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Historic Streetcar Systems of Colorado

APPLIED RESEARCH &
INNOVATION BRANCH

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16. Abstract

Transportation impacts to historic streetcar lines in Denver and other communities in Colorado are often unforeseen given that many tracks lay underneath paved streets and are not well documented. This results in frequent unanticipated discoveries during construction of publicly assisted transportation improvement projects in Colorado. A historic context was developed to provide a consistent methodology for the evaluation of historic streetcar lines. A corresponding GIS component was developed to provide reliable and consistent mapping of the former streetcar line in Colorado along with pertinent information relative to each streetcar line, including ownership, technical information, dates of operation, and current condition, if known. Mead & Hunt, Inc. and ARCH Professionals, LLC conducted historical research at local archives to examine primary documents and maps, along with previous studies and mapping efforts, to develop the statewide historic context and evaluation methodology. AECOM Technical Services Inc. served as the project manager and completed the GIS component of the project.

Implementation

The GIS component will allow CDOT and other interested parties to easily identify the location of potentially buried historic streetcar lines and access information on the companies associated with the lines, the technologies utilized, the years the line was in operation, and other pertinent details. For CDOT, this information will allow project planners to identify the potential location of buried lines early in the project planning and review process, eliminating last minute discoveries that are costly both financially and to project schedules. The evaluation framework will further assist efforts by CDOT and its consultants, as well as local communities, to determine whether a specific surviving remnant of a streetcar line is historically significant. CDOT historians can utilize these findings to evaluate the NRHP eligibility of streetcar lines on the front end of project planning and streamline their Section 106 review process, as the GIS component provides valuable identification information for each line, and the context completes much of the background research historians would otherwise have to complete on a project by project basis.

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Cover photo is from Pikes Peak Library District, Digital Collection, Andrew J. Haralan Photographs, 402-83, Streetcar in Victor, Colorado, ca. 1902. For more information, see Figure 44.

EXECUTIVE SUMMARY

A. Why is Research Needed?

Transportation impacts to historic streetcar lines in Denver and other communities in Colorado are often unforeseen given that many tracks lay underneath paved streets and are not well documented. This results in frequent unanticipated discoveries during construction of publicly assisted transportation improvement projects in Colorado. Because there is no historic context, consistent mapping, or evaluation framework for historic streetcar resources in Colorado, it is often challenging for the Federal Highway Administration (FHWA), the Colorado Department of Transportation (CDOT), the Colorado State Historic Preservation Office (SHPO), local governments, and others to identify locations of these resources, assess potential significance, and determine the appropriate preservation strategy.

B. Cost Benefit

When complying with Section 106 of the National Historic Preservation Act of 1966, CDOT (acting on behalf of the FHWA) typically assumes all potential buried streetcar lines are historically significant, or eligible for listing in the National Register of Historic Places (NRHP). Given the lack of an overall context and evaluation framework, the FHWA, SHPO, and CDOT must evaluate each new discovery individually and execute individual Memoranda of Agreement (MOAs) for almost every federally assisted project with anticipated adverse impacts to buried streetcar resources, with the end result varying greatly from project to project. A more comprehensive and consistent approach to more accurately evaluate future transportation projects with potential to impact historic streetcar systems and related components in the City and County of Denver (Denver) and other communities in Colorado is warranted so mitigation efforts more closely match the historical significance and public interest in these systems. CDOT and local agencies will realize a cost benefit by utilizing the results of this study for future transportation projects that impact streetcar lines.

C. How was Research Completed?

Colorado is a large state, with at least 15 distinct communities that had a streetcar line or system at some point. To complete research across such a broad geographic expanse, CDOT assembled

a team of historians who meet the Secretary of the Interior Standards for history and architectural history to divide efforts. Mead & Hunt, Inc. researched streetcar systems in Aspen, Colorado Springs, Cripple Creek/Victor, Fort Collins, Greeley, Leadville, Manitou Springs, Pueblo, and Trinidad. ARCH Professionals, LLC conducted research relative to the streetcar systems in Boulder, Denver, Durango, Englewood, Littleton, Grand Junction, and the interurban lines that connected some of these communities. AECOM Technical Services Inc. served as the project manager and completed the GIS component of the project. The consultant team visited various local archives to examine primary documents and maps, and relied on previous studies of streetcar systems as well as digitized histories and mapping efforts to develop a context relative to streetcar development in each community.

D. Compare Results with Expectations

It was expected that various themes would emerge regarding the types, materials, design, workmanship, and technology utilized in various streetcar system types across the state and how those elements changed as technology evolved nationally. It was also anticipated that similar motivating purposes for the construction of various lines would be identified, such as construction in response to previous real estate development and growth, and construction designed to access or open new geographic areas for future development. Company competition and the resulting saturation of providers was another anticipated theme in the larger municipalities, in addition to the streetcar systems' relationship with urban growth and development, and the resulting 'streetcar suburbs.' Local government management and regulation of streetcar systems and services was anticipated to emerge as another theme. Finally, the growth of automobile ownership and the introduction of bus services were expected to play a major role in the decline of streetcar systems statewide. Research found that most of these themes were confirmed, while some communities offered surprisingly unique aspects in their streetcar development relative to technologies employed and company ownership.

E. How Can CDOT Use this Study?

The potential uses of the project's results are vast and are pertinent to not only CDOT but other state and local governmental agencies and the general public as well. The user-friendly nature of the GIS component will allow interested parties to easily identify the location of potentially

buried historic streetcar lines and visualize how the network functioned within the city landscape. The GIS component will also provide information on the companies associated with the lines, the technologies utilized, the years the line was in operation, and other pertinent details. For CDOT, this information will allow project planners to identify the potential location of buried tracks early in the project planning and review process, eliminating last minute discoveries that are costly both financially and to project schedules. The evaluation framework will further assist efforts by CDOT and its consultants, as well as local jurisdictions, to determine whether a specific surviving remnant of a streetcar line is historically significant. CDOT historians and local jurisdictions can utilize these findings to evaluate the NRHP eligibility of street car lines on the front end of project planning and streamline their Section 106 review process, as the GIS component provides valuable identification information for each line, and the context completes much of the background research historians would otherwise have to complete on a project by project basis.

F. Recommendations for Further Work

Additional studies and efforts can be completed that build upon this work. A stipulation will be added to the existing Section 106 Programmatic Agreement (PA) between CDOT, the FHWA, and the Colorado SHPO to facilitate a statewide approach toward the treatment of streetcar resources. The results of this study could be used to complete the survey and documentation of the streetcar lines in each community. While this would be a large task, efforts could be prioritized to complete documentation efforts of streetcar lines located beneath highways and major arterials first. This would provide official determinations of NRHP eligibility for these linear resources, further streamlining future Section 106 review efforts for individual projects. The identification process could be taken further by utilizing technologies such as metal detecting and ground-penetrating radar to determine those locations where streetcar lines still remain buried and those where they have been removed. Additionally, this study focused on the streetcar lines themselves, as those are the streetcar-related resources most often encountered by CDOT historians. However, a comprehensive study of built environment, streetcar-related resources has not been completed and would help paint a more complete picture of the overall streetcar networks in each city and of the extent to which those networks remain in place today.

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1. INTRODUCTION

Streetcar resources are not restricted solely to the tracks that are often buried under layers of asphalt and cement, but also include various other features including bridges, grade cuts, barns, powerhouses, and road configurations themselves. When addressed individually, these features may not seem unique or significant, but when understood in the context of an entire streetcar network, they are reflective of a transportation system that was often vital to the daily lives of many Colorado residents. During a time when a majority of private residents lacked their own means of transportation, streetcars opened up the opportunity for individuals to live further from their place of work. Entire neighborhoods owe their existence to the connection provided by streetcars. Residents were able to ride streetcars to visit friends and family in further parts of the city more easily, children had greater accessibility to schools, and people could spend their leisure time taking advantage of unique recreational facilities that were otherwise inaccessible. The nostalgia for streetcars and the freedom they provided to their users remains high, as people that relied on them recall their noisy, often bumpy rides with a sense of romanticism.

The remnants of the streetcar systems in Colorado are often buried or have been removed, but with an understanding of how the streetcar systems functioned, one can begin to discern small clues within the streetscape that indicate both the presence of the former transportation network and the origin of the current urban fabric.

The objectives set forth in the scope of work for this study call for three major components. The first objective is to develop a historic context to advance the knowledge and understanding of the historic streetcar systems throughout Colorado. The second is to identify the locations of Colorado's historic streetcar systems and to make this information readily accessible to historians and researchers via a GIS-based mapping system. The third is to establish an evaluation framework that builds on the historic context and GIS mapping to facilitate NRHP eligibility evaluations of streetcar-related resources performed by the Colorado SHPO, FHWA, CDOT, local jurisdictions, and other practitioners and interested parties in Colorado.

A. Project Purpose/Funding

The Colorado Department of Transportation (CDOT) Applied Research and Innovation Branch, along with the Federal Highway Administration (FHWA) and the City and County of Denver, funded the development of this study of Colorado's historic streetcar systems in order to provide CDOT staff and others with a context of streetcar development in the state along with a framework for the evaluation of these unique resources under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (Section 106). The NHPA requires state and federal agencies to consider how their actions may affect cultural resources listed in or eligible for the National Register of Historic Places (NRHP). Streetcar tracks, as well as other associated streetcar resources, are cultural resources requiring review under Section 106. Cultural resource specialists are often faced with a difficult task when evaluating these complex resources as last-minute discoveries, uncovered during construction of a project. These late discoveries often stop construction during resource documentation and consultation, resulting in unfortunate time delays and additional expense. Historians handling the consultation then must complete consultation quickly. This can be difficult because streetcar networks themselves are complex resources with multiple iterations of technologies and route changes, but also because a clear framework for evaluating their significance in Colorado has not been established. It is the intent of this study to provide that framework.

B. Scope of Study

The study focuses on those communities with known streetcar systems, which include Aspen, Boulder, Colorado Springs, Cripple Creek/Victor, Denver, Durango, Englewood, Fort Collins, Grand Junction, Greeley, Leadville, Littleton, Manitou Springs, Pueblo, Trinidad, and the interurban lines that connected various metropolitan areas within the state. Initial information indicated that a system existed in Canon City/Florence; however, this system was found to have never been constructed and therefore is not included in the study. This study focuses on the streetcar lines themselves and is not intended to be a study of the rolling stock and equipment owned by the various companies. Numerous publications have been written regarding the rolling stock and technologies and configurations utilized by different companies. Similarly, the employees of streetcar companies played a valuable role in their history and success. Their stories are vast and recounted elsewhere, and are not the focus of this study. Additionally, the

GIS mapping comprises a large component of this project. The details of the GIS effort are outlined in Section 5. These mapping efforts focused on completing a robust database with detailed information regarding individual lines. The mapping component was completed with the intention of providing a user-friendly reference for researchers to easily and quickly locate specific details regarding streetcar lines. Research can be continued by referencing the historic context, which provides a broad understanding of streetcar history in each community.

C. Research Design and Methodology

As previously noted, the study area for the project includes all communities in Colorado that were known to historically operate streetcar lines. The consultants divided the locations somewhat geographically in an effort to divide labor equitably and to facilitate potential travel to various archival repositories. As travel, site visits, and field survey to each location was not feasible, only those locations where unique information, or information that was not otherwise available digitally or at other repositories, were visited. The locations researched by Mead and Hunt, Inc. (Mead & Hunt) were: Aspen, Colorado Springs, Cripple Creek/Victor, Fort Collins, Greeley, Manitou Springs, Leadville, Pueblo, and Trinidad. ARCH Professionals, LLC (ARCH Professionals) researched Denver and its associated interurbans, Boulder, Aurora, Littleton, Englewood, Durango, and Grand Junction with its connection to Fruita.

(1) *Key Research Questions*

Information regarding streetcar systems across the state is robust, with the potential to lead researchers in multiple directions. In order to stay within the established budget, timeframe, and goals of this project, research efforts were focused on the following questions:

1) Establishment: Why was the line started (e.g., development purposes, investment, to increase property values)? What places was it meant to connect?

2) Operations: Who founded the line and were they prominent in their community, state, or from out of state? How was the company financed? When did the line operate?

3) Technology: What technology was used for the line (e.g., standard gauge vs. narrow gauge; horse, cable, electric, etc.)? Is the line known for significant technology or for a major innovation in technology?

4) Changes: What major alterations occurred to the line (e.g., realignment, change in technology)?

5) Termination: How, when, and why did disposition of the line take place (e.g., merger, acquisitions, abandonment)?

Additional unique or rare information discovered during research, beyond those covered by the key research questions, was collected when applicable.

(2) *Project Consistency*

To promote consistency between the research and narratives ultimately completed by the consultant team, a context template was created for each community. This community template provided consistency in the level of effort and detail required for each community. The template also established placeholders for the number of figures to be included and their placement within sections.

Additionally, the data collected during research was utilized to populate a table associated with the GIS component of the project. The fields in this table were known to researchers before trips to archives and local repositories were made, ensuring that researchers gathered the appropriate information not only for the narrative, but for the GIS component as well. A technical editor reviewed the document to ensure discussions of the distinct communities maintained a level of consistency.

(3) *Literature Search*

The project team consulted maps, historic photographs, company and streetcar line records, newspapers, and local histories at various repositories to answer the above-mentioned research questions. Resources at the local, state, and national level were consulted. When scans or digital

copies were acquired as part of the research, copies were placed in a shared drive established for the project so CDOT historians would have them at their disposal for future research. Additionally, the bibliography for this report is organized geographically so future researchers may easily find resources for further investigations. Finally, a spreadsheet of local contacts who provided information and/or may have an interest in the study was assembled so CDOT historians could reach out to them with the completed project.

Many secondary sources have already been produced regarding the streetcar systems nationally and in several Colorado communities. To limit the travel time spent researching in local archives, those secondary sources were utilized when available. These works provided incredibly valuable information to this study. For ease of reference, those works are listed below.

Cafky, Morris. *Steam Tramways of Denver*. Denver: Rocky Mountain Railroad Club, 1950.
Steam Tramways of Denver provided great information on the steam dummy lines that were found in Denver and in some cases, provided some of the only information found regarding those lines.

Cafky, Morris and John A. Haney. *Pikes Peak Trolleys: A History of the Colorado Springs Streetcar System.* Colorado Springs, Colo.: Century One Press, 1983.
This book contained great information and detail regarding the streetcar system in Colorado Springs and the history behind it.

Cafky, Morris and John A. Haney. *Pueblo's Street Town Trolleys*. Golden, Colo.: Colorado Railroad Historical Foundation, Inc., 1999.
The Pueblo streetcar system is well documented in this book and served as main source of information regarding the system in that town.

Fletcher, Ken. *Centennial State Trolleys*. Golden, Colo.: Colorado Railroad Historical Foundation, Inc., 1995.

This work served as a good starting point for the study by identifying which Colorado communities had streetcar systems and providing basic information regarding those systems.

