction of new rail rapid transit systems, the CPO plan was released in 1974 (interview with Ken Sulzer, July 16, 2003; interview with J. Kooner).

The president pro tem of the California State Senate, Senator James R. Mills, represented San Diego and favored transit development, having carried two important transit funding bills that enable expansion of the state's transit industry. He believed that the CPO plan was far too rich for the San Diego taxpayer, however, and having been reading *Modern Tramways* for a couple of years and having been in touch with Ken Orski, Mills advocated light rail development for San Diego. Rebuffed by both CPO and earlier by the SDTC's Tom Prior, Mills turned to the San Diego County Board of Supervisors for assistance. The board authorized its assistant county engineer and highway designer, Rudy Massman, to investigate the feasibility of light rail in CPO's highest priority corridor. Massman put together a small staff of road designers, costers, and a transit engineer (Jas Kooner) who had worked under MacDonald and Bakker. Massman concluded that a high performance light rail line could be built at low cost from downtown San Diego to the south. In the second part of the study, which included another protege of MacDonald and Bakker, Greg Thompson, Massman concluded that a regional light rail system was feasible and would serve the region effectively if it were the central part of a reconfigured bus system that allowed multidestop bus service in the region. On the basis of the study, Mills introduced and carried state legislation that created the San Diego Metropolitan Transit Development Board (MTDB) with power and funding to carry out the vision put forward by Massman. Much of the power of MTDB was gained at the expense of both SDTC and CPO, and UMTA staffers attempted unsuccessfully to decertify the San Diego region as a consequence of its passage (Interview with Sen. Mills; interview with Arthur Bauer, Aug. 6, 2002; interview with Rudy Massman, Aug. 15, 2002; interview with J. Kooner; interview with K. Sulzer).

Under the direction of Bob Nelson, who previously had been deputy general manager in charge of finance for BART and who held a similar position later at MARTA in Atlanta, Georgia, MTDB crafted a plan for constructing light rail within the constraints of existing state and local funding sources. The San Diego proposal called for the use of DuWag U2 cars almost identical to those about to go into operation in Edmonton. MTDB's task was made easier in August 1976 when Tropical Storm Kathleen washed out part of the San Diego & Arizona Eastern Railway, which coincidentally traversed the desired corridor, making its owner, the Southern Pacific Company amenable to talking about selling the railroad to MTDB. In 1978 SDTC threatened to reduce bus service if MTDB went ahead with its plans, because it said that there was not enough money in the region to operate both the bus and rail service. For the previous 3 years SDTC's unit costs escalated at about 15% per year, more than double the rate of

inflation. Nelson countered that if SDTC's unit costs could be frozen for 2 years and then allowed to grow at 5.5% per year, the region not only could afford both the existing bus service and light rail, but the amount of transit service operated in the region could be doubled over the next 15 years. Nelson then demonstrated how the region could control the growth in unit bus costs. His argument was credible with Mayor Pete Wilson, who already was impressed by MTDB's ability to get an agreement from the Southern Pacific Company to buy the San Diego & Arizona Eastern Railroad for \$18.1 million. Wilson then added his considerable weight to the light rail cause, and the project went forward. Nelson was replaced by MTDB's director of planning Tom Larwin, who spread oil over the stormy bureaucratic waters, and under Larwin's leadership, MTDB largely kept Nelson's promise. The magnitude of transit service roughly did double in the MTDB service territory over the ensuing 15 years with no significant increase in taxes supporting transit operations, while transit patronage also doubled, and light rail became politically popular (10–12; interview with Ben Dillingham III, July 17 and 19, 2003; interview with Tom Larwin, July 22, 2003; interview with Judith Bauer, July 18, 2003).

CONCLUSIONS AND DISCUSSION

Light rail arose from the social ferment of the mid-1960s through 1970s as activists and politicians sought more benign and affordable solutions to transportation problems facing North American urban regions. The goal was to approach the level of service provided by rapid transit and gain many of its benefits at a small part of the cost. This made it possible to introduce rail transit into previously all-bus cities and by doing so achieve overall transit improvement. Cities in northern Europe provided the model. Dean Quinby, Bill Adams, Stewart Taylor, Vukan Vuchic, and others promoted and refined the idea for over a decade before Ken Orski wove the various threads into the National Conference on Light Rail held in Philadelphia in June 1975.

The decision to build light rail in Edmonton came before the National Conference on Light Rail, but the forces that led to the National Conference led also to the Edmonton decision. From the 1950s into the 1970s the city grew rapidly, straining the city's transportation system. Looking to the future, Don MacDonald and John Bakker sought to add capacity to the transit system's central business district trunk lines with rapid transit while reorienting buses to suburban destinations, but were thwarted by the cost of rapid transit. At the same time, citizen activists resisted the imposition of a freeway network over the city fabric and sought a more socially benign solution that also was less costly. Light rail was seized by both the transit system and the citizens.

In San Diego the major issue was how to improve the region's transit system at an affordable cost. The CPO plan, while laudable, was not achievable fiscally. On the other hand, SDTC used money given to it by Senator Mills to inflate its unit costs, reduce fares, and add unproductive service. By the mid-1970s the system was out of money and threatening service cutbacks. The European model of light rail promised a different and potentially achievable approach toward improving and expanding transit in the region, and the approach used in Edmonton of restructuring the bus system around light rail into a regional, multidestination system appealed to Mills. Excellent results have been achieved following this approach in San Diego.

It is impossible to say whether or not light rail would have happened in other U.S. regions in the absence of Edmonton's and San Diego's decisions to go ahead. The forces that led

to the National Conference on Light Rail and the decisions to move ahead in Edmonton, Calgary, and San Diego, affected other U.S. urban regions, as well, and other regions might have adopted light rail even without the examples of Edmonton, Calgary, and San Diego. Strong anti-freeway movements in Sacramento and Portland (Oregon), for example, would have occurred in any event. Activists from those movements attended the National Conference on Light Rail and were energized by the experience. They would have been energized whether or not light rail decisions happened in Edmonton, Calgary, and San Diego. The Interstate Transfer Provision of the Highway Act of 1973 ultimately provided most of the funding for the initial Sacramento and Portland projects. One is tempted to think that those projects would have gone ahead, even without the examples of Edmonton, Calgary, and San Diego. Other projects may have gone ahead, as well.

I will end on still another speculative note. Before the opening of light rail service in San Diego, the U.S. transit industry was ambivalent toward light rail. After San Diego opened, however, the political popularity of the light rail idea became evident, at least to some in the industry. If a light rail movement started in a particular community, the transit agency that stood in its way might not prosper, whether or not the decision was made to go ahead. Some argue that if light rail is rejected in a region, there is more money with which to expand bus service, but I am not aware of major bus service expansions coming on the heels of light rail proposals being placed on the back burner. Rochester, New York, Dayton, Ohio, Kansas City, Kansas, Tampa, Florida, and Columbus, Ohio, come to mind. Bus transit in those regions has stagnated after it was decided not to proceed with light rail. On the other hand, there are examples of transit agencies that seized upon the light rail idea and ran with it and saw political animus toward transit turn into support, not only for light rail, but for expanding bus service, as well. We have seen this not only in San Diego, but in Portland, Dallas, Texas, Denver, Colorado, and St. Louis, Missouri. Based on the evidence that I have seen so far, I venture to say that where light rail has been conceived not of a technology unto its own but as the central and cost effective backbone of a regional restructuring of bus services, light rail has generated political support that previously was nonexistent for transit improvement. Whether it will continue to do so depends to a large degree on how cost effective future light rail proposals are and what role they are scripted to play in the evolution of regional transit networks.

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