Gensmer, Kristin and Eva Donkin. *The Tracks Beneath the Pavement: A Look at Changing Transportation Systems in Fort Collins, Colorado Through a Segment of the Fort Collins Municipal Railway*. Prepared by Centennial Archaeology LLC, 2018.
Completed in response to a compliance project, this report provided good historical information on the streetcar system in Fort Collins as well as archaeology details regarding the tracks remaining under the streets in Fort Collins and how those tracks were installed.

Glandon, Beth. *Streetcar Commercial Districts Reconnaissance Survey Final Report*. Prepared for Historic Denver and the Discover Denver Project, 2013.
Glandon's work presents information on the integrity of streetcar commercial districts and presented an example of how to divide the city, with its complex history of streetcar companies and lines, into manageable districts to better present information within the report.

Keeney, Ryan. "Denver's Streetcar Legacy and its Role in Neighborhood Walkability." Accessed October 4, 2019. https://www.arcgis.com/apps/MapSeries/index.html?appid=00a2d498a2ac4c58ad140ac306110213.
Keeney's work served as the basis for the GIS mapping efforts for Denver and provided valuable locational information as well as information on the duration of various streetcar routes.

McGuire, William L. and Charles Teed. *The Fruit Belt Route*. Grand Junction, Colo.: Rio Grande Chapter of the National Railway Historical Society, 1981.
The book provided exhaustive information regarding the streetcar system in Grand Junction and the interurban connection with Fruita. It also included a valuable

bibliography pointing researches to the location of additional information regarding the system.

New South Associates. *Historic Streetcar Systems in Georgia*. Prepared for the Georgia Department of Transportation, January 31, 2012.
This resource served as an initial inspiration for this study and provided valuable contextual information.

Peyton, E.S., R.A. Moorman and Kenneth Jessen. *Trolley Cars of Fort Collins: Including "Last of the Birneys" and "Restoration of Car No. 21."* Loveland, Colo.: JV Publication, 1986.
This volume is a combination of two shorter works that extensively detail the history of street operations in Fort Collins, including the historic operations and the restoration efforts in the 1980s.

Robertson, Don, Morris Cafky, and E.J. Haley. *Denver's Street Railways, Volumes I and II*. Denver: Sundance Publications, Ltd., 1999 and 2004.
These two volumes prove to be the exhaustive histories on Denver's streetcar history and contain a plethora of historic context as well as photographs, valuable maps, and details of when route changes occurred.

Robertson, Don and Kenton Forrest, *Denver's Street Railways, Volume III The Interurbans.* Golden, Colo.: Colorado Railroad Historical Foundation, Inc., 2010.
This exhaustive work presents details on the interurban systems that extended from Denver and includes historic photographs, maps and information on route changes.

Wilkins, Tivis. *The Short line to Cripple Creek: Colorado Springs & Cripple Creek District Railway.* Golden, Colo.: The Colorado Railroad Museum, 1983.
This work presented details on the streetcar system in Cripple Creek and the role it played in the famed mining district there.

When these previously completed studies did not answer all of the key research questions developed for this project, research at local archives was completed. Historic newspapers, clipping files, historic photographs, archival collections of ledgers, minutes, reports and correspondence, and historic maps were all consulted, as well as multiple period journals.

Additionally, a number of streetcar resources were previously documented across the state according to Colorado Office of Archaeology and Historic Preservation (OAHP) standards. These previous documentations are inventoried in the OAHP COMPASS database, which was searched as a part of this project. COMPASS is the OAHP's cultural resource database and includes information on previously surveyed and evaluated historic properties throughout Colorado. As multiple terms can be used to refer to the same type of streetcar resource, and a standard lexicon is not utilized by historians across the state when documenting these resources, the consultant team worked with OAHP staff to conduct as comprehensive of a search as possible. The search of the COMPASS database included the following terms: streetcar, street car, trolley, horsecar, horse car, tram, tramway, grip car, cable car, interurban, transit, carbarn, car barn, and municipal railway.

Colorado SHPO staff and the consultant team then cleaned up the COMPASS results to remove any resources not related to streetcar systems, as several mining tramway and railroad resources were included in the results. Many of the resources included GIS mapping information, which was then integrated into the GIS portion of this report; however, the documentation of several resources lacked sufficient information to map the resource. As a result, those resources were not included in the GIS mapping component of this study. The COMPASS search results are provided in Section 6, Known Associated Resources.

(4) *Development of Database and GIS Fields*

The CDOT Historian provided the consultant team with the information that was to be included in the GIS database fields, which included items such as route names, years of operation, construction companies, operating companies, gauge, and technology employed. The consultant team then refined these fields based on the information found during the research efforts and to

optimize usability and filter options when used in the mapping component. A complete discussion of the GIS component is located in Section 5.

(5) *Document Organization*

The document is organized into multiple sections. Section 2 presents a historic context for streetcar systems on a national scale. Section 3 is a synthesis of how Colorado's streetcar systems intersect with the national trends. Section 4 presents a community by community discussion of streetcar systems that operated in Colorado. Section 5 presents the details regarding the ESRI ArcGIS database that was developed as part of this project. Section 6 lists the known extant resources associated with streetcar systems in Colorado, while Section 7 describes potential streetcar property types that researchers may encounter. Section 8 presents the registration requirements for evaluating streetcar systems and streetcar-related resources. Section 9 serves as a guide for future researchers intending to complete additional streetcar research in Colorado. The conclusion and recommendations and future research opportunities are presented in Sections 10 and 11, respectively. A bibliography is located at the end of the document.

D. Definitions

The terminology of streetcar systems can be confusing to those not familiar with these resources. Below is a list of definitions for terminology utilized in the report.

Cable car: A vehicle pulled by a continuous loop of wire, often located in a slot underground between the streetcar trackage.

Catenary: Overhead electrification system.

Double-truck streetcar: A longer streetcar comprised of four axles that operate independently of one another and do not remain fixed perpendicularly to the streetcar body or parallel to each other, as in a single-truck streetcar.[1]

[1] Richard M'Culloch, "Comparative Earnings and Economy of Operation Between Single and Double Truck Cars for City Use," *Electricity, A Popular Electrical and Financial Journal* XV, no. 10 (September 14, 1898): 52.

Electric streetcar: A vehicle powered by electricity, supplied either overhead or via other means, and runs along rails set within street rights-of-way.

Horsecar: A horse- or mule-powered stagecoach running on railroad tracks located within street rights-of-way.

Jitney: An automobile carrying passengers along a flexible route with a flexible schedule.

Interurban: Most often electrified railroads that connected multiple municipalities and dealt primarily with passengers rather than freight. Interurbans traveled on city street rights-of-way until the edge of towns, where they then moved to private rights-of-way.[2]

Line: Used in this report to refer to a collection of different segments of track that together create a streetcar route (see also, *Track*).

Narrow gauge: Railway trackage spaced narrower than standard gauge between the rails.

Omnibus: Horse-drawn stagecoach following established routes operating on a schedule.

Pantograph: A collapsible and adjustable frame mounted atop a streetcar and used to obtain power from overhead power wires. Pantographs were commonly used in European cities whereas rooftop-mounted trolley poles were more common in the United States.[3]

Rails/tracks: The steel bars laid into the street that supported the wheels of streetcars. Streetcar rails were spaced at different intervals known as the gauge. Streetcar rails were also constructed at different weights to support different rolling stock. Generally, lighter

[2] Frank Rowsome, *Trolley Car Treasury* (New York: McGraw-Hill Book Company, Inc., 1956), 120–21.

[3] "Streetcar | Facts, History, & Development," *Encyclopedia Britannica*, accessed December 12, 2019, https://www.britannica.com/technology/streetcar.

weight rails were used for lighter, animal-powered streetcars, and heavier weight rails were used for heavier, electric-power streetcars.

Rolling stock: Individual streetcars (also see trolley, horsecar, cable car, tramway).

Single-truck streetcar: A streetcar with two axles that are perpendicular to the streetcar centerline and parallel to one another.[4]

Standard gauge: Railway trackage spaced at 4 feet, 8.5 inches between the rails.

Steam dummy: A small steam-powered locomotive enclosed in a wooden box to resemble a horsecar and used to pull streetcars.

Streetcar: A vehicle traveling on rails often located within street rights-of-way. Streetcars primarily carried passengers but also hauled freight.

Streetcar Suburbs: Residential areas, sometimes including commercial nodes, that were developed because of the presence of a streetcar line.

Streetcar vs. railroad: Streetcars operated primarily within established street rights-of-way and focused on passenger transportation, whereas railroads traversed expanses between cities and their routes were not predicated on street rights-of-way. Railroads were often powered by steam and then later larger electric locomotives and had a large freight component to their operations.

Track: Used in this report to refer to the actual steel trackage/ties in the ground (see also, *Line*).

Tramway: In this instance, a tramway is another word for a streetcar. This phrase was more frequently utilized in Great Britain when referring to streetcars.

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[4] M'Culloch, "Comparative Earnings and Economy of Operation Between Single and Double Truck Cars for City Use," 152.

Trolley: More broadly, a synonym for an electric streetcar. Precisely, however, it is the "device that carries electric current from an overhead wire to an electrically driven vehicle."[5]

Trolleybus: An electrically powered bus that draws power from overhead electric wires but does not operate on a track.

Trolley coach: A synonym for trolleybus.

[5] "Definition of Trolley," *Merriam-Webster*, accessed October 13, 2019, https://www.merriam-webster.com/dictionary/trolley.

2. NATIONAL HISTORIC CONTEXT

The growth of American cities and the everyday lives of their residents was once centered in part around how far an individual could walk. Walking to work, to school, to church, to play, and back home was often the only means urban American citizens had to go about their daily routines in the seventeenth through nineteenth centuries. During a time today so heavily dominated by automobile transport, the restrictions that walking posed are difficult to fathom. Wealthy residents had the luxury of owning horse-drawn carriages to ease their movement around the city; however, lower- and middle-income residents were less fortunate and were forced to walk or ride horses, which could both be uncomfortable and messy in inclement weather. Additionally, keeping a horse in an urban setting posed another set of problems in terms of securing boarding locations and costs associated with feed and shelter for the animal. It was not until the development of streetcar routes—first horse-drawn, then evolving to cable and eventually electric—that larger groups of urban populations were able to work, recreate, shop, and go to school further from their residences. The introduction of streetcar systems had vast implications on urban growth. No longer were residential populations restricted to the city center. Residents could escape the noise and pollution of downtown areas and live in quieter spaces just outside the centers of commerce, known as "streetcar suburbs." Eventually, this spread to separate communities that grew in response to the streetcar lines, and later, interurban lines that connected communities within a larger metropolis.

Residential "streetcar suburbs" are not the only elements of the urban landscape born as a byproduct of the streetcar systems. These residential areas often included their own small commercial strips. Many times, streetcars were responsible for not only transporting residents, but often served a secondary freight service as well, sometimes delivering mail or affixing freight cars to the back of a passenger car to haul agricultural and commercial goods. While these facets of streetcar systems are not often visible, tangible features of the streetcar system's imprint on an urban landscape remain in communities throughout the United States.

A. National Streetcar Development

Streetcar systems in the United States are largely a product of the Industrial Revolution at the turn of the twentieth century. The Industrial Revolution not only led to new technologies that

made streetcars possible, but it also resulted in vast population growth in the nation's urban centers. From 1800 to 1850 New York City's population grew from 33,111 to 202,589, making it the largest city in the United States. These new urban residents needed places to live, and city centers could only accommodate so many. Transportation became necessary for middle-class workers to travel to the factories and jobs that drew them to the city in the first place. By 1820 New York, Boston, and Philadelphia had adopted an omnibus service, or a large carriage accommodating several passengers and kept to a route and schedule, in an attempt to fulfill those needs (see Figure 1).[6] Omnibus service, however, was lacking in speed, regularity, and comfort. By the early 1830s traditional steam-operated railroads, often operating on a standard-gauge (4 feet, 8.5 inches in width), began to appear in the eastern United States.[7] When steam locomotives eventually made it to the western United States, many railroad companies favored a narrow gauge (anything less than 4 feet, 8.5 inches in width) track placement because of the lower construction costs and ability to traverse tighter curves and steeper grades, although standard-gauge tracks could accommodate heavier weight limits.[8]

While the introduction of steam locomotives improved the long-distance transport of passengers and goods, residents of the nation's growing metropolises still lacked an expedient and reliable manner to move across their cities. In 1832 the New York and Harlem Railroad modified the omnibus service to operate on railroad tracks located on city streets, creating the first horsecar service operating on city streets in the country. This proved to be more efficient than basic omnibus service in keeping to planned schedules, and could carry more passengers.[9] The New York and Harlem Railroad set an example followed in cities across the country, both in its financing and private ownership. The company was also the first example of real estate

[6] New South Associates, *Historic Streetcar Systems in Georgia* (prepared for the Georgia Department of Transportation, January 31, 2012), 17–18.

[7] "First U.S. Railway Chartered to Transport Freight and Passengers," accessed January 9, 2020, http://www.americaslibrary.gov/jb/nation/jb_nation_train_1.html.

[8] "Gauge | Railroad Track," *Encyclopedia Britannica*, accessed January 9, 2020, https://www.britannica.com/technology/gauge-railroad-track.

[9] William D. Middleton, *The Time of the Trolley, Volume I* (San Marino, Calif.: Golden West Books, 1987), 15.

developers creating a streetcar line to promote development within their holdings, a pattern copied for decades to follow.[10]

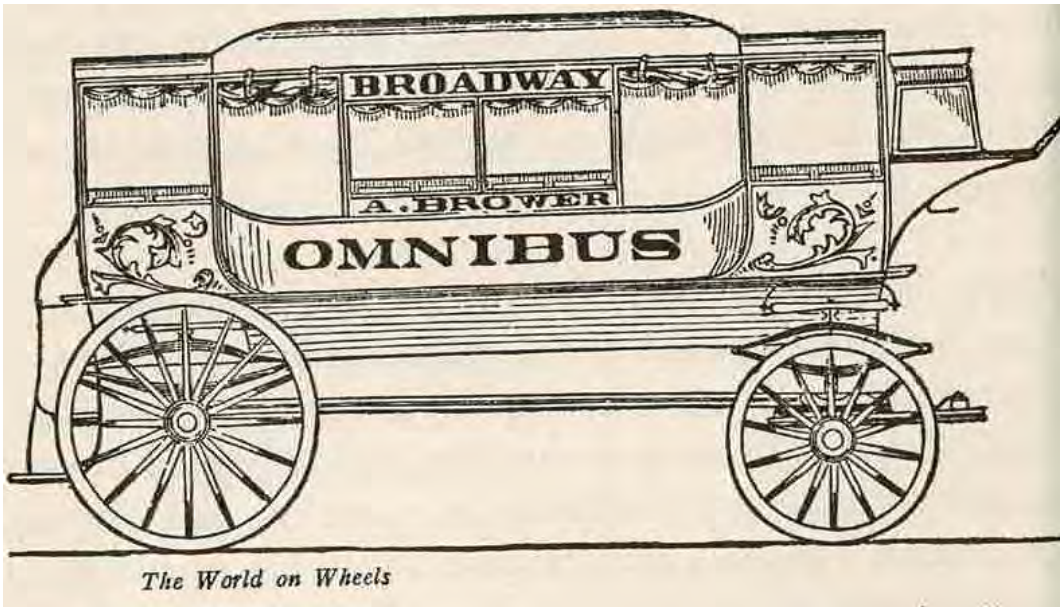

Figure 1. A drawing of New York's first omnibus in 1831.[11]

A private company in New Orleans soon followed the New York and Harlem Railroad's example, establishing a nearly 2-mile route from the downtown area to a residential suburb along St. Charles Avenue. Although New York and New Orleans were quick to jump on the horsecar technology, the rest of the country was delayed for various reasons, including the financial and banking crisis that resulted in the Panic of 1837. By 1858 Boston boasted two competing horsecar companies, another glimpse of a pattern that would be repeated as streetcar usage spread to growing cities such as Chicago, Pittsburgh, Cincinnati, and Baltimore.[12]

Following the Civil War, streetcar service across the United States expanded rapidly. Much of the south, which lacked the population necessary to support streetcar systems prior to the Civil

[10] New South Associates, *Historic Streetcar Systems in Georgia*, 18.

[11] John Anderson Miller, *Fares Please!* (New York: Dover Publications, Inc., 1960), 6.

[12] Middleton, *The Time of the Trolley, Volume I,* 15–16.

War, began industrializing to a greater degree. This industrialization led to population growth in urban communities in the south, and streetcar development soon followed.[13] By 1881 a total of 415 companies operated across the country, accounting for "an annual business in the vicinity of 1 ½ billion dollars."[14]

Horsecars used on these early systems had numerous drawbacks. The horses were often startled, resulting in accidents. Newspapers articles, like one appearing in the Philadelphia *Sunday Dispatch* in 1857, claimed that horsecars in New York City killed people at the rate of a person a week. Many considered them to be a safety hazard for horses, pedestrians, and other vehicles (see Figure 2).[15] Horsecars were only viewed as a slight improvement to the prior omnibus service, and residents became eager for another alternative. Transit companies also sought alternatives. Housing, feeding, and maintaining the often-large fleets of animals required for a horsecar system was an expensive endeavor. A horse used for pulling streetcars cost around $125, and large streetcar companies could require at least 1,000 horses in order to cover the shifts necessary and give the animals their needed breaks. The American Street Railway Association stated at one point that "about forty percent of the entire investment of the average company was in horses and stables."[16] Additionally, the horses were retired quickly, only serving horsecar companies between three and five years.[17] Adding to the daily difficulties and expenses, an equine flu outbreak, referred to as the "Great Epizootic," swept across North America, peaking in 1872. It killed as many as 200 horses a day in some places drastically impacting streetcar services in many cities.[18]

[13] New South Associates, *Historic Streetcar Systems in Georgia*, 20.

[14] Middleton, *The Time of the Trolley, Volume I*, 21.

[15] Middleton, *The Time of the Trolley, Volume I*, 16.

[16] Miller, *Fares Please!*, 23.

[17] New South Associates, *Historic Streetcar Systems in Georgia*, 20.

[18] New South Associates, *Historic Streetcar Systems in Georgia*, 28.

Figure 2. Woodcut image from an 1865 issue of Frank Leslie's *Illustrated Newspaper* showing the dangers often perceived from horsecars.[19]

B. Technology Advances

In an effort to improve the speed of service and cut out the expense of maintaining a fleet of animals, streetcar companies and enterprising individuals experimented with alternate modes of power. Several companies attempted to use steam dummies, which were merely shortened steam locomotives set within a body that resembled a streetcar and operated on rails set on city streets. San Francisco boasted a steam dummy streetcar system that began operating in 1860. This operation, however, only lasted seven years before it was replaced by horsecars. Residents often objected to steam dummies, and some local governments disallowed them, because of noise and pollution. Several companies attempted to design engines that were smokeless and noiseless, though most proved unsuccessful.[20]

An alternative to horsecars and steam dummies finally arrived in 1873, when Andrew S. Hallidie installed the first cable car line in San Francisco (see Figure 3). Hallidie developed cable car

[19] Middleton, *The Time of the Trolley*, *Volume I*, 18.

[20] Middleton, *The Time of the Trolley*, *Volume I*, 32–34.

technology from his own wire rope manufacturing business.[21] Hallidie applied the rope to streetcars, enabling the streetcars to climb steep hills in San Francisco that were previously unmanageable by horsecars. Cable cars featured a grip system in the streetcar's undercarriage that attached to a loop of continuously moving underground cable wire spun from a central powerhouse, which pulled the streetcar along the route. Cable car systems utilized rails supported by cast-iron yokes that created a narrow conduit between the rails through which the cable was strung (see Figure 4). The cable moved through the conduit by way of a series of pulleys and sheaves, ending at a powerhouse. Cables entered the powerhouse at right angles and then wound around a wheel 10 to 25 feet in diameter. Before returning to the conduit, the cable passed through a counterweighted pulley that helped to provide tension on the cable. A reciprocating steam engine powered the wheel, and multiple cables often extended from one power plant.[22]

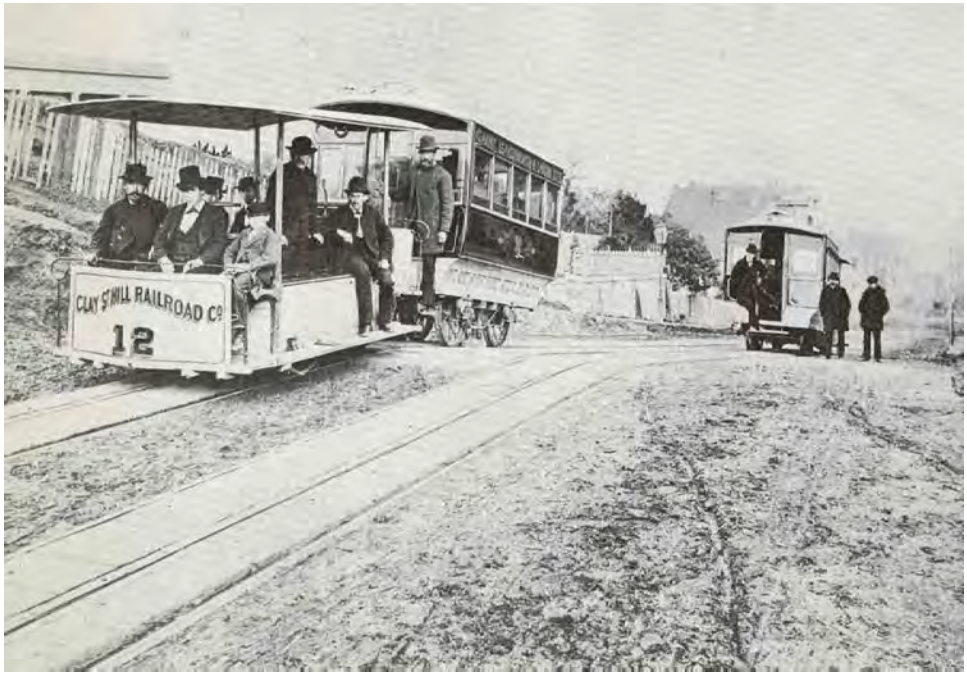

Figure 3. Hallidie's original cable streetcar on Clay Street in San Francisco in September 1873. Note the slot visible in the middle of the tracks where the grip from the cable car attached to the underground cable.[23]

[21] New South Associates, *Historic Streetcar Systems in Georgia*, 29.

[22] Middleton, *The Time of the Trolley, Volume I*, 49.

[23] Rowsome, *Trolley Car Treasury*, 50.

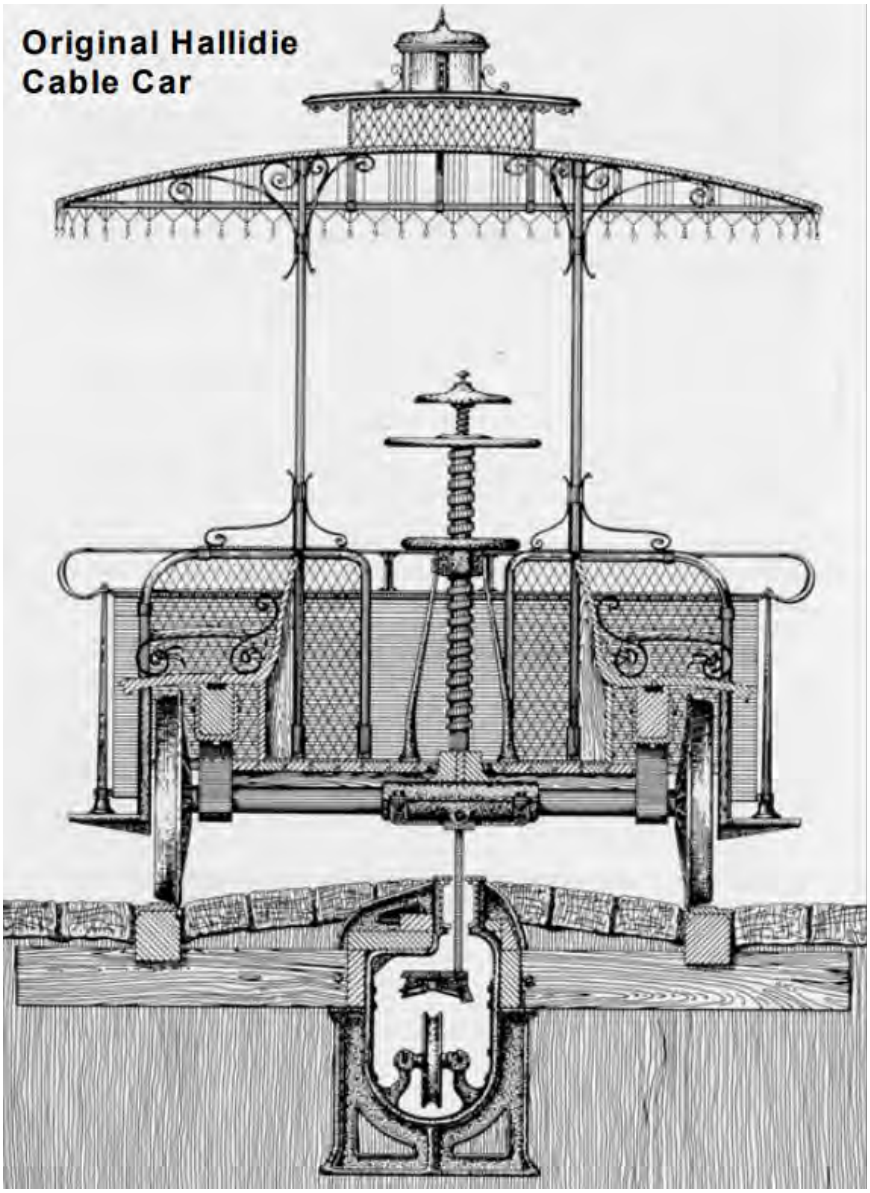

Figure 4. Cross-Section of Hallidie's original cable-car design showing the central cable conduit and grip mechanism beneath the streetcar.[24]

[24] Les M. Okreglak, "San Francisco Cable Car - Original Design and Current Operation" (Presented for the International OITAF Congress, San Francisco, Calif., 1999), 3, https://mountainscholar.org/bitstream/handle/11124/70562/Okreglak.pdf?sequence=1.

Hallidie's cable streetcars were hugely successful and at least 28 other cities adapted the technology by the early 1890s, including Denver.[25] Denver's cable network was particularly notable as two distinct companies operated two separate cable streetcar systems. The cable power house associated with the Denver City Cable Railway, which operated 34 miles of cable from its powerhouse, had the largest amount of cable running from a powerhouse than anywhere else in the country. The Denver City Cable Railway's Welton Street line also had the distinction of holding the longest known individual cable line at the time at nearly 7 miles.[26] By 1890 the Unites States had approximately 500 miles of cable railways in operation, carrying roughly 400 million passengers per year.[27] By 1894 mileage in the United States had reached a peak of 662 miles.[28] Cities like Chicago and San Francisco saw property values increase near the cable car routes. Citizens appreciated having access to consistent public transportation and the corresponding health benefits from removing the "voidings" of thousands of horses and associated noise that came with them.[29]

Cable railways traveled nearly two times as fast as horsecars and did not require the expenses associated with maintaining a fleet of animals. Additionally, cable cars were quieter and cleaner than horsecars and steam dummies. Despite these improvements over horsecar service, cable railways had their own shortcomings. Depending on the number of curves in a line and the amount of traffic it saw, cables could wear out as quickly as three months.[30] Constructing cable routes was expensive, and replacing cables was a costly and disruptive activity.[31] Operating a cable streetcar system was extremely costly as well, as it required great deal of power to move the heavy wire cables. Most of the power generated to operate a cable car system went not to moving the cars or passengers themselves, but instead to operating the wheels and pulleys

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[25] New South Associates, *Historic Streetcar Systems in Georgia*, 29; Middleton, *The Time of the Trolley, Volume I*, 49.

[26] George W. Hilton, "Denver's Cable Railways," *The Colorado Magazine*, 1967, 43.

[27] Miller, *Fares Please!*, 49.

[28] Middleton, *The Time of the Trolley, Volume I*, 49.

[29] Miller, *Fares Please!*, 45.

[30] Middleton, *The Time of the Trolley, Volume I*, 49.

[31] Hilton, "Denver's Cable Railways," 7.

needed to move the cable, as a San Francisco study from 1888 estimated 57 percent of the power used in the system was devoted to the latter.[32] Breakdowns were common, as grip mechanisms on the cable cars were prone to breaking or becoming entangled in frayed wires on the cable, making it impossible for streetcars to stop. Colder climates, like Denver, also experienced difficulties with ice and snow accumulating in the cable tube. The gripman operating the cable car required a great deal of training and physical ability to work the grip and maintain a smooth and consistent speed.[33] Finally, the cable car era "proved to be one of the most litigious in the entire history of public transportation." Individuals and municipalities frequently argued whether the technology employed in their systems was previously patented or whether the minor changes in grips, pulleys, and other workings precluded their system from hefty royalties on patented technology.[34] While cable streetcar systems were being constructed and operated across the country, inventors were hard at work for the next technological advancement in the public transport realm: electricity.

(1) *Frank Sprague and the Modern Electric Streetcar*

Early attempts at electrification of streetcar lines proved to have various drawbacks. Experimentations with batteries proved they lacked sufficient power and reliability to pull streetcars for a sufficient distance, while efforts to obtain power through a third rail, like that attempted in Denver in the mid-1880s, proved unreliable, dangerous to pedestrians and animals, and problematic in rain, snow, and ice.[35]

This changed when Frank J. Sprague developed the world's first modern electric streetcar system in Richmond, Virginia, in 1887-1888 (see Figure 5). Sprague became interested in electricity as an undergraduate in the United States Naval Academy. In 1883 he resigned from the Navy and

[32] Middleton, *The Time of the Trolley, Volume I*, 50.

[33] Miller, *Fares Please!*, 48.

[34] Brian J. Cudahy, *Cash Tokens and Transfers: A History of Urban Mass Transit in North America* (New York: Fordham University Press, n.d.), 31.

[35] New South Associates, *Historic Streetcar Systems in Georgia*, 30.

began working for Thomas Edison in Menlo Park, New Jersey. The following year Sprague ventured out on his own and founded the Sprague Electric Railway and Motor Company.[36]

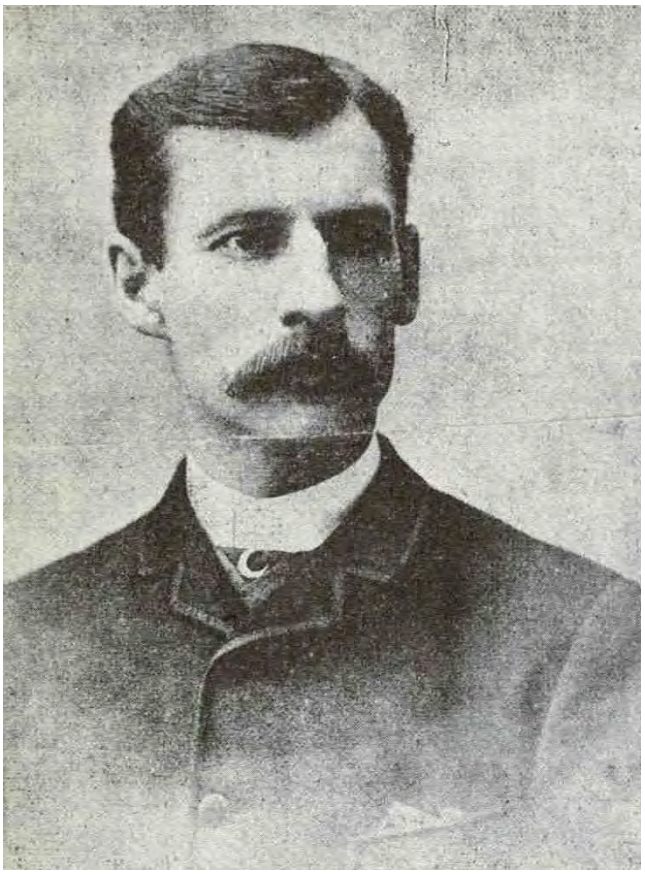

Figure 5. Undated photograph of Frank J. Sprague.[37]

Sprague's company secured a contract to electrify the streetcar network in Richmond. He used an overhead electrification system with a "swivel mounting that would permit the pole to swing freely to follow the trolley wire on curves or wherever it was not immediately above the center of the track."[38] Richmond, with its steep hills and 12 miles of streetcar trackage, proved to be an important testing ground to determine whether or not Sprague's new system could handle the

[36] New South Associates, *Historic Streetcar Systems in Georgia*, 32.

[37] Rowsome, *Trolley Car Treasury*, 82.

[38] Miller, *Fares Please!*, 65.

geographic rigors present across many cities in the United States (see Figure 6).[39] On February 2, 1888, Sprague proved his new configuration could handle the challenges when the fully electrified system in Richmond opened for operations.[40]

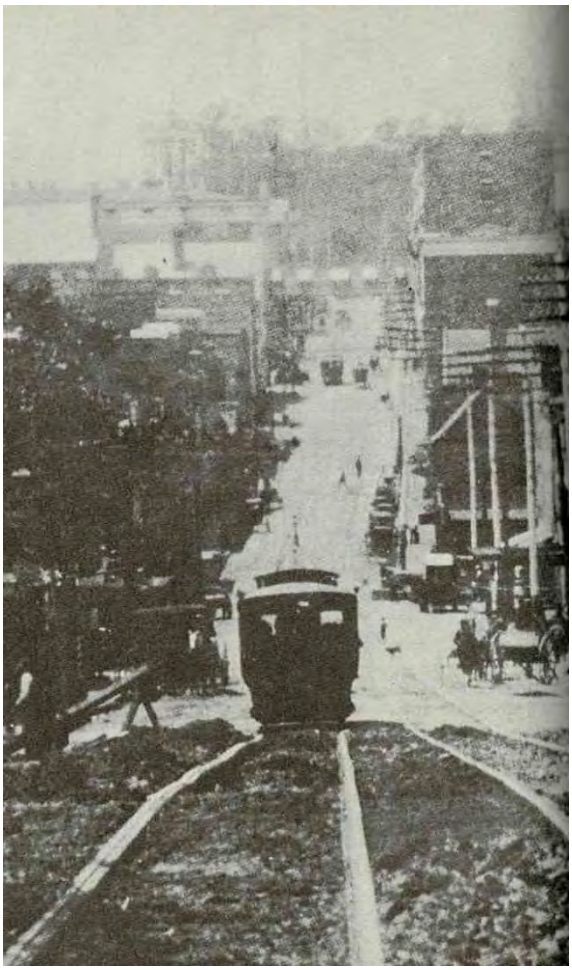

Figure 6. Sprague's electric streetcar successfully navigating the challenging geography in Richmond.[41]

[39] Rowsome, *Trolley Car Treasury*, 2.

[40] New South Associates, *Historic Streetcar Systems in Georgia*, 32.

[41] Miller, *Fares Please!*, 64.

C. Electric Streetcars Roll Across the Country

Communities across the United States took notice and quickly abandoned the finicky and expensive cable operations in favor of electric power. By 1890 Cleveland, St. Louis, Pittsburgh, Tacoma, and Minneapolis had all adopted Sprague-designed electric streetcar systems. That same year a census of electrified trackage in the United States recounted that 1,260 miles of streetcar trackage had been electrified, just two years following Sprague's successful opening of the line in Richmond.[42] By 1902 only a few cities retained cable operations and horsecar trackage had shrunk to roughly 250 miles in the entire country. In contrast, electric streetcar trackage had ballooned to 22,000 miles.[43] The adaptation of electric street railway technology spread like wildfire following the success in Richmond.

Companies could often utilize the tracks already in place from the horsecar systems; however, many companies elected to replace the rails with a heavier weight of steel to accommodate the greater weight of electric streetcars. In addition, more equipment and infrastructure were required to adopt electricity as the power source for running a streetcar system. The electricity was often supplied by the streetcar companies themselves. Most streetcars operated using direct current (DC) at between 500 and 600 volts. Power, however, was typically generated using higher-voltage alternating current (AC), which was favorable to the lower-voltage DC because it transmitted more efficiently over longer distances without losing power. In order to get the AC current disseminated from the power plants, which were often coal-fired, to the overhead lines and streetcars themselves, many times streetcar companies employed a series of substations. These substations, which were spaced at intervals depending on the traffic on various lines, utilized transformers and converters to drop the AC current to DC.[44] In order to maintain consistent power levels, companies often constructed their electric streetcar systems as a series of sections, which each obtained power from separate "high capacity feeder cables" that were then connected to the overhead wires.[45] The circuit from the overhead wires is then completed via the

[42] Miller, *Fares Please!*, 69–101.

[43] Miller, *Fares Please!*, 101.

[44] Middleton, *The Time of the Trolley*, *Volume I*, 223.

[45] "Sources of Power," accessed January 15, 2020, http://www.heritagetrolley.org/planPower.htm.

metal streetcar wheels grounded through the steel tracks.[46] In addition to coal-fired power plants, some streetcar networks generated power using hydroelectric facilities, which utilized flowing water to rotate turbine and generate electricity. One known hydroelectric facility in Colorado was the Lake Moraine power plant west of Colorado Springs, which was constructed specifically to provide electricity for the streetcars in Cripple Creek.[47]

Despite the initial investment required to construct the infrastructure necessary to support an electric streetcar system, the country's municipalities were fully behind the new technology, as were industry experts. The once popular *Street Railway Journal*, which began in 1884 as a spin-off of *The Journal of Railway Appliances* and recounted all things related to streetcar service in the country, changed its name to the *Electric Railway Journal*, reflecting the national trend.[48] From 1890 to 1902 investments in street railway systems grew from $400 million to more than $2 billion.[49] Investors were eager to make their money on streetcar systems and new companies appeared overnight in many cities, creating great competition and, in some cities, oversaturation of services.[50] Competition between streetcar companies was intense, with larger cities served by multiple companies, all operating in close proximity to one another. This oversaturation led many electric streetcar companies to find themselves in difficult financial standing, resulting in mergers and consolidations of streetcar companies across the country.

Streetcar companies were often required to obtain a franchise from municipalities in order to operate a system within street rights-of-way. Each city structured their franchises differently, but most required payment to the city that could be a lump sum or annual payment, either based on a percentage of revenues for that year or a set amount. These franchises often contained other requirements for the streetcar company to follow, which included track and street maintenance or

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[46] "How A Streetcar Works," *Boston Streetcars*, accessed January 15, 2020, http://www.bostonstreetcars.com/how-a-streetcar-works.html.

[47] Tivis E. Wilkins, *Short Line to Cripple Creek: The Story of the Colorado Springs & Cripple Creek District Railway* (Golden, Colo.: The Colorado Railroad Museum, 1983), 10–13.

[48] Miller, *Fares Please!*, 109.

[49] Middleton, *The Time of the Trolley*, *Volume I*, 77.

[50] Rowsome, *Trolley Car Treasury*, 97.

paving, and occasionally fixed fare rates.[51] The franchises with fixed fare rates proved to be difficult for streetcar companies to contend with in the future, as expenses and labor costs rose. With fares often set by their original franchise, the streetcar companies were generally left with little recourse to recuperate these costs in the form of fare changes. Many streetcar companies became embattled in legal arguments regarding the rights of franchises to fix fares and how to restructure franchises to allow for fare changes.

Residents fully embraced streetcar life as it became an indispensable aspect of daily travel routines. Less than 30 percent of the United States lived in urban environments in 1880, but by the beginning of World War I that number jumped to at least 50 percent as industrial jobs attracted both immigrant labor and the nation's rural population into the cities. Electric streetcars arrived on the scene just in time to serve this growing population. Beyond the practical use of streetcar transportation, patrons utilized electric streetcars for "pleasure travel" as well, which included social excursions, charter trips, sight-seeing tours, and even courtships. Streetcar companies were also keenly aware of the income potential associated with transporting patrons to and from parks and resorts, and the revenue was even better if those destinations were owned by streetcar companies themselves. A census completed in 1907 showed that streetcar companies operated "some 4,676 parks or pleasure resorts…with an annual patronage well in excess of 50 million visitors."[52] Ownership and service to amusement parks provided continual operation of the streetcars, which were necessary during rush hours, but would have otherwise sat idle on the weekends.

Streetcars, which played such an important role in the day-to-day lives of metropolitan residents, often provided their final ride through funeral service transportation. Streetcar companies across the country had specially outfitted cars to transport coffins to cemeteries located on streetcar lines. In addition to providing funeral services, streetcar companies also serviced cemeteries as a means of recreation during a time when citizens across the country also utilized burial grounds as parks and picnic grounds.

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[51] Middleton, *The Time of the Trolley*, *Volume I*, 79.

[52] Middleton, *The Time of the Trolley*, *Volume I*, 86.

To many communities, an electric streetcar system symbolized the value of their community, its potential for growth, and economic prospects.[53] Civic leaders encouraged future business investment by pointing to the investment streetcar promotors had already allocated as a reflection of their city's potential.

The ramifications of electric streetcar service to cities across the country are clear. Electric streetcars were able to travel further and faster than any previous mode of urban transport. Areas once considered outlying and sparsely populated were now expediently serviced by electric streetcars. Streetcar investors felt that future residents would provide paying fares in the future, creating a profitable business proposition not only for the streetcar investors, but real estate developers as well.[54] A direct correlation was found between streetcar construction and land values, as streetcar lines often increased land values and the population of adjacent areas.[55] Real estate developers were keenly aware of this trend and often built electric streetcar lines themselves, or helped finance their construction into their holdings. The result was the growth of "streetcar suburbs," residential areas built along a streetcar line that sometimes included commercial nodes. Streetcar suburbs often included wider streets with sweeping curves, landscaped streets, and picturesque houses set on enlarged lots compared with their denser city-center residential counterparts.[56]

D. Streetcar Alternate Uses

Streetcar lines were not only utilized to transport people from one place to another. Post offices employed streetcars to deliver mail more efficiently, with New York utilizing cable cars in its mail delivery services as early as 1895. By 1890 Saint Paul and Minneapolis became one of the first cities to utilize an electric streetcar to assist in mail delivery. Soon, most large American

[53] Rowsome, *Trolley Car Treasury*, 97.

[54] Miller, *Fares Please!*, 101–2.

[55] Middleton, *The Time of the Trolley, Volume I*, 77.

[56] Sam B. Warner, Jr., *Streetcar Suburbs* (Cambridge, Mass.: Harvard University Press and the M.I.T. Press, 1962), 20.

cities utilized trolley cars to expedite mail delivery.[57] Streetcars were also sometimes used to haul freight. In Colorado, the interurban systems in Denver, Cripple Creek, and Trinidad hauled coal, precious metal ores, and other goods on their electric lines.

E. Interurbans

Soon after Sprague's historic accomplishment in Richmond, investors recognized the potential for electric streetcar applications outside the city limits. If a connection could be made between towns using the same fast, efficient, and affordable electric railway technology utilized by streetcars within town, communities once separated by day-long carriage rides could become a quick trip apart. Steam railroads already connected some of these locations, but their schedules were often predicated around freight transport rather than passenger needs. Electric streetcar service provided more frequent, dedicated passenger service than their steam counterparts. Progress in alternating-current transmission technology made this possible.[58] The first interurban lines were constructed in Ohio, between Granville and Newark in 1889, and in Oregon, between Portland and Oregon City in 1893.[59] The trend, however, did not really take off until 1895, when the Akron Bedford and Cleveland Railroad began constructing interurbans that would eventually include more than 500 miles of interurbans trackage in systems in Michigan, Ohio and Canada.[60] Initially, interurbans did not fare as well, but as equipment and technology advanced, the lines connecting municipalities were embraced across the country, just as electric streetcars within towns were.[61]

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[57] Middleton, *The Time of the Trolley, Volume I*, 50–96.

[58] William M. Moedinger, *The Trolley Triumph of Transportation* (Lebanon, Penn.: Applied Arts Publishers, 1987), 16.

[59] Cudahy, *Cash Tokens and Transfers: A History of Urban Mass Transit in North America*, 50; Raanan Geberer, "Trolleys' Time: When Streetcars Were Desired," *HistoryNet*, July 22, 2019, https://www.historynet.com/trolleys-time-when-streetcars-were-desired.htm.

[60] Geberer, "Trolleys' Time."

[61] Rowsome, *Trolley Car Treasury*, 123.

Interurbans were less expensive, more frequent, and cleaner than steam railroads and proved to be successful for investors.[62] Interurbans took on a variety of appearances from a simple streetcar line that extended beyond city limits into a more rural area, to "a highly developed grid of lines like those that were developing around Los Angeles during this period."[63] The Los Angeles interurban network, established by the Pacific Electric Railway, was the largest interurban system in the country, boasting more than 1,000 miles of trackage, 2,700 daily train rides, and 109 million passengers annually during its peak. While other interurban systems were not as large as that surrounding Los Angeles, the area including Michigan, Indiana, Illinois, Wisconsin, Ohio, and New York saw the greatest concentrations of interurban trackage, accounting for almost half of the total interurban trackage in the country.[64] The flat topography of Midwestern states lent itself to easy interurban construction, while the proximity of manufacturing centers afforded additional income opportunities.[65]

Interurban companies found that they could make money not only off of fares, but by offering freight operations as well. Many interurbans were constructed at standard gauge, which allowed for easy interchanges with steam-powered freight railroads that crisscrossed the country.[66] Despite the quick embrace of interurban lines, it became clear by the early decades of the twentieth century that automobile traffic, with its flexibility of schedule and destination, would prevail over interurbans. There was roughly 18,000 miles of interurban trackage across the country by 1917; however, the 1920s marked the beginning of abandonments that lasted through the depression. By 1939 the number of interurban trackage miles had dropped to 3,711 and it was clear that interurbans across the country had been replaced.[67]

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[62] Moedinger, *The Trolley Triumph of Transportation*, 16.

[63] Don Robertson and Kenton Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, vol. 3 (Golden, Colo.: Colorado Railroad Historical Foundation, Inc., 2010), 36.

[64] Moedinger, *The Trolley Triumph of Transportation*, 16.

[65] Geberer, "Trolleys' Time."

[66] Moedinger, *The Trolley Triumph of Transportation*, 17.

[67] Geberer, "Trolleys' Time."

F. The Decline of Streetcars

Urban life in the United States continued to revolve around electric streetcars, and investment in and construction of streetcar lines across the country continued beyond the initial building boom. At the turn of the twentieth century, automobiles were a novelty only affordable to the wealthy. With Henry Ford's development of a moving assembly line for automobile production, which was in place by 1914, automobile ownership became more affordable and accessible to the masses. Prior to the efficient assembly line manufacturing process, a Model T sold for $850. By 1924 one could be purchased for $290, a price far more attainable to middle-class citizens.[68] Despite this uptick in automobiles, most Americans still relied on public transportation, but the writing was on the wall. Starting in 1914 there is evidence of the use of jitneys, or small bus-like vehicles, to transport riders between set destinations.[69] By 1915 it was estimated that anywhere between 6,000 and 10,000 jitneys were in operation in the United States.[70] Jitney drivers provided their service only during rush hours and were not required to keep to a schedule of any sort. Jitneys quickly faded from the scene; however, their early use foreshadowed what was to come.

By 1917 the country saw the peak of electric streetcar track mileage with approximately 26,000 miles of electric streetcar trackage across the country, while ridership peaked in 1923 at roughly 14 billion.[71] In addition to the growing popularity of private automobile ownership that diminished ridership revenue, streetcar companies also found themselves constrained by their franchises granted to them by their respective cities, which often required a set fare. Additionally, streetcar companies were subject to taxes as well as additional fees charged by municipalities that went toward street maintenance and paving, infrastructure improvement, and other various projects aimed at improving the roads for automobiles.[72] Original franchise terms and growing expenses left streetcar companies across the country in difficult financial standing.

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[68] Associated Cultural Resource Experts, *Highways to the Sky: A Context and History of Colorado's Highway System* (Prepared for the Colorado Department of Transportation, 2002), 5–1.

[69] New South Associates, *Historic Streetcar Systems in Georgia*, 58.

[70] Middleton, *The Time of the Trolley, Volume I*, 156–57.

[71] Middleton, *The Time of the Trolley, Volume I*, 103; Cudahy, *Cash Tokens and Transfers: A History of Urban Mass Transit in North America*, 56.

[72] Miller, *Fares Please!*, 103.

After 1923 streetcar and transit companies across the country began turning to cheaper, trackless options such as motor buses and electric trolley buses to address the transit needs of their communities.[73] Between 1930 and the 1950s the number of trackless trolleys rose from approximately 173 to 7,000 vehicles across the United States.[74] Buses were cheaper to operate, did not require an expensive network of tracks to maintain, and had the freedom to change routes as desired should an impediment appear on the scheduled route. This, combined with the hardships of the Great Depression, saw ridership on streetcars suffer. Most streetcars had ceased operations in smaller cities by the early 1930s, while larger municipalities continued to hold on to the rails that carried their residents across town. Major cities, including Denver, Cincinnati, Cleveland, Minneapolis, Saint Paul, Detroit, Brooklyn, Kansas City, and Dallas, however, abandoned the streetcar in droves during the 1950s.[75] While some residents were glad to see the streetcar removed in the guise of progress, many were not. Across the nation, urban Americans sent the streetcars that had been such a crucial aspect of their daily lives into retirement with grand celebrations, noting their long relationship and appreciation for the role they played.

[73] Miller, *Fares Please!*, 116.

[74] Cudahy, *Cash Tokens and Transfers: A History of Urban Mass Transit in North America*, 112.

[75] Middleton, *The Time of the Trolley, Volume I,* 170.

Figure 7. Junked streetcars in Los Angeles.[76]

[76] Middleton, *The Time of the Trolley, Volume I*, 166.

3. STREETCARS IN COLORADO

A. Colorado Community Development

Although Native Americans have inhabited Colorado for thousands of years, the first Spanish explorers arrived in approximately 1540 looking for the famed seven cities of gold. Fur trappers and traders did not begin to work the plains of eastern Colorado until the later 1600s. In the early 1800s explorers Zebulon Pike and later Stephen H. Long sent reports on the Arkansas and Platte River valleys back to interested parties on the east coast. Slowly, trappers, traders, and explorers established trails across the plains east of the Rocky Mountains. Early forts protected travelers along these routes. It was not until William Russell discovered gold on Dry Creek near present day Denver in 1858 that additional prospectors arrived and began establishing towns along the Front Range of the Rocky Mountains, which spans roughly from Fort Collins to the north to Colorado Springs to the south.[77]

The United States Congress created the Colorado Territory in February 1861 to provide some sort of organization among the newly arriving prospectors. Towns east of the mountains were established, often near water sources, to serve as mining supply centers and agricultural activities were encouraged to support the miners and those living in the growing communities.[78] When the first railroad entered Colorado in 1867, it changed the way cities were established and their future prosperity. Those communities fortunate enough to be located along one of the many railroads that soon crisscrossed the Front Range had their futures solidified by the connection provided by the rail network, while entirely new communities were founded along the iron rails.[79]

Town promotors and real estate speculators were busy at work creating new towns across the plains. Communities like Denver, founded in 1858 as a result of prospecting finds, ultimately

[77] Steven F. Mehls, *Colorado Plains Historic Context* (Denver: Prepared for the Colorado Historical Society, 1984), 1–20.

[78] Mehls, *Colorado Plains Historic Context*, 21.

[79] Mehls, *Colorado Plains Historic Context*, 41–62.

grew into major railroad hubs. Fort Collins, which originally developed because of the protection the nearby army post offered, also grew because of a later rail connection. Agricultural and ranching communities, like Greeley, utilized irrigation efforts to secure their future success and railroad connections to transport their goods. These Front Range communities also promoted themselves as tourist and health destinations where individuals could take in the beautiful mountain scenery and benefit from the thin, clear air, which aided those afflicted with respiratory problems. Communities like Colorado Springs successfully marketed themselves as health retreats easily accessible by train, and later by highway in the comfort of one's own automobile.[80]

Mountain and western communities, however, grew differently than those along the Front Range. Mountain communities were often established in response to major mining claims and processing facilities. Towns grew around mines and mills, complete with the amenities needed by miners and mill employees including stores, schools, churches, union halls, doctors' offices, and newspapers. Mountain towns were often separated into residential areas reserved for mine management and a distinct area for workers. Though often geographically segregated by great distances, this pattern was duplicated in communities across the high country.[81]

Colorado's population grew to 39,864 by 1870. The federal government declared Colorado a state in 1876 and Denver was chosen as the capitol, cementing its importance within the state. Rail connections to other communities within Colorado and further to the east allowed the state's population to balloon to 413,249 in 1890, with a majority residing in the Front Range.[82] The population of Colorado's mountain and western communities, which were often extremely isolated, fluctuated greatly depending upon the status of the mining industry.[83]

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[80] Mehls, *Colorado Plains Historic Context*, 41–96.

[81] Steven F. Mehls, *Colorado Mountains Historic Context* (Denver: Prepared for the Colorado Historical Society, 1984), 31.

[82] U.S. Census Bureau, "Resident Population and Apportionment of the U.S. House of Representatives-Colorado," n.d., https://www.census.gov/dmd/www/resapport/states/colorado.pdf.

[83] William Philpott, *Vacationland: Tourism and Environment in the Colorado High Country* (Seattle: University of Washington Press, 2013), 17.

Whether Colorado cities were located in the western part of the state or on the Front Range, their residents and promotors wanted them to be desirable. Beginning in the late 1870s this desirability was often linked to the presence of a streetcar system. Residents of the newly formed state, which much of the country viewed as the "Wild West," wanted to be taken seriously and regarded as equally cosmopolitan to their eastern counterparts. Simultaneously, young communities within Colorado battled each other for status as local and regional hubs. The presence of a streetcar system was a status symbol for Colorado communities; it implied that certain cities were more prosperous than their neighboring towns, and just as sophisticated as the East Coast and Midwestern cities from which many settlers had relocated.

On the Front Range, the smaller communities and suburbs that emerged near larger cities offered quieter, cleaner residential areas removed from the city centers. Early on, most of these suburbs were short carriage rides away. With the advent of streetcar service in all of its forms, streetcar suburbs grew across the Front Range, allowing residents to live further from their places of employment.[84] The notion of living further from centers of commerce expanded with the development of the automobile and personal automobile ownership. As the population grew, the largest cities of the Front Range quickly became a web of connected communities, extending from Fort Collins to Pueblo.[85] Conversely, suburbs are not common in mountain communities because of the great distances and geographic features between cities in the western part of the state.

B. Streetcar Technologies in Colorado

Although the first horsecar service in the United States opened in 1832 in Harlem (New York), Colorado did not receive its first horsecar service until 1871, when tracks were laid in Denver's

[84] R. Laurie Simmons and Thomas H. Simmons, "The Instant City- The Gold Rush and Early Settlement, 1858-1892," n.d., 10, https://www.discoverdenver.co/sites/discoverdenver.co/files/document/pdf/The%20Instant%20City%201858%20-%201892.pdf.

[85] Bunyak Research Associates and Front Range Research Associates, Inc., *Denver Area Post-World War II Suburbs* (Prepared for the Colorado Department of Transportation Applied Research and Innovation Branch, April 2011), 4–6.

central business district.[86] Pueblo followed shortly thereafter, establishing horsecar service in 1878.[87] There does not appear to be a significant difference in the timing of horsecar lines in the Front Range communities and mountain communities. With the exception of Grand Junction, which did not end horsecar service until about 1903, and the Cherrelyn gravity horsecar tourist attraction in Englewood that continued service until 1910, most Colorado communities stopped their horsecar service by the turn of the century, either abandoning streetcar service altogether or upgrading horsecars in favor of newer technologies.[88] While all other streetcar companies in Colorado utilized either horsecars or electric power, Denver's streetcar companies experimented with various technologies. Among these technologies were steam dummies, which were employed by the Denver Circle Railroad, the Denver & Berkeley Park Rapid Transit Company, the Park Railway Company, and the Fairmount Railway Company. Steam dummies began operating in Denver in 1880 and appear to have ceased operations by 1898, when steam dummy lines were either abandoned or converted to electric power.[89]

Other Denver streetcar companies, such as the Eastern Capitol Hill Electric Railroad and the Denver, Lakewood & Golden Railroad, also attempted to utilize alternate modes of power including storage batteries, which ultimately failed to meet speed and range expectations.[90] The Denver Tramway Company (Tramway), which started as an early rival to Denver's first horsecar company and would ultimately be the final streetcar company left operating in Denver, dominated public transportation in the city for over 60 years. It made the first attempt at operating an electric streetcar in Colorado in 1886 by utilizing a technology developed by

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[86] Middleton, *The Time of the Trolley, Volume I*, 15; Beth Glandon, *Streetcar Commercial Districts Reconnaissance Survey Final Report* (Prepared for Historic Denver and the Discover Denver Project, 2013), 2.

[87] Ken Fletcher, *Centennial State Trolleys* (Golden, Colo.: Colorado Railroad Historical Foundation, Inc., 1995), 134.

[88] Englewood Historical Society, *A History of Englewood, Colorado and An Overview of Fort Logan Colorado* (Dallas: Curtis Media Corporation, 1993), 103; William L. McGuire and Charles Teed, *The Fruit Belt Route* (Grand Junction, Colo.: Rio Grande Chapter of the National Railway Historical Society, 1981), 10–13.

[89] Morris Cafky, *Steam Tramways of Denver* (Denver: Rocky Mountain Railroad Club, 1950), 6–19.

[90] Don Robertson, Morris Cafky, and E.J. Haley, *Denver's Street Railways, Volume I 1871-1900* (Denver: Sundance Publications, Limited, 1999), 187–216; Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:18–27.

University of Denver Professor Sidney H. Short, which employed a conduit electric system installed between the rails. Denver was one of multiple cities across the country concurrently experimenting with its own variations on an electric transit system.[91] The Tramway's first efforts failed and the company turned its focus toward a different mode of transportation: cable.

Perhaps a reflection of the high cost needed to construct a cable route, only two companies in the state—the Tramway and the Denver City Cable Railway Company—employed cable railway technology for a period from 1888 to 1900. The adaptation of this costly technology coincided with Colorado's silver boom during the late 1800s. Denver boasted "one of the most complete coverages [by cable streetcars] of any city" in the country.[92] Because of the inherent danger and cost associated with cable car transportation, and the development of the next great technology (electric streetcars), most American cities stopped running cable cars between 1895 and 1897. Denver converted its last cable lines to electric in 1900.[93]

The next technology embraced by Colorado's streetcar companies was overhead electric transportation. While the country was watching the events unfolding in Richmond, Virginia, with Frank Sprague's successful development of an overhead electric streetcar system in 1887 (see Section 2.B.(1)), Colorado residents had their concerns. Over the years, as Colorado communities employed the new technology, newspapers carried stories of the dangers of electric streetcars, including stories of gruesome collisions, electrocution from falling wires, and accidents from startled horses. Newspapers, with stories that kept residents apprised of the latest happenings regarding streetcar service in the town, played an interesting role in streetcar history in the state, particularly in Denver, where different papers sided with different streetcar companies during contentious turf wars and labor disputes (see Figure 8).

[91] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:181.

[92] Hilton, "Denver's Cable Railways," 35.

[93] Hilton, "Denver's Cable Railways," 51.

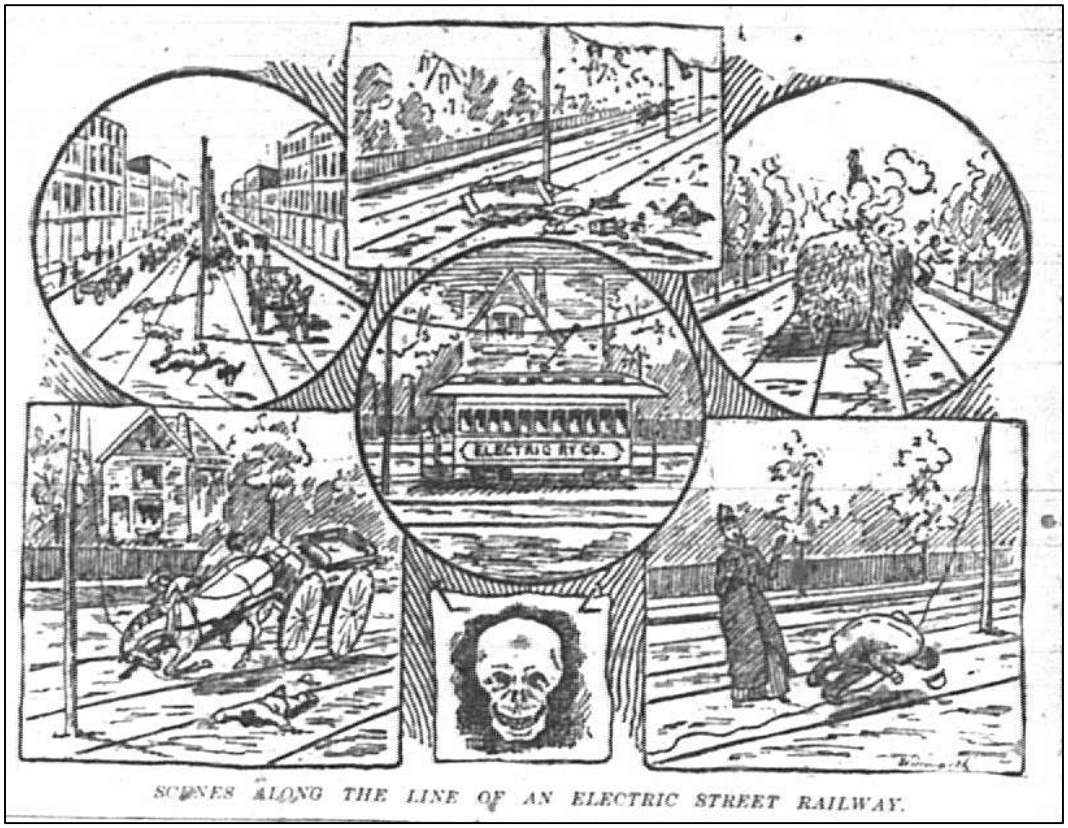

Figure 8. Cartoon from the *Denver Times* showing the perceived dangers of an electric streetcar.[94]

Despite the plethora of concerns, the use of overhead electric power was inevitable. Electric streetcars could travel faster, required less investment to establish, and operated more efficiently than cable cars. Cities across the country were rapidly adopting the new technology, including nearby Salt Lake City, which established electric streetcar service just prior to Denver.[95] Colorado's first electric streetcar started operating down South Broadway in Denver at the end of 1889, roughly two years after Sprague's system in Virginia began operations.[96] Colorado Springs

[94] "Scenes Along the Line of an Electric Street Railway," *Denver Times*, November 16, 1889, 1.

[95] "History," *Trolley Square*, accessed December 5, 2019, http://www.trolleysquare.com/history.

[96] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:181.

and Pueblo were close behind, starting their electric streetcar service the following year, in 1890.[97] The last city to start an electric streetcar system was Greeley, which began in 1910.[98]

C. Motives for Streetcar Development in Colorado

Like much of the country, streetcar routes in Colorado cities were constructed for varying reasons, including to establish public transportation, for private financial profit, as a reflection of civic pride, or as a way to spur real estate development and increase accessibility for established neighborhoods. Other motivating factors included providing access to educational institutions and recreational and tourism attractions. Additionally, streetcar routes were also built for industrial and commercial reasons, and occasionally agricultural purposes. Sometimes only one of these factors was the impetus for constructing a streetcar line, while other times several of these factors overlapped, resulting in a public transportation system that became heavily engrained in the everyday lives of Colorado residents.

Many early lines were built to connect already established areas with a form of public transportation. Streetcar service in Denver began in the central business district and provided a way to move people about the business downtown without cluttering it with additional carriages and horses. Business owners and hotels felt that offering easy access for the traveling public to their establishments via streetcar was imperative for their success. Denver's commercial district became crisscrossed with streetcar lines following lobbying efforts by various business owners on different streets, which also resulted in the growth of competing streetcar companies.[99] In Grand Junction, citizens raised concerns with the city when streetcars directed passengers to other establishments or failed to stop in front of theirs. An additional spur was constructed there specifically to provide access to a hotel not located on the main streetcar line.[100]

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[97] Morris Cafky and John A. Haney, *Pikes Peak Trolleys: A History of the Colorado Springs Streetcar System* (Colorado Springs, Colo.: Century One Press, 1983), 3; Morris Cafky and John A. Haney, *Pueblo's Steel Town Trolleys* (Golden, Colo.: Colorado Railroad Historical Foundation, Inc., 1999), 17.

[98] Leland Feitz, *Colorado Trolleys* (Denver: The Golden Bell Press, 1971), 37.

[99] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:72.

[100] McGuire and Teed, *The Fruit Belt Route*, 10.

Soon, the operation of a streetcar system became a matter of civic pride. Many communities felt the presence of a streetcar system assured their city's future permanence and success. This is indicated in editorials in *Grand Junction Sentinel*, projecting the effects that their new electric streetcar would have on the future development of the city.[101] The western communities of Colorado were not only concerned about their status among their neighbors, but were also sensitive to how they were perceived by the large eastern cities. Colorado communities often compared themselves to their neighboring towns, touting the presence and condition of their streetcar system as an indication of their superiority. In an effort to boost their perception amongst their neighbors, the *Great Southwest* newspaper in Durango proclaimed upon the arrival of the city's new electric streetcars in 1893, stating: "Denver, Chicago, nor other cities [could] boast of finer service from track to trolleys."[102] Long viewed as rugged cow towns in the Wild West, Colorado communities, and particularly Denver, were keen to be seen as sophisticated cities with the same amenities of other metropolises across the country. The *Rocky Mountain News* stated in 1891 that streetcar service in Denver was already "…unsurpassed in equipment and service by any in the world."[103]

A major motivating factor for the construction of streetcar lines in Colorado was real estate speculation, with real estate developers attempting to ensure the success of their development by procuring streetcar transportation for future residents. Some of these routes successfully encouraged development, while others were ultimately abandoned when development failed to reach expectations. When established developments lacked streetcar service, residents themselves sometimes pooled their resources to help fund streetcar lines to their communities, which provided them with better access to the rest of the city. This was the case for several neighborhoods in Denver, including those in what was then the town of Harman. Residents of Harman, which is located in today's Cherry Creek neighborhood of Denver, raised their own funds to entice the streetcar company to construct a line to their neighborhood.[104]

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[101] McGuire and Teed, *The Fruit Belt Route*, 18.

[102] Robert W. McLeod, "Durango's Trolley, Ver. 2," July 21, 2004, 3, Streetcar folder, Subject Files, The Animas Museum.

[103] "Made the Transfer," *Rocky Mountain News*, June 25, 1891, 1.

[104] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:266.

Recreation and tourism were also frequent motivations for streetcar lines in Colorado. The companies capitalized on certain leisure time attractions by providing transport to amusement and recreational parks, sometimes directly affiliated with the streetcar company providing the service. In Durango, the streetcar company operated parks along its lines, making investments in amenities including rowboats and concession stands to attract visitors. The Durango company also owned the fair grounds.[105] The Denver Circle Railroad opened Jewell Park, which boosted ridership. [106] The Denver & South Platte Railway leased Bowles Picnic Grove, which became known as Tramway Park, as a picnic ground for streetcar riders.[107] Multiple other cities, including Denver, Fort Collins, Colorado Springs, and Pueblo, constructed lines to established parks as a way to ensure tourism and recreational riders. Lines were also constructed to local cemeteries, not only providing funeral transportation, but also for locals who often picnicked in the cemeteries.[108]

On occasion, routes were built to provide access to educational facilities outside of city centers. The Loretto Heights Railway Company provided access for students of Loretto Heights Academy, which was located southwest of the Denver city center.[109] The Denver & Interurban constructed a spur off its route between Denver and Boulder so students could access Westminster College.[110]

While potential freight income was not often the original motivation for constructing a streetcar line in Colorado, streetcar and interurban companies, like their counterparts across the country, often built extensions and spurs to nearby industrial and sometimes agricultural areas to capitalize on hauling freight in addition to their passenger revenue. The interurban system in the

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[105] "Street Railway Company," *Durango Democrat,* April 27, 1906, 3; "Durango's Electric Street Car History 1890's |," accessed April 4, 2019, https://www.durangorvpark.com/durangos-electric-street-car-history-1890s/.

[106] Cafky, *Steam Tramways of Denver*, 8.

[107] "Town Council Meeting," *Littleton Independent,* June 16, 1911, 1.

[108] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:280–98.

[109] Bonita Hutcheson and Thea Hutcheson, "Transportation in Sheridan," July 29, 2018, http://www.shs-co.org/ha_transportation.htm.

[110] Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:115.

Cripple Creek District hauled supplies, machinery, and ore to and from the nearby mines to make additional money.[111] The Trinidad Electric Railway Company built extensions to nearby coalfields. The Denver & Northwestern did the same; however, it also owned the Leyden coal mine through a sister company and used the material to power cars on its interurban line as well as streetcars on the associated Denver Tramway system.[112] Tapping into the agricultural side of the western slope's economy, the Grand Junction and Grand River Valley Railway built an extension to haul crops in the fertile valley. The Denver, Lakewood & Golden hauled clay and lumber.[113] Many of these companies used the freight income to sustain their operations during difficult financial times. In addition to constructing extensions and lines to accommodate freight operations, many streetcar companies across the state had contracts to transport U.S. mail, offering an additional means of income, although transporting mail was not the motivation for constructing streetcar lines in Colorado.[114]

Freight was not the only motive for constructing streetcar lines to industrial areas. Factory workers provided a constant passenger base. In Pueblo, immigrant laborers rode the streetcar daily to and from their long shifts at the Colorado Fuel and Iron Company's steel mill. The streetcar provided a pivotal connection for a workforce that, besides walking several miles, otherwise may not have had other means to access the mill every day.[115] A specific branch was built in Denver in 1923 solely to provide access for workers to the Chicago, Burlington & Quincy Railroad and the Colorado & Southern Railway's shop.[116]

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[111] Colorado Springs & Cripple Creek District Railway, *Short Line Blue Book: A Handbook for Travelers* (Pueblo, Colo.: Blue Book Publishing Co., 1904), 26, https://play.google.com/books/reader?id=npg1AQAAMAAJ&hl=en&pg=GBS.PP1.

[112] Fletcher, *Centennial State Trolleys*, 156; Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:35–36.

[113] Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:71–74; "Notes on the Grand Junction & Grand River Valley Railway," *Electric Railway Journal*, October 15, 1910, 832.

[114] Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:179–216.

[115] "East Side Line," *Colorado Daily Chieftain*, May 28, 1891.

[116] Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:310.

D. Colorado Streetcar Company Ownership and Investment

Colorado streetcar companies were owned by a variety of individuals. Most frequently, the successful companies were established by well-respected local residents and businessmen. Occasionally, outside parties and investors saw an opportunity and began streetcar services within a community, although it was more often that outside investors would be brought in when additional funds were needed or reorganization efforts were required. Specific streetcar lines and extensions were occasionally paid for by local residents, who paid subscriptions to entice companies to build lines to service their neighborhoods. This practice was particularly common in Denver, where neighbors seeking greater connectivity would pool their funds to pay for all or portions of the construction costs for new lines.[117]

There is no evidence that any streetcar systems in Colorado were started by a municipality. However, some local municipalities took over ownership to maintain streetcar services, including Grand Junction, which owned its horsecar system from 1901 to 1903, and Fort Collins, which established the Fort Collins Municipal Railway to take over its electric streetcar operations from 1919 to 1952.[118]

Although it appears most Colorado streetcar companies were started by individuals or railway companies, there are instances of ownership by utility companies. Utility Company ownership, however, appears to have occurred later in the history of an established streetcar system. This was the case with the Pueblo Electric Street Railway, which was under the control of General Electric, and the Boulder Electric Light Company, which purchased the Boulder system in 1902.[119] These utility companies were often more interested in the potential income from the electrical services that powered the streetcar lines than operating a streetcar system. One example is the Cities Service System, a utility company that took over ownership of the Grand River

[117] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:260–83.

[118] McGuire and Teed, *The Fruit Belt Route*, 7–9; Fletcher, *Centennial State Trolleys*, 106.

[119] "Pueblo City Railway Sold," *Pueblo Daily Chieftain*, September 1, 1895, 3; Hermsen Consultants, *Documentation of Boulder Streetcars Boulder, Colorado* (prepared for the Colorado Department of Transportation-Region 4, City of Boulder Public Works- Transportation, August 19, 2009), 8.

Valley Railway Company in Grand Junction in 1926 and promptly shut down service within the city to focus on the profitable electric utilities potential of the company.[120] The electric streetcar system in Trinidad was an exception to this trend, which was tied to the power and utility company since service began in 1904.[121]

Streetcar companies in Colorado were interested in the profitability of their lines, with the exception of the unique ownership and investment structure of the Colorado Springs and Interurban Railway Company, which was owned by philanthropist Winfield Scott Stratton. Stratton saw streetcar transportation as a public service and, upon his death, left the company to his estate, which operated the service not for profit, but rather as a part of his philanthropic legacy.[122]

E. Uniquely Colorado

Colorado faced many challenges regarding streetcar operations. Most cities in Colorado with streetcar systems did not have to overcome particularly difficult topographical challenges. They did, however, have fairly unique weather and climate challenges to contend with. First and foremost, the extreme winter weather conditions experienced across the state could cripple streetcar operations. In 1913 Denver's complex system was shut down for days following a massive snow storm. Tracks were buried under feet of snow and streetcars were stranded.[123] The freeze-thaw cycle, which can be problematic for roads across the state, wreaked the same havoc on streetcar rails and ties. The system in Leadville lasted only one year, as the damage done to the streetcar infrastructure during winter at such a high elevation was so severe that the company

[120] W. L. McGuire, "Interurban Cars Were to Serve Entire Valley," n.d., Western Interludes Collection, Call Number 1980.132, Loyd Files Research Library, Museums of Western Colorado.

[121] Fletcher, *Centennial State Trolleys*, 154; Feitz, *Colorado Trolleys, 47*; "State News Items," *The Turret Gold Belt*, September 30, 1908, 2.

[122] *Pikes Peak Trolleys: A History of the Colorado Springs Streetcar System*, 25–26; P.R. Griswald, *Colorado Springs Streetcars: A History* (Aurora, Colo.: Double R Publishing, 2009), 15, 17.

[123] Don Robertson and Rev. W. Morris Cafky, *Denver's Street Railways, Volume II 1901-1950* (Denver: Sundance Publications, Ltd., 2004), 213–15.

could not afford to rebuild and continue operations.[124] Despite its location at just over 10,000 feet, the Cripple Creek District Railway managed to maintain operations at the high altitude and became the highest electric railroad in the world, although the extreme elevation and topography there required a number of switchbacks.[125]

A particularly unique facet in the history of streetcar systems in Colorado is the Panic of 1893. Following the repeal of the Sherman Silver Purchase Act, the United States government was no longer required to purchase a set amount of silver each year and in turn sent the economy of Colorado, which was centered almost entirely on mining activities, into a tailspin. Many Coloradans suddenly found themselves unemployed. While other parts of the country were likely impacted by the repeal of the Sherman Silver Purchase Act, Colorado felt its economic ramifications deeply, and many streetcar systems across the state were either forced to cut costs, reorganize, or close as a result.[126] Aspen's economy was decimated by the Panic of 1893, and its streetcar company likely fell victim to the economic crash, as did Trinidad's horsecar system. Although Pueblo's streetcar did not fold as a result of the economics of the time, the company did reorganize in order to weather the hardships.[127] Similarly, the Denver, Lakewood & Golden steam line was forced into receivership in 1894, following the events of the year before.[128] In Denver, multiple smaller companies, like the Park Avenue Railway, either immediately folded during the Panic of 1893 or were forced to sell in the next few years.[129]

Likely because of its size, Denver was the only city in Colorado that boasted multiple active, competing streetcar companies before the turn of the century (see Section 4.E.). Many of these companies succumbed to the economic difficulties facing the city as a result of the Panic of 1893, coupled with the oversaturation and duplicity of the streetcar market in Denver at the time.

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[124] Fletcher, *Centennial State Trolleys*, 122.

[125] "Interurban Railroading at Cripple Creek," *Street Railway Journal* 14, no. 11 (November 1898): 703.

[126] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:281.

[127] "Pueblo City Railway Sold," 3.

[128] Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:327–29.

[129] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:135–283.

This led to mass consolidations and takeovers around the turn of the century, resulting in one final company dominating the streetcar industry in the city: the Tramway.[130] Within the Cripple Creek mining district, a unique consolidation was arranged between the electric interurban line that carried passengers and freight and the steam freight railroads in the area due to the oversaturation of rail service in the small district following the turn of the century.[131]

Colorado, and the Front Range in particular, is prone to severe lightning events, which come on quickly with little warning. It was noted in *Electric Traction Weekly* that the Denver Tramway "probably suffers worse from lightning troubles than any [streetcar] company in the country" with strikes common at any time from May through September.[132] A lightning strike to the streetcar system could damage the armature, the rotating portion of the motor that produces the torque needed to power the streetcars, often disabling multiple cars at once and resulting in costly repairs. The Tramway worked diligently to develop effective lightning arresters to combat the problem; however, when lightning storms set in, the company often halted the streetcar system to prevent potential damages.[133]

F. Minority Involvement in Colorado Streetcars

The golden era of streetcars occurred during a time when segregation and the exclusion of minorities prevailed across much of the United States. African American residents were one such group limited in their employment options. The streetcar industry was no exception and there is limited documentation indicating that minorities participated in streetcar operations. For the most part, Colorado appears to have followed the trend of limited minority involvement in streetcar ownership and operations; however, Grand Junction appears to have bucked that trend during its early streetcar days when an African American man named John Newman was operating its horsecar line by 1893. Once the City of Grand Junction obtained ownership of the system in

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[130] Glandon, *Streetcar Commercial Districts Reconnaissance Survey Final Report*, 2–3.

[131] Wilkins, *Short Line to Cripple Creek: The Story of the Colorado Springs & Cripple Creek District Railway*, 78–79.

[132] *Electric Traction Weekly* (Kenfield-Fairchild Publishing Company, 1909), 1012.

[133] *Electric Traction Weekly*, 1012.

1900, it was leased to another African American man by the name of John M. Price.[134] In 1905 the Denver Tramway hired George Eli, who is thought to be the first African American motorman in the country.[135] African Americans were not the only minority often excluded from streetcar company ownership and operations. There is very little evidence of female ownership or management of streetcars in Colorado; however, the Cherrelyn streetcar line appears to be an exception to that trend. The Cherrelyn horsecar line in Englewood was not only unique for its rare gravity-powered operation, but also because it was reportedly owned by Mrs. George H. Bogue in 1906, making it the only known female-owned streetcar service in the state.[136]

G. Colorado Interurban Streetcar Systems

Most interurban streetcar systems across the country were constructed between 1901 and 1908, including those in Colorado. The Denver & Northwestern Railway Company opened its electric connection between Denver and Arvada in 1901 before continuing on to Golden. Just as they did across the country, Colorado's interurban systems helped establish growth patterns in rural areas. It is reported that when the interurban was built from Grand Junction to Fruita in 1902, there was "the damndest land boom in Fruita you ever saw," a testament to the impact an interurban had on land development.[137] People who otherwise may not have lived in Fruita were now choosing to because of the connectivity the interurban provided. While many companies in Colorado, particularly along the Front Range, had grand visions of connecting their surrounding communities with electric interurban service, few were successful. Greeley, Fort Collins, and Littleton never saw their dreams of vast interurban networks completed. Grand Junction, Golden, Boulder, and Denver had interurban connections, but not to the extent that was originally envisioned. Most interurbans across the country were associated with power companies. The Denver & Interurban Railroad, a subsidiary of the Colorado & Southern Railway that connected

[134] McGuire and Teed, *The Fruit Belt Route*, 7–9.

[135] Robertson and Cafky, *Denver's Street Railways, Volume II 1901-1950*, II:110.

[136] "Unique Street Railway," *Greeley Tribune*, May 10, 1906, Vol. 36, No. 27 edition, 10.

[137] McGuire and Teed, *The Fruit Belt Route*, 42.

Denver and Boulder beginning in 1904, was a rare example of an interurban owned and operated by a steam railroad.[138]

H. Equipment

A variety of equipment was needed to operate a streetcar system, especially in Colorado, where the elements posed unique challenges for streetcar companies. Snow, rain, and the freeze-thaw cycle complicated streetcar operations and required special equipment. When it came to basic equipment, Colorado companies utilized much of the same equipment used by streetcar companies across the country. Early companies utilized horsecars, which were similar to their predecessor omnibuses but mounted on rails. Variations included open horsecars, operated during the warmer months, and closed horsecars, which featured removable windows to protect passengers from the elements. Horsecars also included prominent advertising signage for local businesses or attractions mounted atop and on the sides of the car body, and the route name was often painted on the side of the cars.[139] A rare variation of the standard horsecars were the gravity horsecars, utilized by the Cook's Addition line in Denver (see Section 4.E.(3)) and the Cherrelyn line in Englewood (see Section 4.G), which featured a platform at the rear of the horsecar where the horse rode downhill aboard the streetcar with the patrons.[140] Steam dummies were used on a few lines in Denver and were essentially smaller steam locomotives that were often proclaimed to be noiseless and smokeless, although that claim was highly debated.[141] Two companies in Denver employed cable streetcars on their cable network. These cable cars were larger in size than a horsecar body and featured a platform in front with large brake and grip levers, which held the cable in the conduit between the rails below the car (see Figure 9).[142]

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[138] *Colorado State Register of Historic Places*, Broomfield Denver & Interurban Railroad/ Colorado and Southern Railway Depot, Broomfield, Broomfield County, Colorado, Colorado Office of Archaeology and Historic Preservation # 5BF.80.

[139] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:60.

[140] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:264–84.

[141] Cafky, *Steam Tramways of Denver*, 6.

[142] Henry Goeddertz, "Early Public Transportation in Denver," *The Colorado Magazine*, April 1949, 126–27.

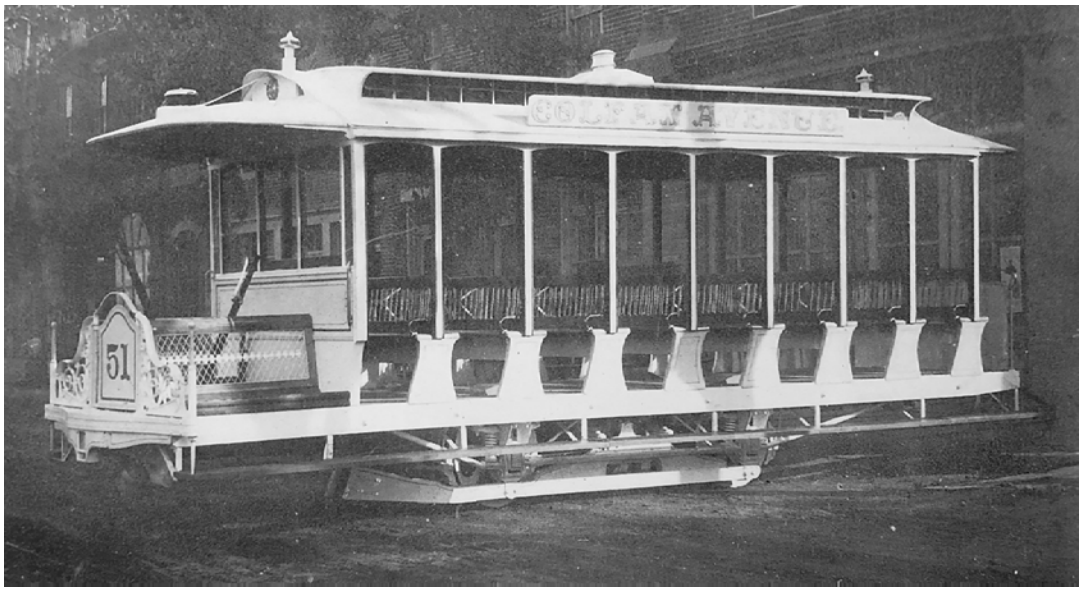

Figure 9. A Denver Tramway open cable car, which would have been used in good weather. Note the two large brake and grip levers on the motorman's platform.[143]

For a brief period the Tramway utilized a special streetcar outfitted for Professor Short's electric streetcar system. This car resembled a smaller horsecar but had platforms on either end, and an electric pick-up arm extended beneath the car and made contact with a slot in the street between the rails, supplying power to the traction motor that was mounted beneath the center of the streetcar (see Figure 55). Otherwise, early electric streetcars across the state were similar to those used across the country. Most were single-truck units with open platforms and two motors that occasionally pulled trailers to accommodate additional passengers during heavy traffic periods. Some companies added double-truck cars, which were longer and carried a greater number of passengers. In 1898 the Tramway developed a unique style of car called the "Center Side Entrance Streetcar" or the "Denver Design Car," which utilized the company's existing single-truck streetcars by splicing them together to create a double-truck car that required a two-member crew to operate (see Figure 10).[144]

[143] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:114.

[144] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:305–6.

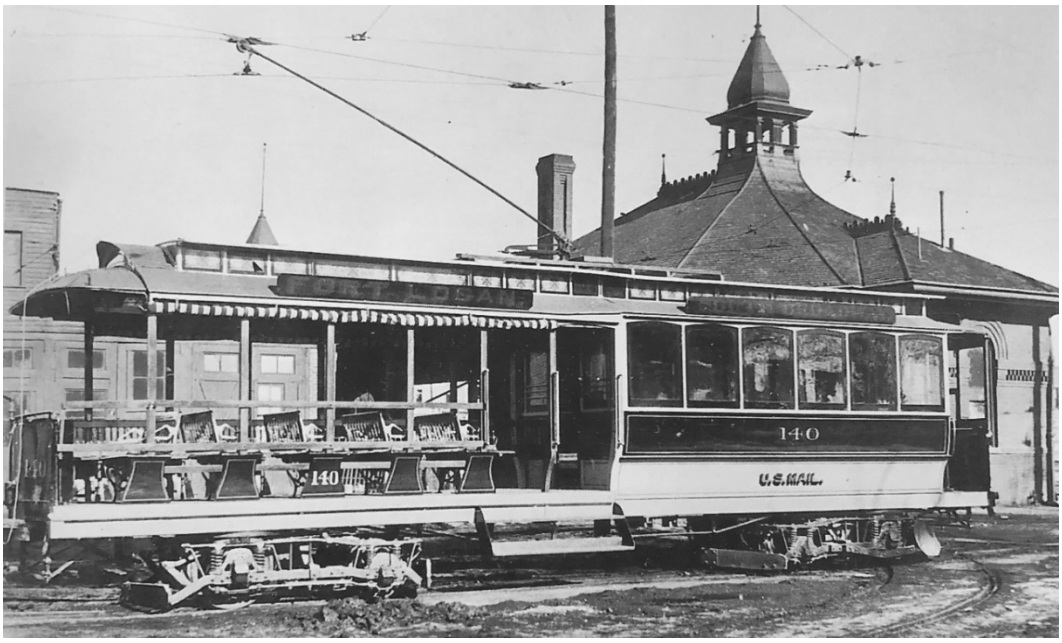

Figure 10. A "Center Side Entrance Streetcar" of the Denver Tramway formed by merging a single-truck closed car with a single-truck open car.[145]

While the "Center Side Entrance Streetcar" made use of the Tramway's existing rolling stock, it did have its faults. The constantly open center portion of the car led to a greater number of accidents for boarding and disembarking passengers than experienced in other cities across the country. As a result, the Tramway developed the "Safety Car" in 1921, which employed folding doors in the center and front of the car and repositioned cabs for the motorman and conductor (see Figure 11). Later modifications would make the car operable by a single motorman. The cars also featured a roll sign, which was a piece of fabric that could be rolled and unrolled to display the various route numbers printed on the fabric.[146]

[145] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:307.

[146] Robertson and Cafky, *Denver's Street Railways, Volume II 1901-1950*, II:306–8.

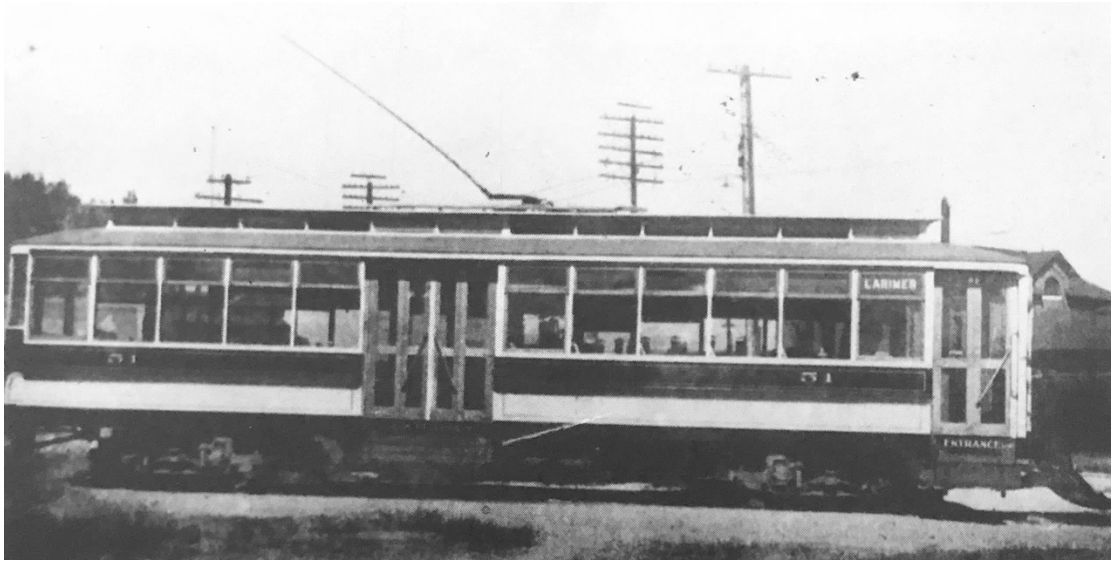

Figure 11. A Safety Car, in which passengers entered from the front and exited from the middle.[147]

To save money, companies across the state often purchased other companies' discarded rolling stock for use on their own systems, modifying, splicing, and joining cars to fit their respective needs.[148] Interurban cars, as they traveled longer distances at faster speeds, were much heavier and larger than streetcars that were restricted solely to city streets. As seen in Denver and Boulder, these heavy interurban cars often damaged the streetcar rails within city streets as many of the rails were not built to withstand the heavier cars. The Denver & Interurban Railroad employed a unique electric system on its cars that used both a pantograph to draw alternating current on its mainline and a trolley pole for the direct current utilized within city streets.[149]

A Denver-based company built many of the streetcars that rode along Colorado city streets and streets of other western cities. Bavarian immigrants Amandus and Gallus Woeber worked in the carriage building industry in Davenport, Iowa, before moving their business to Denver in 1867 and establishing A. Woeber & Company, which later became the Woeber Brothers Carriage Works. The company had a shop on 11th Street between Walnut and Wazee Streets and made

[147] Robertson and Cafky, *Denver's Street Railways, Volume II 1901-1950*, II:306.

[148] Cafky and Haney, *Pueblo's Steel Town Trolleys*, 48; Fletcher, *Centennial State Trolleys*, 14.

[149] Robertson and Forrest, *Denver's Street Railways Vol. 3 The Interurbans*, 3:112–15.

various commercial wagons and private carriages. When the Denver City Railway Company needed additional horsecars in 1884, it looked to the Woeber Brothers. The Woeber Brothers utilized wood that was already acclimated to the high altitude and dry climate in Denver, resulting in lower maintenance costs than cars manufactured out east, which often dried and warped upon arrival to Colorado (see Figure 12).[150] The cars were a hit, and soon streetcar companies across the West were placing orders. At some point the company's name changed to the Woeber Car and Manufacturing Company; it moved operations to a larger facility between 1889 and 1890 at South Bannock Street and West Colorado Avenue. The Woeber Company manufactured streetcars for multiple Denver streetcar companies and interurban lines, as well as the streetcar systems in Grand Junction, Pueblo, Trinidad, Fort Collins, and Colorado Springs. It is estimated the company was responsible for constructing as many as 900 streetcars, employing various modes of transportation, for Denver and the Front Range communities alone.[151]

[150] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900*, I:63.

[151] "Denver Tramway Company Streetcar No. 77 1906-1946," n.d., 15, Colorado Railroad Museum.

Figure 12. Advertisement for the Woeber Bros. Carriage Co.[152]

In the late 1910s and early 1920s a number of streetcar companies in Colorado invested in fleets of the new "Birney Safety Car." The Birney car, as it was commonly known, was developed and patented by Charles Birney, of the holding company Stone and Webster, and J.M. Bosenbury, of the Illinois Traction System, between 1917 and 1919. The Birney car was the first mass-produced streetcar and was designed to address the issues faced by streetcar companies across the nation, including growing operating and maintenance costs compounded by the competition with automobile ownership. The Birney's lightweight, compact design accommodated approximately 30 passengers, which made it ideal for smaller communities that no longer required larger streetcars (see Figure 13). Birney cars included a number a safety features that

[152] "Denver and Its Street Railways," *The Street Railway Journal* IX (March 1893): 33.

enabled single-man operation, including an interconnected system of doors, controls, and brakes, which prevented the doors from opening any time the car was in motion. Thousands of Birney cars were sold across the country. From the 1910s to the 1950s, Birney cars could be found across Colorado, riding the streets of Colorado Springs, Pueblo, and Fort Collins. Fort Collins is significant in the history of the Birney car. When the city ended its streetcar service in 1952, it was the last city in the nation to operate Birney cars. In the 1970s private citizens restored one of the city's Birney cars and began running it on a reconstructed section of track on Mountain Avenue in 1986.[153]

Figure 13. A Birney Safety Car in Fort Collins, 1941.[154]

Entire fleets of maintenance equipment were necessary to keep streetcar systems functioning. Concrete trains, air-powered jack hammers, and wire trains were needed to construct the lines. Snow sweepers, work cars, wreck cars, and snowplows, were necessary to ensure continued

[153] Cafky and Haney, *Pueblo's Steel Town Trolleys*, 41–42; E.S. Peton, R. A. Moorman, and Kenneth Jessen, *Trolley Cars of Fort Collins: Including "Last of the Birneys" and "Restoration of Car No. 21", Second Printing* (Loveland, Colo.: JV Publication, 1986), 15; "Birney Safety Car," *American Rails*, n.d., https://www.american-rails.com/birney.html.

[154] R.H. Kindig, "Trolley Car #26," February 1, 1941, Al Kilminster Collection, H08995, Fort Collins History Connection.

operations. Specialty touring and sightseeing cars were commissioned for special occasions and featured roomier seats and large windows, which could often be entirely opened during good weather (see Figure 14). Some streetcar companies also had funeral cars, which were specially fitted to transport coffins. Denver and its interurbans provided streetcar access to at least four cemeteries around the city and its environs.[155]

Figure 14. The interior of a specialty charter car that was also used for sightseeing tours and featured fancy rattan seats.[156]

The Rocky Mountain Fender was developed by the Colorado Springs Rapid Transit Company to prevent pedestrians and bicyclists from falling beneath the front of the streetcar and being run over. The apparatus was made of curved hickory slats set in a frame suspended from the front of the streetcar (see Figure 15). The motorman could drop the fender to the rails when an obstacle appeared, scooping them up and avoiding catastrophe. The Rocky Mountain Fender, which earned the nickname "cowcatcher," proved widely successfully. By 1899 a city ordinance required it on all Denver city streetcars.[157] The Rocky Mountain Fender appeared in multiple

[155] Robertson and Cafky, *Denver's Street Railways, Volume II 1901-1950,* II:51–109.

[156] Robertson and Cafky, *Denver's Street Railways, Volume II 1901-1950,* II:51.

[157] Robertson, Cafky, and Haley, *Denver's Street Railways, Volume I 1871-1900,* I:320.

trade publications and was likely adapted by other cities across the country to improve the safety of their streetcar systems (see Figure 16).

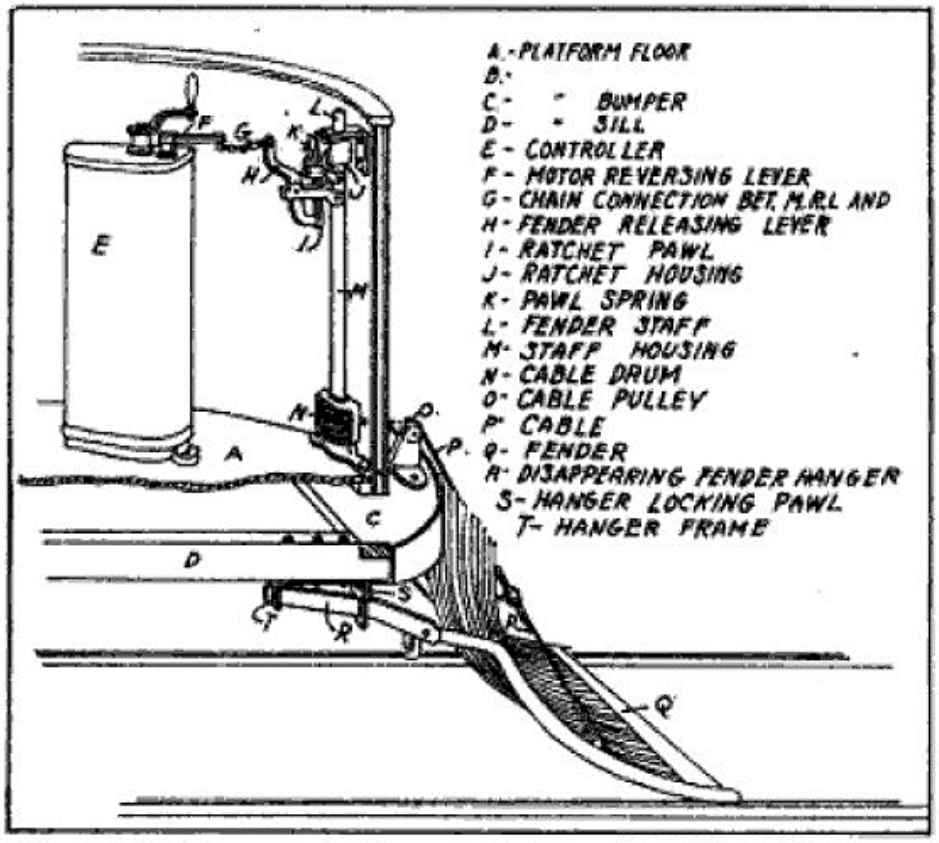

Figure 15. Diagram of a Rocky Mountain Fender from *Electric Traction Weekly*, 1909.[158]

[158] *Electric Traction Weekly*, 1012.

Figure 16. Drawing of a bicyclist saved by a fender, *Grand Junction Daily Sentinel*, 1898.[159]

During the late 1930s and into the 1940s transit companies across the country converted their streetcar routes to trolley coach operations (see Figure 17). Trolley coaches blended the technologies of streetcars and buses. They were powered by overhead lines but ran on rubber wheels and did not require a set of tracks. In 1935 only 578 trolley coaches were in operation across the country, but by 1945 that number jumped to 3,716.[160] Some communities in Colorado followed that trend by transferring their public transportation needs to trolley coaches while others chose buses or a combination thereof. Denver, for example, utilized trolley coaches and buses on their streets for several years before switching entirely to bus service.[161]

[159] "Fender Saved Him," *Grand Junction Daily Sentinel*, August 22, 1898, 2.

[160] The Denver Tramway Corporation, "The Denver Tramway System... Its Past, Present, and Future" (Denver Tramway Corporation, c.1948), Available in Closed Stacks 2, #C388.4 D436de, Denver Public Library Western History Collection.

[161] Robertson and Cafky, *Denver's Street Railways, Volume II 1901-1950*, II:427–67.

Figure 17. An example of a Denver Tramway trolley coach.[162]

I. The End of Colorado's Streetcars

While streetcars were a popular part of everyday life in Colorado communities, individual automobile ownership was on the rise across the country, and Colorado was no exception. Early reports of automobile ownership in Colorado started around 1892. While automobile ownership was initially restricted to wealthy individuals, manufacturing technologies soon brought car ownership into the realm of middle-class citizens. Nationwide, automobile registration spiked to 8,131,522 in 1920.[163] These new automobile owners took to the roads in large numbers.

High country tourism in Colorado played a big role in the state's economic development. Automobile drivers were able to access areas away from the set route of established steam railroads and explore the state over improved highways on their own time.[164] Initially, the state was crisscrossed by difficult, steep, rutted wagon and toll roads and later by railroads. As personal automobile ownership increased, the call for better roads began. Beginning in 1902 with

[162] "Trolley Coach Route 4 Aurora," n.d., Denver Public Library Western History Collection.

[163] Federal Highway Administration, "State Motor Vehicle Registrations, By Years, 1900-1995," n.d., https://www.fhwa.dot.gov/ohim/summary95/mv200.pdf.

[164] Philpott, *Vacationland: Tourism and Environment in the Colorado High Country*, 80.

the founding of the Colorado Auto Club, various automobile associations in the state petitioned for better roads. It was not until 1910, however, that the first state highway commission was formed, although it had little funding. Auto clubs continued advocating for better roads, but marked progress was not seen until federal funds became available and the commission was reorganized in 1917 into the State Highway Department. As federal and state funds flowed into the coffers of the State Highway Department, roads across the state were improved for auto travel. At this point, automobile ownership and highway improvement took off. From 1915 to 1923 the number of automobile registrations in the state exploded from 27,000 to 188,000. Expenditures by the State Highway Department grew with the ownership levels, partially through measures voted upon by the state's residents, reflecting their desire for improved highways. In 1920, $3.4 million was spent on highway construction, growing to $5.7 million in 1922. Although the Great Depression stalled progress, Colorado Highway engineers utilized federal funds and work programs to continue making improvements to the state's highway system, and by 1937 were again investing more than $18.8 million in funds for highway construction expenses.[165] The investment in State Highway construction is reflected in the total mileage of designated State Highways during the period. By the mid-1940s Colorado boasted 12,394 miles within the State Highway System, earning it the 11th highest number of designated highway mileage within all 48 states in the country.[166] With improved roads providing access to anywhere someone with an automobile wanted to go, the reliance on streetcars and interurban connections waned.

The Great Depression that crippled the country certainly had impacts on Colorado's remaining streetcar companies. They weathered the Depression with the same tactics as companies across the country: by trimming costs through cutting routes and service times. Pueblo's streetcar system switched its cars from two-man operations to single-man to cut costs.[167] Boulder's

[165] Marion C. Wiley, *The High Road* (State Highway Department of Colorado, 1976), 4–25.

[166] Associated Cultural Resource Experts, *Highways to the Sky: A Context and History of Colorado's Highway System*, 7–1.

[167] Cafky and Haney, *Pueblo's Steel Town Trolleys*, 48.

streetcar system, which was in a difficult financial situation before the Depression, could not withstand the additional blow and closed in 1931.[168]

When World War II hit the nation, rationing measures that impacted personal automobile usage helped ensure the continued existence of several streetcar companies in Colorado, including those in Pueblo and Denver. These companies may have folded sooner if not for the increased ridership experienced during the war years. Streetcar companies themselves sought to help the war effort by promoting the sale of war bonds on patriotic banners strung from their streetcars and donating abandoned steel tracks and equipment to the war effort. The City of Grand Junction offered to remove its remaining rails for donation, but the War Production Board declined the offer.[169]

Although the increased ridership experienced during World War II gave the remaining streetcar companies in Colorado a temporary lifeline, when the war ended individuals returned to their daily routines in their personal automobiles. Nationally, automobile registrations reached nearly 31 million by 1947.[170] Streetcar ridership and revenues in the state, like much of the country, again began to decline. The last communities in Colorado offering streetcar service were Pueblo, which ceased operations in 1947; Denver, ending in 1950; and Fort Collins, which held on until 1952 (see Figure 18).[171] Today, Fort Collins seasonally operates a restored Birney streetcar, and a small streetcar runs along the Platte River in Denver on select weekends and during Denver Broncos home football games.

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[168] "Rapid Transit," *Public Works*, January 1985, Vertical File- Transportation- Street Railroads, Boulder Carnegie Library.

[169] McGuire and Teed, *The Fruit Belt Route*, 51.

[170] Federal Highway Administration, "State Motor Vehicle Registrations, By Years, 1900-1995."

[171] Fletcher, *Centennial State Trolleys*, 38–135; Feitz, *Colorado Trolleys*, 39.

Figure 18. A Denver Tramway car with a farewell message.[172]

[172] "Good-Bye...," n.d., Denver Tramway Manuscript Collection, Photo Box 1, Album 1, Denver Public Library Western History Collection.